XXIV International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS16)

Report of Contributions

https://indico.desy.de/e/12482

Contribution ID: **0** Type: **not specified**

Conference opening

Monday, April 11, 2016 9:00 AM (10 minutes)

Presenter: Dr BEHNKE, Olaf (DESY)

Session Classification: Plenary

Contribution ID: **1** Type: **not specified**

Parton Density Functions

Monday, April 11, 2016 9:10 AM (30 minutes)

Presenter: NADOLSKY, Pavel (Southern Methodist University)

Session Classification: Plenary

Contribution ID: **2** Type: **not specified**

The HERA Legacy

Monday, April 11, 2016 9:50 AM (30 minutes)

Presenter: NEWMAN, Paul (Birmingham University)

Session Classification: Plenary

Contribution ID: **3** Type: **not specified**

Advances in QCD Predictions

Monday, April 11, 2016 11:00 AM (30 minutes)

Presenter: Prof. GEHRMANN, Thomas (Universitaet Zuerich)

Session Classification: Plenary

Contribution ID: **4** Type: **not specified**

QCD at Colliders

Monday, April 11, 2016 11:40 AM (30 minutes)

Presenter: Dr MUELLER, Katharina (University of Zurich)

Session Classification: Plenary

Contribution ID: **5** Type: **not specified**

Low-x and Diffraction

Monday, April 11, 2016 12:20 PM (30 minutes)

Presenter: FAVART, Laurent (Brussels)

Session Classification: Plenary

Contribution ID: **6** Type: **not specified**

Spin Physics

Monday, April 11, 2016 3:10 PM (30 minutes)

Presenter: SEIDL, Ralf (RIKEN)

Session Classification: Plenary

Contribution ID: **7** Type: **not specified**

Searches Landscape 2016

Monday, April 11, 2016 4:20 PM (30 minutes)

Presenter: KRÄMER, Michael (Aachen)

Session Classification: Plenary

Contribution ID: **8** Type: **not specified**

Higgs and Electroweak results

Monday, April 11, 2016 5:00 PM (30 minutes)

Presenter: KORTNER, Sandra (MPI Munich)

Session Classification: Plenary

Contribution ID: **9** Type: **not specified**

Top Quark Results

Monday, April 11, 2016 5:40 PM (30 minutes)

Presenter: IORIO, Orso (Napoli)

Session Classification: Plenary

Contribution ID: **10** Type: **not specified**

Astro-particle Physics Review

Monday, April 11, 2016 2:30 PM (30 minutes)

Presenter: Dr KNAPP, Johannes (DESY)

Session Classification: Plenary

Contribution ID: **11** Type: **not specified**

Structure functions and PDFs - WG1 Summary

Friday, April 15, 2016 11:30 AM (20 minutes)

Presenters: Dr WICHMANN, Katarzyna (DESY); Prof. THORNE, Robert (University College London); Prof. MCNULTY, Ronan (University College Dublin)

Session Classification: Plenary

Track Classification: Structure Functions and Parton Densities

Contribution ID: **12** Type: **not specified**

QCD - WG2 Summary

Friday, April 15, 2016 11:00 AM (20 minutes)

Presenters: TACKMANN, Frank (DESY); Dr SHIMIZU, Shima (Kobe University); Dr PLÄTZER, Simon (DESY Theory Group)

Session Classification: Plenary

Track Classification: QCD and Hadronic Final States

Contribution ID: **13** Type: **not specified**

BSM and EW - WG3 Summary

Friday, April 15, 2016 9:00 AM (20 minutes)

Presenter: Prof. BLACK, Kevin (Boston University)

Session Classification: Plenary

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **14** Type: **not specified**

Charm, Beauty and Top - WG4 Summary

Friday, April 15, 2016 12:00 PM (20 minutes)

Presenters: Mr MULDERS, Martijn (CERN); STAHLHOFEN, Maximilian (DESY); Mr LISOVYI, Mikhaylo (PI Heidelberg University)

Session Classification: Plenary

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **15** Type: **not specified**

Low-x and Diffraction - WG5 Summary

Friday, April 15, 2016 12:30 PM (20 minutes)

Presenters: Dr BRUNI, Alessia (INFN Bologna); MOTYKA, Leszek (Jagiellonian University); Dr SCHICKER, Rainer (Phys. Inst., Heidelberg)

Session Classification: Plenary

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **16** Type: **not specified**

Spin - WG6 Summary

Friday, April 15, 2016 2:20 PM (20 minutes)

Presenters: Dr NOCERA, Emanuele Roberto (Rudolf Peierls Centre for Theoretical Physics University of Oxford); Dr SEDER, Erin (CEA Saclay DSM/IRFU/SPhN/LSN); Dr FAZIO, Salvatore (Brookhaven National Laboratory); Dr PISANO, Silvia (Laboratori Nazionali di Frascati - INFN)

Session Classification: Plenary

Track Classification: Spin Physics

Contribution ID: **17** Type: **not specified**

Future Colliders and EIC status -WG7 Summary

Friday, April 15, 2016 2:50 PM (30 minutes)

Presenters: GWENLAN, Claire (Oxford); Dr ASCHENAUER, Elke-Caroline (BNL); Dr MELNITCHOUK, Wally (Jefferson Lab)

Session Classification: Plenary

Track Classification: Future Experiments

Contribution ID: **18** Type: **not specified**

Particle Physics Perspective

Friday, April 15, 2016 3:30 PM (30 minutes)

Presenter: Prof. ABRAMOWICZ, Halina (Tel Aviv University)

Session Classification: Plenary

Contribution ID: **19** Type: **not specified**

Report of the IAC

Friday, April 15, 2016 4:10 PM (10 minutes)

Presenter: Prof. LEVY, Aharon (Telo Aviv University)

Session Classification: Plenary

Contribution ID: **20** Type: **not specified**

Report of the LOC - Conference Closing

Friday, April 15, 2016 4:25 PM (10 minutes)

Presenter: Dr BEHNKE, Olaf (DESY)

Session Classification: Plenary

Contribution ID: **25** Type: **not specified**

Progresses on Light hadron spectroscopy

Tuesday, April 12, 2016 2:49 PM (20 minutes)

The BESIII experiment at the electron positron collider BEPCII in Beijing is successfully operating since 2008 and has collected large data samples in the tau-mass region, including the world's largest data samples at the J/ψandψ(2S) resonances. In particular decays of these two resonances provide a rich and clean environment to study hadrons consisting out of light quarks and search for exotics. The BESIII collaboration has recently started a campaign to understand the nature of the X(1835) and Y(2175) resonances, which are debated to be exotic matter. Further, decays of eta' mesons are studied to deepen our knowledge of their structure and possible symmetry breaking effects in their decays. In this presentation recent results of the light hadron physics program will be highlighted.

Primary author: Mr FANG, shuangshi (Institute of High Energy Physics)

Presenter: Dr PELIZAEUS, Marc (Ruhr-University Bochum)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **26** Type: **not specified**

XYZ studies at BESIII

Thursday, April 14, 2016 9:00 AM (15 minutes)

The BESIII Experiment collected large data samples for electron-positron collisions with center-of-mass above 4 GeV during 2013 and 2014. The analysis of these samples has resulted in a number of surprising discoveries, such as the discoveries of the electrically charged "Zc" structures, which, if resonant, cannot be accomodated in the traditional charm quark and anti-charm quark picture of charmonium. In this talk, we will review the current status of the analyses of the Zc structures, as well as a number of other interesting features in the new BESIII data samples.

Primary author: Mr FANG, shuangshi (Institute of High Energy Physics)

Presenter: Dr GUO, Aiqiang (IHEP and DESY)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **27** Type: **not specified**

Charm Physics at BESIII

Tuesday, April 12, 2016 9:40 AM (15 minutes)

The BESIII Experiment at the Beijing Electron Positron Collider (BEPCII) has accumulated the world's largest e+e- collision samples atψ(3770) peak, around theψ(4040) nominal mass, and at the Lambda_c-pair mass threshold which allow us to study decays of charmed mesons and baryons in a uniquely clean background. In this talk, we will review our recent results including: (1) the extractions of the D(s)+ decay constants, the form factors of D semi-leptonic decays, and the CKM matrix elements |Vcs(d)|; (2) the measurements of the strong phase and D0D0-bar mixing parameters using quantum coherence; (3) the determinations of the absolute branching fractions of the hadronic and semi-leptonic decays of Lambdac+.

Primary author: Mr FANG, shuangshi (Institute of High Energy Physics)

Presenter: ZHANG, Yu (UCAS)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **28** Type: **not specified**

Exclusive ρ0 Meson Photoproduction with a Leading Neutron at HERA

Tuesday, April 12, 2016 12:00 PM (15 minutes)

A first measurement is presented of exclusive photoproduction of rho;0 mesons associated with leading neutrons at HERA.
The data were taken with the H1 detector in the years 2006 and 2007 at a centre-of-mass energy of radic;=319 GeV and correspond to an integrated luminosity of 1.16 pb-1.
The rho;0 mesons with transverse momenta p_T<1 GeV are reconstructed from their decays to charged pions, while leading neutrons carrying a large fraction of the incoming proton momentum, x_L>0.35, are detected in the Forward Neutron Calorimeter. The phase space of the measurement is defined by the photon virtuality Q2<2 GeV2, the total energy of the photon-proton system 20<W<100 GeV and the polar angle of the leading neutron theta;_n<0.75 mrad.
The cross section of the reaction gamma;p rarr; rho;0 n pi;+ is measured as a function of several variables. The data are interpreted in terms of a double peripheral process, involving pion exchange at the proton vertex followed by elastic photoproduction of a rho;0 meson on the virtual pion. In the framework of one-pion-exchange dominance the elastic cross section of photon-pion scattering, sigma;_el(gamma;pi;+ rarr; rho;0pi;+), is extracted. The value of this cross section indicates significant absorptive corrections for the exclusive reaction studied.

Primary author: Dr LEVONIAN, Sergey (DESY)

Presenter: Dr LEVONIAN, Sergey (DESY)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **29** Type: **not specified**

Search for QCD Instanton-Induced Processes in DIS at HERA

Tuesday, April 12, 2016 2:25 PM (20 minutes)

Signals of QCD instanton-induced processes are searched for in
deep-inelastic scattering (DIS) at the electron-proton collider HERA in the kinematic region defined by the Bjorken-scaling variable x > 0.001, the inelasticity 0.2< y < 0.7 and the photon virtuality 150 < Q2 < 15000 GeV^2. The search is performed using H1 data corresponding to an integrated luminosity of 350 pb^-1. Several observables of the hadronic final state of the events are exploited to identify a potentially instanton-enriched domain. Two Monte Carlo models, RAPGAP and ARIADNE, are used to estimate the background from the standard DIS processes, and the instanton-induced scattering processes are modeled by the program QCDINS. In order to extract the expected signal a multivariate data analysis technique is used. Exclusion limits on instanton production are reported, excluding cross sections larger than 2 pb. Limits are also reported as a function of parameters used to regularize the perturbative instanton model.

Primary author: Dr H1, Collaboration (DESY)

Presenter: MIKOCKI, Stanislav (Institute of Nuclear Physics Polish Academy of Sciences)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **30** Type: **not specified**

D* Production in diffractive DIS at HERA

Wednesday, April 13, 2016 5:50 PM (15 minutes)

Measurements of open charm production are presented in diffractive deep inelastic scattering (5 < Q2 < 100 GeV2), based on HERA data recorded at √s = 319 GeV with an integrated luminosity of 281 pb-1. The event topology is given by ep ⟶ eXY, where the system X, containing at least one D(2010) meson, is separated from a leading
low-mass proton dissociative system Y by a large rapidity gap. The D candidates are reconstructed fully in the D*+ ⟶ D0 π+ ⟶ (K- π+) π+ (+C.C.) decay channel. The measured differential cross sections are compared at the level of stable hadrons with next-to-leading order QCD predictions obtained in the massive scheme, where the charm quark is produced via the boson-gluon fusion, using diffractive parton densities previously obtained by H1 from fits of the inclusive diffractive cross sections.

Primary author: Dr H1, Collaboration (DESY)

Presenter: CERNY, Karel (Charles University in Prague)

Session Classification: WG4/WG5 joint session (HF+diffraction)

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **31** Type: **not specified**

Jet Production at Low Momentum Transfer at HERA

Tuesday, April 12, 2016 4:30 PM (20 minutes)

The production of inclusive jets as well as of dijet and trijet topologies is investigated at HERA in the domain of low momentum transfer Q2 < 100 GeV2, using the H1 experiment. The new data complement a previous measurement done at higher momentum transfer. The value of the strong coupling constant alpha;_s(M_Z) is extracted and its running is probed.

Primary authors: H1, Collaboration (DESY); BRITZGER, Daniel (DESY)

Presenter: BRITZGER, Daniel (DESY)

Session Classification: WG1/WG2 joint session (QCD and PDF)

Track Classification: QCD and Hadronic Final States

Contribution ID: **32** Type: **not specified**

Fit of electroweak parameters in polarized deep-inelastic scattering using data from the H1 experiment

Wednesday, April 13, 2016 3:00 PM (15 minutes)

Using inclusive DIS cross sections measured with the H1 experiment at HERA, electroweak parameters of the Standard Model are probed. The cross sections were determined using longitudinally polarized lepton beams, which enhances the sensitivity to the vector couplings of the light quarks. The quark couplings and the electroweak mixing angle are probed through the γ/Z interference. This gives access to electroweak parameters in t-channel exchange at virtualities up to 10000 GeV2.

Primary author: BRITZGER, Daniel (DESY)

Presenter: BRITZGER, Daniel (DESY)

Session Classification: WG1/WG3 joint session (EW+PDF)

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **33** Type: **not specified**

Complete off-shell effects for top-antitop + jet production with leptonic decays at the LHC

Wednesday, April 13, 2016 12:00 PM (15 minutes)

We present results for the NLO QCD corrections to the process $pp \to t\bar{t}j \to W^+W^-b\bar{b}j \to e^+\nu_e\mu^-\bar{\nu}_\mu b\bar{b}j + X$, including for the first time the full off-shell effects for top quarks and W bosons: double-, single- and non-resonant contributions at the order {\cal{O}}(\alpha_{s}^4 \alpha^4). Focusing on the case of the LHC at 8 TeV, we analyse numerical results for the total cross section and its scale dependence, and show differential distributions. We also provide an estimate of the impact of the off-shell effects within our study.

Primary authors: Dr BEVILACQUA, Giuseppe (University of Debrecen); Dr HARTANTO, Heribertus Bayu (RWTH Aachen); Dr WOREK, Malgorzata (RWTH Aachen); Mr KRAUS, Manfred (RWTH Aachen)

Presenter: Dr BEVILACQUA, Giuseppe (University of Debrecen)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **34** Type: **not specified**

Measurements of inclusive and differential Drell-Yan cross sections with the ATLAS detector (WG1)

Wednesday, April 13, 2016 2:30 PM (12 minutes)

Precision measurements of the Drell-Yan production of W and Z/gamma*bosons at the LHC provide a benchmark of our understanding of perturbative QCD and probe the proton structure in a unique way.*
The ATLAS collaboration has performed high precision measurements at center-of-mass energies of 7TeV and 8TeV, integrated and as a function of the rapidity and the Z/gamma mass. New measurements at 7 TeV reach unprecedented accuracy in the resonance regions, while the 8 TeV measurements explore the high mass Z/gamma* domain. The measurements are compared to state-of-the-art calculations at NNLO in QCD, combined with various contemporary parton distribution functions and including higher-order electroweak effects. Strong constraints on the parton distribution functions are found.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: YATSENKO, Elena (DESY)

Session Classification: WG1/WG3 joint session (EW+PDF)

Track Classification: Structure Functions and Parton Densities

Contribution ID: **35** Type: **not specified**

Measurements of inclusive W and Z cross sections at 13 TeV with the ATLAS detector (WG1)

Wednesday, April 13, 2016 2:45 PM (12 minutes)

Precision measurements of the Drell-Yan production of W and Z bosons at the LHC provide a benchmark of our understanding of perturbative QCD and electroweak processes and probe the proton structure in a unique way.
The ATLAS collaboration has performed these measurements at a center-of-mass energy of 13 TeV. Ratios of W and Z cross sections and of the W boson charges significantly reduce experimental uncertainties.
In addition, ratios of the cross sections for the production of single Z bosons and top-quark pairs have been derived at various center-of-mass energies.
The measurements are compared to state-of-the-art calculations at NNLO in QCD, combined with various contemporary parton distribution functions and including higher-order electroweak effects.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: Dr PIRUMOV, Hayk (DESY)

Session Classification: WG1/WG3 joint session (EW+PDF)

Track Classification: Structure Functions and Parton Densities

Contribution ID: **37** Type: **not specified**

Measurements of the production of jets in association with a W or Z boson with the ATLAS detector (WG2)

Wednesday, April 13, 2016 9:50 AM (15 minutes)

The production of jets in association with vector bosons is an important process to study QCD in a multi-scale environment. The ATLAS collaboration has performed a first measurement of vector boson+jets cross sections, differential in several kinematic variables, in 3.2 /fb of proton-proton collision data taken in 2015 at center-of-mass energies of 13TeV.
In data corresponding to 20.3 /fb at a centre-of-mass energy of 8TeV, the collaboration has measured the production of vector boson+jets in the presence of a high scale defined by the transverse momentum of the leading jet, which enriches the collinear production of the gauge boson and a jet.
The measurements are compared to state-of-the-art QCD calculations and Monte Carlo simulations.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: Mrs SANDHOFF, Marisa (Bergische Universitaet Wuppertal)

Session Classification: WG2/WG3 joint session (QCD+EW)

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **38** Type: **not specified**

Precision studies of Drell-Yan transverse momentum distributions and the polarisation angular coefficients in Z boson decays with the ATLAS detector (WG2)

Wednesday, April 13, 2016 9:00 AM (20 minutes)

The ATLAS collaboration has performed precision measurements sensitive to the transverse momentum of the Z/gamma*bosons, both directly through the transverse momentum of the di-lepton pair and through the angular decorrelation as measured in the phi* observable. These measurements are sensitive to soft resummation effects and hard jet emissions for small and large momentum transfers, respectively, probing QCD in a unique way.
The studies carried out with 20.3 /fb of data at a center-of-mass energy of 8TeV probe a wide di-lepton invariant mass region from 12 GeV to 150 GeV, both integrated and differential in the di-lepton rapidity. The measurements are compared to a variety of resummation calculations and parton shower Monte Carlos at up to NNLO+NNLL as well as fixed order predictions at NNLO QCD including NLO electroweak corrections.

The precision measurement of angular distributions of the Drell-Yan lepton pairs around the Z-boson mass peak provide a stringent test of the underlying QCD dynamic of the Z-boson production mechanisms through spin-correlation effects between initial and final state.
A measurement is presented of the complete set of eight angular coefficients describing these distributions as determined from 20.3 /fb data collected with the ATLAS detector at a center-of-mass energy of 8 TeV. The measurements are carried out with a fine granularity in the Z boson transverse momentum as well as three coarse Z rapidity intervals. The measurements are compared to precise theory calculations at NNLO in QCD and state-of-the-art MC generation at NLO in QCD. Strong discrimination power between different approaches of the QCD modeling and effects beyond NNLO are found

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: EZHILOV, Aleksei (B.P. Konstantinov Petersburg Nuclear Physics Institute - PNPI)

Session Classification: WG2/WG3 joint session (QCD+EW)

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **39** Type: **not specified**

Measurement of photon production cross sections with the ATLAS detector

Tuesday, April 12, 2016 11:48 AM (20 minutes)

The production of prompt isolated photons at hadron colliders provides a stringent test of perturbative QCD and can be used to probe the gluon density function of the proton.
The ATLAS collaboration has performed precise measurements of the inclusive production of isolated prompt photons in 20.3 /fb of data collected at a center-of-mass energy of 8TeV and in 3.2 /fb of data collected at a center-of-mass energy of 13TeV, differential in both rapidity and the photon transverse momentum. The measurements are compared with state-of-the-art theory predictions at NLO in QCD and with predictions of several MC generators.
If available, further detailed studies of isolated photons and hadronic jets in the 8 TeV data set will be presented. These measurements were carried out in final states with at least one, two or three hadronic jets differential in a wide range of kinematic variables describing the photon+jet production dynamic. Colour-coherence effects were investigated in events with a photon accompanied by two jets.
If available, further studies of production of pairs of isolated photons in the 8 TeV data set will be presented. These measurements are the most precise to data and were carried out both integrated and differential in a wide range of kinematic variables.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: TERRON, Juan (Madrid UA)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **40** Type: **not specified**

Measurement of 4-jet production cross sections and transverse energy correlations with the ATLAS detector

Wednesday, April 13, 2016 3:40 PM (20 minutes)

The production of multi-jet final states at hadron colliders probes pQCD at several mass scales. The processes can also be used to probe the gluon density function of the proton.
The ATLAS collaboration has measured the production of 4-jets final states in in 20.3 /fb of data collected at a center-of-mass energy of 8TeV. The measurements have been performed differentially as a function of a variety of kinematic and topological observables and compared with state-of-the-art theory calculations at NLO in pQCD and with the predictions of several MC generators.
The collaboration has also used multi-jets events in data taken at an effective integrated luminosity of 158 /pb at a center-of-mass energy of 7TeV to measure the transverse energy correlation and its asymmetry and derive a measurement of the strong coupling constant.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: RIDEL, Melissa (LPNHE-Paris)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **42** Type: **not specified**

Measurement of jet properties with the ATLAS detector

Wednesday, April 13, 2016 5:50 PM (20 minutes)

The average charge and the multiplicity of charged hadrons within a jet provide new insights into the modeling of strong interactions. The jet charge can also be used to tag hadronically decaying gauge bosons and the number of charged particles within a jet provides a powerful means to distinguish gluon-initiated from quark-initiated jets.
The ATLAS collaboration has used a selection of di-jet events in 20.3 /fb of data collected at a center-of-mass energy of 8TeV to measure the average charged-particle multiplicity and the transverse-momentum weighted average charge of the hadrons within the jets, separately for the more central and the more forward jet and as a function of the jet transverse momentum.
The results have been compared with calculations at NLO in pQCD and with predictions of MC generators interfaced with various parton distribution functions and underlying-event tunes.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: BEAUCHEMIN, Pierre-Hugues (Tufts University)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **49** Type: **not specified**

Measurements of the charged-particle distributions with the ATLAS detector (WG5)

Thursday, April 14, 2016 12:00 PM (15 minutes)

Inclusive charged-particle measurements at hadron colliders probe the low-energy non-perturbative region of QCD.
The ATLAS collaboration has measured the charged-particle multiplicity and its dependence on transverse momentum and pseudorapidity in special data sets with low LHC beam currents, recorded at center-of-mass energies of 8TeV and 13TeV. The new precise measurements at 8 TeV cover a wide spectrum using charged-particle selections with minimum transverse momentum of both 100MeV and 500MeV and in various phase space regions of low and high charged particle multiplicities. The measurements at 13 TeV present the first detailed studies with a minimum transverse momentum of 500MeV and, if available, will be extended to a lower threshold of 100 MeV.
The measurements are compared with predictions of various MC generators and are found to provide strong constraints on these.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: LUKAS, Wolfgang (University of Innsbruck)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **50** Type: **not specified**

Measurements of the underlying-event properties with the ATLAS detector

Thursday, April 14, 2016 9:40 AM (20 minutes)

A correct modelling of the underlying event in proton-proton collisions is important for the proper simulation of kinematic distributions of high-energy collisions.
The ATLAS collaboration extended previous studies at 7 TeV with a leading track or jet or Z boson by a new study of Drell-Yan events in 1.1 /fb of data collected at a center-of-mass energy of 7TeV. In this new study the distributions of several topological event-shape variables based on charged particles are measured, both integrated and differential in the transverse momentum of the Drell-Yan lepton pair. These measurements are sensitive to the underlying-event as well as the onset of hard emissions. The results have been compared with the predictions of several state-of-the-art MC generators.
The collaboration has also performed a first study of the number and transverse-momentum sum of charged particles as a function of pseudorapidity and azimuthal angle in a special data set taken with low beam currents at a center-of-mass energy of 13TeV.
The results are compared to predictions of several MC generators.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: MILSTEAD, David Anthony (Stockholm University)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **53** Type: **not specified**

Top quark pairproduction crosssection measurements with the ATLAS detector

Wednesday, April 13, 2016 9:20 AM (15 minutes)

Measurements of the inclusive and differential topquark pair cross sections in protonproton collisions at both 8 and 13 TeV
with the ATLAS detector at the Large Hadron Collider are presented. The inclusive measurements reach high precision and are
compared to the best available theoretical calculations. Differential measurements of the kinematic properties of the top quark
production are also discussed. These measurements, including results using boosted tops, probe our understanding of top pair
production in the TeV regime. The results, unfolded to particle and parton level, are compared to Monte Carlo generators
implementing LO and NLO matrix elements matched with parton showers and NNLO QCD calculations.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: Mr AHMED, Hasib (University of Oklahoma)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **54** Type: **not specified**

Measurements of ttbar+X using the ATLAS detector

Wednesday, April 13, 2016 3:10 PM (15 minutes)

The large centreofmass energy available at the protonproton collider LHC allows for the copious production of top quark pairs
in association with other final state particles at high transverse momentum. The ATLAS experiment has measured several final state
observables that are sensitive to additional radiation in top antitop quark final states. Results on the top production in
association with W and Z bosons at both 8 and 13 TeV are presented along with measurements of the cross section for production
with an associated isolated photon at 8 TeV. Analyses probing the top pair production with additional QCD radiation include the
multiplicity of jets for various transverse momentum thresholds in the 13 TeV data. These measurements are compared to modern
Monte Carlo generators based on NLO QCD matrix element or LO multileg matrix elements.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: KHANOV, Alexander (Oklahoma State)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **55** Type: **not specified**

Top quark pair property measurements using the ATLAS detector at the LHC

Wednesday, April 13, 2016 10:00 AM (15 minutes)

Precise measurements of the properties of the top quark test the Standard Model (SM) and can be used to constrain new physics models.
The top quark pair charge asymmetry is an asymmetry predicted to occur beyond leadingorder QCD in the SM, and may be significantly
enhanced by the presence of new physics. The ttbar production charge asymmetry is measured inclusively and differentially using the
8 TeV ATLAS dataset using both the lepton+jets and dilepton channels, including a dedicated measurement for highly boosted topquarks.
The results are in agreement with the SM and are compared to new physics models. The topquark is predicted in the SM to decay almost
exclusively into a W boson and a bquark. We present a wide range of searches for nonSM top quark decays using the 8 TeV ATLAS
dataset, including t->q H, t->q gamma and t->q Z. In addition, measurements of the Whelicity and spin correlations in ttbar
production are presented.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: KAREEM, Mohammad (Georg-August-Universitaet Goettingen)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **56** Type: **not specified**

Measurements of the top quark mass using the ATLAS detector at the LHC

Wednesday, April 13, 2016 11:20 AM (15 minutes)

The latest measurements of the top quark mass using the ATLAS experiment are presented. A measurement based on a multidimensional
template fit that can constrain the uncertainties on the energy measurements of jets is presented and combined with a measurement
using dilepton events. A new measurement of the top quark mass using leptonic kinematic variables is presented. The measurement
uses a novel technique to measure the top quark mass with minimal dependence on hadronic jets. In addition, measurements are
presented that use precision theoretical QCD calculations for both inclusive ttbar production and ttbar production with an
additional jet to extract the top quark mass in the polemass scheme.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: BENDER, Michael (LMU München)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **57** Type: **not specified**

Single Top quark production cross section using the ATLAS detector at the LHC

Wednesday, April 13, 2016 2:30 PM (15 minutes)

Measurements of single topquark production in proton proton collisions are presented. The measurements include the first
such measurements from the 13 TeV ATLAS dataset. In the leading order process, a W boson is exchanged in the tchannel.
The single topquark and antitop total production cross sections, their ratio, as well as a measurement of the inclusive
production cross section is presented. At 8 TeV, differential crosssection measurements of the t-channel process are also
presented, these measurements include limits on anomalous contributions to the Wtb vertex. A measurement of the production
cross section of a single top quark in association with a W boson, the second largest singletop production mode, is also presented.
Finally, evidence for singletop production in the 8 TeV ATLAS dataset is presented. All measurements are compared to stateof
theart theoretical calculations.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: Mr RIECK, Patrick (Humboldt-University of Berlin)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **58** Type: **not specified**

Search for squark and gluino production in hadronic final states

Tuesday, April 12, 2016 11:00 AM (15 minutes)

Weak scale supersymmetry is one of the best motivated and studied extensions of the Standard Model. The recent increase in the center of mass energy of the proton-proton collisions gives a unique opportunity to extend the sensitivity to production of supersymmetric particles at the Large Hadron Collider.
This talk summarises recent ATLAS results on searches for supersymmetric squarks and gluinos, including third generation squarks produced directly or via decay of gluinos. The searches involved final states containing jets (possibly identified as coming from b-quarks), missing transverse momentum and no leptons.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: BESJES, Geert Jan (University of Copenhagen)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **59** Type: **not specified**

Search for squark and gluino production in leptonic final states

Tuesday, April 12, 2016 11:20 AM (15 minutes)

Weak scale supersymmetry is one of the best motivated and studied extensions of the Standard Model. The recent increase in the center of mass energy of the proton-proton collisions gives a unique opportunity to extend the sensitivity to production of supersymmetric particles at the Large Hadron Collider.
This talk summarises recent ATLAS results on searches for supersymmetric squarks and gluinos, including third generation squarks produced directly or via decay of gluinos. The searches involved final states containing jets (possibly identified as coming from b-quarks), missing transverse momentum and leptons.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: KAHN, Sebastien Jonathan (Centre National de la Recherche Scientifique Marseille)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **60** Type: **not specified**

Search for R-parity violating or long-living SUSY particles

Tuesday, April 12, 2016 12:40 PM (15 minutes)

The proton-proton collisions at sqrt{s} = 13 TeV at the LHC have increased the ATLAS sensitivity to production of strongly produced supersymmetric particles. If R-parity is not conserved, these particles may decay to jets and leptons, and lightest supersymmetric particles may decay into many leptons with or without missing transverse momentum. Several supersymmetric models also predict massive long-lived supersymmetric particles. Such particles may be detected through abnormal specific energy loss, appearing or disappearing tracks, displaced vertices, long time-of-flight or late calorimetric energy deposits. The talk presents recent results from searches of supersymmetry in resonance production, R-parity violating signatures and events with long-lived particles with the ATLAS detector using LHC Run 2 data.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: AXEN, Bradley Dean (Lawrence Berkeley National Lab.)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **61** Type: **not specified**

Search for production of SUSY particles produced via electroweak interactions

Tuesday, April 12, 2016 12:00 PM (15 minutes)

Many supersymmetry models feature gauginos and also sleptons with masses less than a few hundred GeV. These can give rise to direct pair production rates at the LHC that can be observed in the data sample recorded by the ATLAS detector. The talk summarises the status of searches for gaugino and slepton pair production in final states with leptons.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: SHEHU, Ciwake (University of Sussex)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **62** Type: **not specified**

Searches for new physics with third generation quarks using the ATLAS detector at the LHC

The presence of fermionic top/bottom quark partners, referred to as
vector-like quarks (VLQs), may be an important ingredient for mechanism to cancel mass divergence for the Higgs boson required for "natural" theories beyond the Standard Model (SM). The VLQs typically couple preferentially to the third generation SM quarks. In addition, there are many extensions of the SM that predict new particles decaying into a pair of top-quarks, such as Kaluza-Klein excitation of the gluon in a Randall-Sundrum model of extra dimensions. This talk highlights recent ATLAS results for new physics involving third generation quarks at LHC Run 2.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: Dr FERRANDO, James (University of Oxford)

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **63** Type: **not specified**

Searches for new physics in high-mass fermionic final states and jets with the ATLAS detector at the LHC

Wednesday, April 13, 2016 11:30 AM (15 minutes)

Many new physics scenarios beyond the Standard Model predict
resonant or non-resonant production of high-transverse momentum fermions or gluons. The high-mass resonant production of bottom-quark pairs is also a good benchmark process for high-pT b-quark tagging. This talk summarizes Run 2 searches for new physics in fermionic final states and jets at the ATLAS experiment in LHC.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: Mr VIAZLO, Oleksandr (Lund University)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **65** Type: **not specified**

Dark Matter searches with Mono-X signatures at the ATLAS experiment

Wednesday, April 13, 2016 11:00 AM (15 minutes)

At the LHC dark matter particles can be produced in association with other particles which mainly come from initial state radiation. Searches for such processes are presented using events with jets, photons or massive gauge bosons recoiling against large missing transverse momentum in ATLAS at 13 TeV. These "mono-X" signatures provide powerful probes to dark matter production at the LHC, allowing to interpret results in terms of simplified models with pair production of WIMPs.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: TOLLEY, Emma Elizabeth (Harvard University)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **66** Type: **not specified**

Search for the 125 GeV Higgs Boson at 13 TeV in the diboson decay channels, by the ATLAS collaboration.

Tuesday, April 12, 2016 9:00 AM (15 minutes)

The ATLAS collaboration has searched for the Standard Model Higgs Boson in the first run-2 data using 3.2 fb^(-1) at 13 TeV. Results are presented in terms of central value and limits on the fiducial and total cross-sections.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: ALCONADA VERZINI, Maria Josefina (Universidad Nacional de La Plata)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **67** Type: **not specified**

Search for the 125 GeV Higgs Boson produced in association with top quarks: final run-1 results and first run-2 results from the ATLAS collaboration.

Tuesday, April 12, 2016 9:40 AM (15 minutes)

The search for the production of the Higgs Boson with a pair of top-anti-top quarks is both very important and very challenging. The final results from run-1 are presented, with about 20 fb^(-1) of data at 8 TeV, as well as first run-2 results with 3.2 fb^(-1) of data at 13 TeV.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: BOUMEDIENE, Djamel Eddine (Univ. Blaise Pascal Clermont-Fe. II)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **68** Type: **not specified**

Search for heavy Higgses and di-Higgs resonances in fermionic decay modes, by the ATLAS collaboration.

Tuesday, April 12, 2016 2:50 PM (15 minutes)

Several "Beyond Standard Model" theories predict the existence of additional heavy Higgs particles or di-Higgs resonances, with sizeable contributions of fermionic decay channels. Searches are presented using the first run-2 data of 3.2 fb^(-1) at 13 TeV.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: DUSCHINGER, Dirk (TU Dresden)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **71** Type: **not specified**

Jet measurements in p+Pb and Pb+Pb with the ATLAS Experiment at the LHC

Tuesday, April 12, 2016 11:00 AM (20 minutes)

Jets provide a powerful tool for probing the dynamics of the quark-gluon plasma created in Pb+Pb collisions at the LHC. The modification of high-pT jets as they propagate in the quark-gluon plasma provides insight on structure of the plasma at short-length scale. Such modifications have been observed in a variety of measurements of single jet, dijet, photon-jet and charged-particle fragmentation functions. Recent results of modifications of jets in proton-lead and Pb+Pb collisions will be presented.

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: Dr SANTOS, Helena (LIP - Lisboa)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **72** Type: **not specified**

Measurement of the ridge correlations in pp and pPb collisions with the ATLAS detector at the LHC

Tuesday, April 12, 2016 9:40 AM (20 minutes)

ATLAS measurement of azimuthal correlations between particle pairs at large pseudorapidity separation in pp and pPb collisions are presented. The data were collected using a combination of the minimum-bias and high track-multiplicity triggers. A detailed study of the dependence of two-particle correlations on the charged particle multiplicity, transverse momentum of the pair constituents and the pseudorapidity separation between particles forming a pair is shown. Measurements of multi-particle cumulants in the azimuthal angles of produced particles in wide pseudorapidity ($|\eta|<2.5$) and multiplicity ranges, with the aim to extract a single particle anisotropy coefficient, v1-v5, are also presented. These measurements can help to understand the origin of the long-range correlations seen in high-multiplicity pp and p+Pb collisions.

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: BURKA, Klaudia (Polish Academy of Sciences)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **73** Type: **not specified**

Vector boson and Charmonium production in proton-lead and lead-lead collisions with ATLAS at the LHC

Wednesday, April 13, 2016 11:00 AM (15 minutes)

Photons and weak bosons do not interact strongly with the dense and hot medium formed in the nuclei collisions, thus should be sensitive to the nuclear modification of parton distribution functions (nPDFs). The in-medium modification of heavy Charmonium states plays an important role in studying the hot and dense medium formed in the larger collision systems. The ATLAS detector, optimized for searching new physics in proton-proton collisions, is especially well equipped to measure photons, Z, W bosons and quakonium in the high occupancy environment produced in heavy ion collisions. We will present recent results on the prompt photon, Z and W boson yields as a function of centrality, transverse momentum and rapidity, from the ATLAS experiment.

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: KOHLER, Markus Konrad (Weizmann Institute of Science)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **74** Type: **not specified**

J/psi and Upsilon production cross-sections at the ATLAS experiment

Thursday, April 14, 2016 10:00 AM (15 minutes)

New measurements of prompt and non-prompt J/psi and of Upsilon production at a centre-of mass energy of 13 TeV are presented. Comparisons with theoretical predictions and precision measurements made at energies of 2.76, 7 and 8 TeV are discussed.

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: CHEATHAM, Susan (Lancaster)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **75** Type: **not specified**

X(3872) and its bottomonium counterpart at ATLAS

Thursday, April 14, 2016 9:40 AM (15 minutes)

We present the measurement of the differential cross-section of the X(3872) state through its decays to J/psi pi pi final state . The cross-section was extracted for both prompt and non-prompt production. The existence of the X(3872) suggests the presence of its bottomonium counterpart X_b. Search for X_b with the ATLAS experiment in several final states, including Upsilon pi pi, is presented.

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: KORDAS, Konstantinos (Aristotle Univ. of Thessaloniki)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **76** Type: **not specified**

Recent results on B-Physics and Quarkonia with the ATLAS detector

Tuesday, April 12, 2016 3:10 PM (15 minutes)

This talk will report on four measurement recently completed by ATLAS:
(a) the decay of Lambda_b into Lambda and psi(2S), observed for the first time and compared to the decay into Lambda and J/psi;
(b) the decay of Bc into J/psi Ds and J/psi Ds*, including the first polarisation measurement for the latter channel;
(c) the measurement of the ratio of the fragmentation fraction f_s/f_d, which complements a previous measurement of LHCb over a different range of pT and y;
(d) B+ mass reconstruction in the decay of B+ to J/psi and K+ at ATLAS at 13 TeV pp collisions;
(e) Measurement of the differential non-prompt Jpsi production fraction at 13 TeV

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: MAEVSKIY, Artem (M.V. Lomonosov Moscow State University)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **77** Type: **not specified**

Mixing and CP-violation in the Bd and Bs systems

Tuesday, April 12, 2016 11:20 AM (15 minutes)

Search for deviations from the standard model is performed in the systems of the neutral B mesons. The Bs system is studied in the decay into J/psi phi. The mixing phase phi_s and the width difference DeltaGamma_s are determined through the simultaneous study of angular distributions in the final state and of the decay time, performed together with flavor tagging at production. ÊThe measurement performed by ATLAS with the full LHC Run-1 sample is discussed and compared to the previous world average.
The width difference DeltaGamma_d in the Bd system is obtained from the comparison of the decay time distributions in the flavor specific state J/psi K* and in the CP eigenstate J/psi KS. The result obtained from the full sample of data collected by ATLAS at 7 and 8 TeV is the most accurate single measurement of the width difference currently available.

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: BORISOV, Guennadi (Lancaster)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **78** Type: **not specified**

Search for new physics in rare and semi-rare decays of B-mesons

Tuesday, April 12, 2016 12:00 PM (15 minutes)

Processes involving the FCNC transitions in b-hadron decays are suppressed in the SM and are sensitive to new physics.
New results in the search for the rare decays of Bs and Bd into mu+mu- are presented. They are based on the full sample of data collected by ATLAS at 7 and 8 TeV of collision energy. The consistency with the SM and with other available measurements is discussed.
The properties of the decay of the Bd meson into K*mu+mu- are relevant because of possible deviations from the standard model observed by LHCb. We present recent results obtained by ATLAS, concerning the angular distribution parameters FL, S_i and P_i in the region Q^2(mu+mu-)<6 Gev^2,

Primary author: Dr MARTI, Salvador (IFIC-Valencia (UVEG-CSIC))

Presenter: BEVAN, Adrian John (London QUML)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **79** Type: **not specified**

High-luminosity LHC prospects with the upgraded ATLAS detector

Thursday, April 14, 2016 9:46 AM (20 minutes)

Run-I at the LHC was very successful with the discovery of a new boson with properties compatible with those of the Higgs boson predicted by Standard Model. Precise measurements of the boson properties, and the discovery of physics beyond the Standard Model, are primary goals of the just restarted LHC running at 13 TeV collision energy and all future running at the LHC. The physics prospects with a pp centre-of-mass energy of 14 TeV are presented for 300 and 3000 fb-1 at the
high-luminosity LHC. The ultimate precision attainable on measurements of the couplings of the 125 GeV boson to elementary fermions and bosons is discussed, as well as perspectives on the searches for partners associated with it.
Supersymmetry is one of the best motivated extensions of the Standard Model. The current searches at the LHC have yielded sensitivity to TeV scale gluinos and 1st and 2nd generation squarks, as well as to 3rd generation squarks and electro-weakinos in the hundreds of GeV mass range. Benchmark studies are presented to show how the sensitivity improves at the future LHC runs. A considerable fraction of the parameter space for a wide variety of other BSM models has been probed with the 8 TeV data and initial 13 TeV data. The prospects of searches for new heavy bosons and dark matter candidates at 14 TeV are explored as well as the sensitivity of searches for anomalous top decays and di-boson production.
For all these studies, a parameterised simulation of the upgraded ATLAS detector is used, taking into account the expected pileup conditions.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: SLAWINSKA, Magdalena (Nikhef National institute for subatomic physics)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **80** Type: **not specified**

Double Parton Scattering effects in 4 jet production at the LHC

Thursday, April 14, 2016 11:24 AM (20 minutes)

We study both the single and double parton scattering contributions to 4 jet production in kt-factorization using off-shell matrix elements and KMR PDFs. We compare them to the collinear case and find that the expected relevance of the Double Parton Scattering contribution is tamed in the kt-factorization framework: in particular, kinematic cuts should be chosen carefully as we thoroughly discuss.

Primary author: Dr SERINO, Mirko (Institute of Nuclear Physics, PAN, Cracow)

Presenter: Dr SERINO, Mirko (Institute of Nuclear Physics, PAN, Cracow)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **81** Type: **not specified**

Altarelli prize ceremony

Friday, April 15, 2016 9:30 AM (10 minutes)

Session Classification: Plenary

Contribution ID: **82** Type: **not specified**

Altarelli prize talk (a)

Friday, April 15, 2016 9:45 AM (15 minutes)

Presenter: KRETZSCHMAR, Jan (University of Liverpool)

Session Classification: Plenary

Contribution ID: **84** Type: **not specified**

Statistical Hadronisation in ep, ee, pp and AA Collisions

Tuesday, April 12, 2016 10:05 AM (20 minutes)

It has been shown that power-law hadron spectra observed in jets stemming from high-energy ee and pp collisions can be described by a statistical hadronisation model based on microcanonical statistics and superimposed Negative-Binomial (NBD) multiplicity fluctuations [1,2,3]. In this talk, applications of this model to ep DIS are discussed: fits to fragmentation functions and multiplicity distributions are presented. Besides, applications of such fragmentation model to heavy-ion collisions are also discussed based on [4,5].

Refs.:
[1] Phys. Lett. B, 718 (2012) 125-129, arXiv:1204.1508
[2] Phys. Lett. B, 701 (2011) 111-116, arXiv:1101.3023
[3] Acta Phys.Polon.Supp. 5 (2012) 363-368
[4] Phys.Lett. B689 (2010) 14-17, arXiv:0911.1411
[5] J.Phys.Conf.Ser. 612 (2015) 1, 012048

Primary author: URMOSSY, Karoly (Shandong University, Jinan China; Wigner RCP Hungary)

Presenter: URMOSSY, Karoly (Shandong University, Jinan China; Wigner RCP Hungary)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **85** Type: **not specified**

Top quark event modelling and generators in CMS

Wednesday, April 13, 2016 3:30 PM (15 minutes)

State-of-the-art theoretical predictions accurate to next-to-leading order QCD interfaced with Pythia8 and Herwig++ event generators are tested by comparing the unfolded ttbar differential data collected with the CMS detector at 8 TeV. These predictions are also compared with the underlying event activity distributions in ttbar events using CMS proton-proton data collected in 2015 at a center of mass energy of 13 TeV.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: BILIN, Bugra (Middle East Technical University, Physics Department in Ankara, Turkey.)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **86** Type: **not specified**

Top quark cross section measurements with CMS

Wednesday, April 13, 2016 9:00 AM (15 minutes)

Measurements of the inclusive and differential top quark pair production cross section at 7 TeV, 8 TeV and 13 TeV are presented, performed using CMS data collected in 2011, 2012 and 2015. The total cross section is measured in the lepton+jets, dilepton and fully hadronic channels, including the tau-dilepton and tau+jets modes. Indirect constraints on both the top quark mass and alpha_s are obtained through their relation to the inclusive cross section. First measurements of top quark pair production with additional b-quarks in the final state are also presented. Differential cross sections are measured and are given as functions of various kinematic observables, including the transverse momentum and rapidity of the (anti)top quark and the top-antitop system and the jets and leptons of the event final state. Multiplicity and kinematic distributions of the jets produced in addition to the top pair are also investigated. The results are combined and confronted with precise theory calculations.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Mr BARTOSIK, Nazar (DESY)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **87** Type: **not specified**

Top quark mass measurements with CMS

Wednesday, April 13, 2016 11:40 AM (15 minutes)

Measurements of the top quark mass are presented, obtained from CMS data collected in proton proton collisions at the LHC at centre-of-mass energies of 7 TeV and 8 TeV. The mass of the top quark is measured using several methods and channels, including the reconstructed invariant mass distribution of the top quark, an analysis of endpoint spectra as well as measurements from shapes of top quark decay distributions. The dependence of the mass measurement on the kinematic phase space is investigated. The results of the various channels are combined and compared to the world average. The top mass and also alpha_s are extracted from the top pair cross section measured at CMS.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Mr SPANNAGEL, Simon (DESY - CMS)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **88** Type: **not specified**

Single top quark production with CMS

Wednesday, April 13, 2016 2:50 PM (15 minutes)

Measurements of single top quark production are presented, performed using CMS data collected in 2011, 2012 and 2015 at centre-of-mass energies of 7, 8 and 13 TeV respectively. The cross sections for the electroweak production of single top quarks in the t-channel and in association with W-bosons is measured and the results are used to place constraints on the CKM matrix element Vtb. In the t-channel the ratio of top and anti-top production cross sections is determined and compared with predictions from different parton density distribution functions. In the same channel, the inclusive cross-section in the fiducial volume is also measured. Measurements of top quark properties in single top quark production are also presented, such as the top-quark polarisation, the probe of tWb vertex through the W-helicity measurement in top quark decay and the searched for anomalous couplings to gluons, photons or Z bosons. A search for the s-channel is also performed.

Primary author: Prof. CMS, Collaboration (CInco)

Presenter: MITRA, Soureek (Tata Institute of Fundamental Research in Mumbai, India)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **89** Type: **not specified**

Measurements of the top-quark properties in the production and decays of ttbar events at CMS

Wednesday, April 13, 2016 9:40 AM (15 minutes)

Measurements of several top-quark properties are presented, obtained from the CMS data collected at various centre-of-mass energies. The results include measurements of the top pair charge asymmetry, the W helicity in top decays, the top quark charge, the ttbar spin correlation, of the top polarisation and the search for anomalous couplings. The results are compared with predictions from the standard model as well as new physics models. The cross section of ttbar events produced in association with a W, Z boson or a photon is also measured.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: POYRAZ, Deniz (Ghent University in Ghent, Belgium)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **90** Type: **not specified**

Distributions of charged particles at 13 TeV with CMS

Thursday, April 14, 2016 12:20 PM (15 minutes)

Pseudorapidity and transverse momentum distributions of charged-particles produced in pp collisions at 13 TeV will be presented for different event categories: an inclusive, inelastic enhanced, SD enhanced and NSD enhanced event samples. The measurements are compared to MC predictions tuned to describe the Underlying Event properties at 7 TeV.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Mr GRADOS LUYANDO, Juan Manuel (DESY)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **91** Type: **not specified**

Jet measurements at 2.76, 7 and 8 TeV from CMS

Tuesday, April 12, 2016 4:55 PM (20 minutes)

We present recent jets results from CMS at at 2.76, 7 and 8 TeV and show comparison to theory calculations. Inclusive jet cross sections as well as azimuthal correlations between jets are presented.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Mr GUNNELLINI, Paolo (Deutsches Elektronen Synchrotron (DESY))

Session Classification: WG1/WG2 joint session (QCD and PDF)

Track Classification: QCD and Hadronic Final States

Contribution ID: **92** Type: **not specified**

PDF constraints and a_s results from CMS

Tuesday, April 12, 2016 5:20 PM (20 minutes)

We present and discuss the impact of the most recent CMS data on the precision measurement of a_s and parton density functions.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Mr EREN, Engin (DESY)

Session Classification: WG1/WG2 joint session (QCD and PDF)

Track Classification: QCD and Hadronic Final States

Contribution ID: **94** Type: **not specified**

Multiboson measurements from CMS (Run I)

Tuesday, April 12, 2016 5:30 PM (15 minutes)

Overview of the latest legacy measurements of multibosons with CMS

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: LI, Jing (Peking University in Beijing, China)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **95** Type: **not specified**

Multiboson measurements from CMS (Run II)

Tuesday, April 12, 2016 5:50 PM (15 minutes)

Early results from Run II multiboson measurements with CMS

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: COUBEZ, Xavier (Institut Pluridisciplinaire Hubert Curien, IN2P3-CNRS - ULP, UHA Mulhouse in Strasbourg, France)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **96** Type: **not specified**

V+jets from CMS

Wednesday, April 13, 2016 10:10 AM (15 minutes)

Run I & II measurements of a vector boson (V=W, Z and photon) produced in association with jets from CMS

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Mr ZHANG, Fengwangdong (CERN)

Session Classification: WG2/WG3 joint session (QCD+EW)

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **97** Type: **not specified**

Vector boson (W, Z) studies with CMS

Wednesday, April 13, 2016 9:25 AM (20 minutes)

Run I & II electroweak studies of vector boson production

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Dr HAN, Ji Yeon (University of Rochester in Rochester, NY, United States)

Session Classification: WG2/WG3 joint session (QCD+EW)

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **99** Type: **not specified**

Search for SM and MSSM dimuon Higgs decay channel with CMS

Tuesday, April 12, 2016 9:20 AM (15 minutes)

The search for the Higgs boson dimuon decay in standard model (SM) and its minimal supersymmetric extension (MSSM) based on the proton-proton collision data collected with the CMS detector at LHC is presented. To enhance the sensitivity of the search, events are categorised according to different production mechanisms and the dimuon invariant mass. Upper limits on the production cross section at 95% confidence level are reported for Higgs bosons masses in the range from 120 to 150 GeV for the SM search while for the MSSM case the mass range is extended from 115 to 300 GeV. An independent model search in the dimuon final state is also presented. The limits in the independent model search cover the mass range from 115 GeV to 500 GeV.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Dr PERIEANU, Adrian (CMS)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **100** Type: **not specified**

Exclusive pi+ pi- production at 7TeV

Tuesday, April 12, 2016 5:10 PM (15 minutes)

We report a measurement of exclusive pion pair production in proton-proton collisions, dominated by $p + p \to p^{(*)} + \pi^+\pi^- + p^{(*)}$, where the $\pi^+\pi^-$ pair is produced at central rapidities y and the incident protons stay intact or dissociate without being detected. The measurement is performed with the CMS detector at the LHC, using an integrated luminosity of 450~μb^{-1} collected at a center-of-mass energy of $\sqrt{s}$ = 7 \TeV in 2010. The cross section measured in the phase space defined by $p_T(\pi) > 0.2$~GeV/c and $|y(\pi)| < 2$ is $20.5 \ \pm 0.3\ (stat) \ \pm 3.1\ (syst) \ \pm \ 0.8\ (lumi)\ \mu b$. The differential $\pi^+\pi^-$ cross sections as a function of invariant mass, p_T, and y, and the single π cross section as a function of p_T, are also shown and compared to model predictions.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: KHAKZAD, Mohsen (Institute for Studies in Theoretical Physics & Mathematics (IPM) in Tehran, Iran)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **101** Type: **not specified**

Soft and Hard Diffraction at 7TeV observed with CMS

Thursday, April 14, 2016 11:20 AM (15 minutes)

The measurement of the soft diffractive cross sections in single- and double-diffractive final states is presented at 7TeV. Furthermore, also the jet-gap-get production is discussed.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Dr RUSPA, Marta (Univ Piemonte Orientale)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **102** Type: **not specified**

Exclusive production observed at the CMS experiment

Tuesday, April 12, 2016 4:30 PM (15 minutes)

Exclusive W+ W- pair production in photon-photon collisions during the pp runs at 7 and 8TeV are observed and used to put constraints on the Anomalous Quartic Gauge Couplings. During the proton lead collisions in photon-induced vector meson production is observed via the decay of Ypsilon into two muons. The slope of the squared pT distribution is measured to determine the size of the production region.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: CHUDASAMA, Ruchi (Bhabha Atomic Research Centre in Mumbai, India)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **103** Type: **not specified**

Results from combined CMS-TOTEM data

Thursday, April 14, 2016 12:40 PM (15 minutes)

The successful combined data taking of the CMS and TOTEM experiments allows to characterize hadronic final states of an extremely wide pseudo-rapidity range. The measurement of the charged particles distributions over |eta<6.6| is a very important example that puts strong constraints on interaction models.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: SEN, Sercan (Istanbul Technical University in Istanbul, Turkey)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **104** Type: **not specified**

Multi-jet production and jet correlations at CMS

Wednesday, April 13, 2016 3:15 PM (20 minutes)

Hadronic jet production at LHC is an excellent testing ground for QCD. Essential components of QCD, necessary for the description of hadronic jet data, are hard parton radiation and multiple parton interactions. The importance of these components increases for final states including multiple jets. We will show results of one observables sensitive to the hard parton radiation, which is the azimuthal correlation between jets. Measurements of multi-jet production in specific topologies is particularly sensitive to multiple parton interactions. In this report measurements of multi-jet production performed with the CMS detector at LHC with pp collision data are summarized.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: VERES, Gabor (CERN)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **105** Type: **not specified**

Measuremennt of the inelastic cross section at 13TeV

Thursday, April 14, 2016 11:40 AM (15 minutes)

The inelastic hadronic cross section is measured at 13TeV with the CMS experiment. Different detectors are used to study the dependence on the proton momentum loss, xi. The result is given in different visible acceptance regions as well as extrapolated to the full acceptance.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Dr VAN HAEVERMAET, Hans (DESY/University of Antwerp)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **106** Type: **not specified**

Very forward energy distributions and jet production observed with CASTOR in CMS

Thursday, April 14, 2016 9:00 AM (15 minutes)

The distribution of electromagnetic and hadronic energy in the very forward phase-space is measured with the CASTOR calorimeters located at a pseudorapidity of -5.2 to -6.6 in the very forward region of CMS. The energy distributions are very powerful benchmarks to study the performance of MPI in hadronic interactions models at 13TeV collision energy. Furthermore, also the jet-spectra for very low-pt jets in 7 and 13TeV pp collisions are obtained with CASTOR and compared to model predictions.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: VAN SPILBEECK, Alex Beaudoin E (Universiteit Antwerpen in Wilrijk, Belgium)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **107** Type: **not specified**

Forward energy density per pseudorapdidty and limiting fragmentation studied with CMS at 13TeV

Thursday, April 14, 2016 9:20 AM (15 minutes)

The forward (HF) and very-forward (CASTOR) calorimeters of CMS are used to measure the density of energy per unit of pseudorapiditdy up to eta of 6.6 at 13TeV. The measurements are compared to model predictions. Furthermore, the corresponding data of transverse energy are compared to CMS measurements at lower center-of-mass energies, where all data are shifted by the beam rapidity. The result is a demonstration of limiting fragmentation in pp collisions over a wide range of energies.

Primary author: Prof. CMS, COllaboration (CINCO)

Presenter: KATKOV, Igor (DESY)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **108** Type: **not specified**

Measurement of the underlying event at 13TeV with the CMS experiment

Thursday, April 14, 2016 9:15 AM (20 minutes)

The measurements of the underlying events (UE) in the event topology of leading jet and leading track are presented. UE activities are quantified in term of particle and energy density. The UE observables are calculated in the transverse region with respect to the direction highest pT jet/track. These UE observables are measured as a as function of the pT of the leading track and jet.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Prof. SOLANO, Ada (Torino University and INFN)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **109** Type: **not specified**

Double parton scattering results obtained by CMS

Thursday, April 14, 2016 11:00 AM (20 minutes)

The double parton scattering (DPS) in proton-proton collisions at a center-of-mass energy of 8 TeV has been investigated using various final states. Multi-Jet, including b-jets, photon-jets as well as same-sign W bosons with each W boson decaying into muon and associated neutrino. The observables most sensitive to double parton scattering are defined and studied. A multivariate analysis is developed in order to enhance the DPS sensitivity. A limit on the DPS yield has been evaluated.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: ALVES, Gilvan Augusto (Centro Brasileiro de Pesquisas Fisicas in Rio de Janeiro, Brazil)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **110** Type: **not specified**

Resummations in PDF fits

Wednesday, April 13, 2016 4:30 PM (15 minutes)

I will discuss the inclusion in PDF fits of two resummations in QCD: threshold (large x) and high-energy (small x). I will present published results for threshold resummation on a global NNPDF, and implication for phenomenology (as well as future plans).
I will then show preliminary results on the effect of resumming small-x logarithms in PDF fits, again in the context of the NNPDF methodology.

Primary author: Dr BONVINI, Marco (University of Oxford)

Presenter: Dr BONVINI, Marco (University of Oxford)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **111** Type: **not specified**

Factorization and resummation for massive quark effects in exclusive Drell-Yan

Wednesday, April 13, 2016 11:30 AM (20 minutes)

Exclusive 0-jet processes at hadron colliders are nowadays studied at an unprecedented precision in theory and experiment. Within the framework of Soft-Collinear Effective Theory we discuss how to incorporate massive bottom quark effects in the resummed cross section for Drell-Yan, where as specific examples for a measured exclusive observable we consider the transverse momentum of the electroweak boson and beam thrust. At NNLL' order, i.e. including matrix elements at O(alphas^2) and NNLL resummation, one has to account for both heavy quark initiated (primary) corrections to the hard scattering process as well as secondary radiation effects. The theoretical description depends on the hierarchy between the involved scales, ranging from the decoupling limit for large masses to the massless limit for small masses, and involves quark mass dependent beam functions/TMDs and soft functions in between.

Primary authors: SPIERING, Anne (HU Berlin); SAMITZ, Daniel (University of Vienna); TACKMANN, Frank (DESY); PIETRULEWICZ, Piotr (DESY)

Presenter: PIETRULEWICZ, Piotr (DESY)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **112** Type: **not specified**

Combined QCD and electroweak analysis of HERA data

Wednesday, April 13, 2016 3:20 PM (15 minutes)

A simultaneous fit of parton distribution functions (PDFs) and electroweak parameters to HERA data on deep inelastic scattering is presented. The input data are the neutral current and charged current inclusive cross sections which were previously used in the QCD analysis leading to the HERAPDF2.0 PDFs. In addition, the polarisation of the electron beam was taken into account for the ZEUS data recorded between 2004 and 2007. Results on the vector and axial-vector couplings of the Z boson to u- and d-type quarks, on the value of the electroweak mixing angle and the mass of the W boson are presented. The values obtained for the electroweak parameters are in agreement with Standard Model predictions. The resulting sets of PDFs, ZEUS-EW, are in agreement with HERAPDF2.0 and give a good description of ZEUS data with polarisation taken into account.

Primary authors: WING, Matthew (UCL); Mr MYRONENKO, Volodymyr (DESY)

Presenter: Mr MYRONENKO, Volodymyr (DESY)

Session Classification: WG1/WG3 joint session (EW+PDF)

Track Classification: Structure Functions and Parton Densities

Contribution ID: **113** Type: **not specified**

Search for a narrow baryonic state decaying to pKS0 and \bar{p}KS0 in deep inelastic scattering with the HERA II data

Tuesday, April 12, 2016 3:13 PM (20 minutes)

A search for a narrow baryonic state in the pKS0 and \bar{p}KS0 system has been performed in ep collisions at HERA with the ZEUS detector using an integrated luminosity of 358 pb−1 taken in 2003-2007. The search was performed with deep inelastic scattering (DIS) events at an ep centre-of-mass energy of 318 GeV for exchanged photon virtuality, Q2, between 20 and 100 GeV2. Contrary to evidence presented for such a state around 1.52 GeV in a previous ZEUS analysis using a sample of 121 pb−1, taken in 1995−2000, no resonance peak is found in the p(\bar{p})KS0 invariant-mass distribution in the range 1.45−1.7 GeV. Upper limits on the production cross section are set for different assumptions on the width of the resonance.

Primary authors: WING, Matthew (UCL); Mr HORI, Ryuma (KEK)

Presenter: Mr HORI, Ryuma (KEK)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **114** Type: **not specified**

Prompt photon production in deep inelastic scattering at HERA

Tuesday, April 12, 2016 12:12 PM (20 minutes)

Following earlier measurements of prompt photon production in DIS, the ZEUS collaboration at HERA presents measurements of new kinematic variables. These include the azimuthal separations of the recoil electron, the outgoing photon and an accompanying jet, and the fraction of the incoming virtual photon energy that is taken by the outgoing photon and the jet.

Primary authors: WING, Matthew (UCL); Ms HLUSHCHENKO, Olena (ZEUS, qcd working group)

Presenter: Ms HLUSHCHENKO, Olena (ZEUS, qcd working group)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **115** Type: **not specified**

Measurement of the cross-section ratio sigma(psi(2S))/sigma(J/psi(1S)) in deep inelastic exclusive ep scattering at HERA

Tuesday, April 12, 2016 11:20 AM (15 minutes)

The exclusive deep inelastic electroproduction of psi(2S) and J/\psi(1S) at an ep centre-of-mass energy of 317 GeV has been studied with the ZEUS detector at HERA in the kinematic range 2 < Q2 < 80 GeV2, 30 < W < 210 GeV and |t| < 1 GeV2, where Q2 is the photon virtuality, W is the photon–proton centre-of-mass energy and t is the squared four-momentum transfer at the proton vertex. The data for 2 < Q2 < 5 GeV2 were taken in the HERA I running period and correspond to an integrated luminosity of 114 pb-1. The data for 5 < Q2 < 80 GeV2 are from both HERA I and HERA II periods and correspond to an integrated luminosity of 468 pb-1. The decay modes analysed were mu+ mu- and J/psi(1S) pi+ pi- for the psi(2S) and mu+ mu- for the J/psi(1S). The cross-section ratio sigma(psi(2S))/sigma(J/psi(1S)) has been measured as a function of Q2, W, and t. The results are compared to predictions of QCD-inspired models of exclusive vector-meson production.

Primary authors: WING, Matthew (UCL); Ms KOVALCHUK, Nataliia (UNI/EXP CMS)

Presenter: Ms KOVALCHUK, Nataliia (UNI/EXP CMS)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **117** Type: **not specified**

Limits on the effective quark radius from inclusive ep scattering at HERA

Thursday, April 14, 2016 9:40 AM (15 minutes)

The high precision HERA combined measurement of inclusive deep inelastic cross sections in neutral and charged current ep scattering, corresponding to a luminosity of about 1 fb-1, permits searches for new contributions to electron-quark scattering beyond the Standard Model up to TeV scales. A new approach to beyond the Standard Model analysis of the inclusive ep data is presented; simulataneous fits of parton distribution functions and contributions of "new physics" processes were performed. Results are presented considering a finite radius of quarks within the quark form-factor model. The resulting 95% C.L. upper limit on the effective quark radius is 0.43 x 10^-16 cm.

Primary authors: WING, Matthew (UCL); Mr TURKOT, Oleksii (DESY)

Presenter: Mr TURKOT, Oleksii (DESY)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **118** Type: **not specified**

Bottom-quark mass effects in bbH production.

Tuesday, April 12, 2016 5:50 PM (15 minutes)

After carefully explaining how fixed and variable flavour schemes arise in the context of DIS, I will discuss how one can consistently combine the merits of the two. The final matched result includes the full power corrections of the fixed-flavour scheme and resums the potentially large logs. I will then talk about the application of this approach to the case of bbH at the LHC and present a fair and thorough comparison to the other existing predictions in the literature.

Primary author: PAPANASTASIOU, Andrew (Cavendish Laboratory, University of Cambridge)

Co-author: BONVINI, Marco (University of Oxford)

Presenter: PAPANASTASIOU, Andrew (Cavendish Laboratory, University of Cambridge)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **119** Type: **not specified**

Exploring Anomalous $HZ\gamma$ Couplings in γ-proton Collisions at the LHC

Wednesday, April 13, 2016 5:10 PM (15 minutes)

The anomalous $HZ\gamma$ couplings, which are dominated by the new physics effects, through the process $pp \to p\gamma p \to pHX$ at the LHC are studied. To this purpose, an effective Lagrangian, in a model independent approach, with dimension six operators is considered in this paper. New interaction terms regarding beyond the standard model physics include the Higgs particle anomalous vertices in both CP-even and CP-odd structures. A detailed numerical analysis is performed to scrutinize the accurate constraints on the effective $HZ\gamma$ couplings and to discus how far the corresponding bounds can be improved. This is achieved by testing all the possible Higgs decay channels and increasing the luminosity at three different forward detector acceptance regions. The numerical results propose that the Higgs photoproduction at the LHC, as a complementary channel, has a great potential of exploring the $HZ\gamma$ couplings.

Primary author: Dr TAHERI MONFARED, Sara (IPM)

Co-authors: Dr MOHAMMADI NAJAFABADI, Mojtaba (IPM); Dr FAYAZBAKHSH, Shima (IPM)

Presenter: Dr TAHERI MONFARED, Sara (IPM)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **120** Type: **not specified**

The atmospheric prompt neutrino flux revisited

Thursday, April 14, 2016 11:00 AM (15 minutes)

I will present a state-of-the-art prediction for the prompt atmospheric neutrino flux in the framework of perturbative QCD. The calculation was performed using a gluon PDF constrained at small-x by the inclusion of charm production measurements from the LHCb experiment at 7 TeV, and recently validated with the corresponding 13 TeV data [arXiv:1511.06346, arXiv:1506.08025]

Primary author: Mr ROTTOLI, Luca (University of Oxford)

Presenter: Mr ROTTOLI, Luca (University of Oxford)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **121** Type: **not specified**

Threshold resummation for polarized high-p_T hadron production at COMPASS

Wednesday, April 13, 2016 10:10 AM (15 minutes)

We study the cross section for the photoproduction process gamma N -> h X where the incident photon and nucleon are longitudinally polarized and a hadron h is observed at high transverse momentum. Specifically, we address the "direct" part of the cross section, for which the photon interacts in a pointlike way. For this contribution we perform an all-order resummation of logarithmic threshold corrections generated by soft or collinear gluon emission to next-to-leading logarithmic accuracy. We present phenomenological results relevant for the COMPASS experiment and compare to recent COMPASS data.

Primary author: Ms UEBLER, Claudia (University of Regensburg)

Presenter: Ms UEBLER, Claudia (University of Regensburg)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **122** Type: **not specified**

Combined analysis of charm-quark fragmentation-fraction measurements

Tuesday, April 12, 2016 4:30 PM (15 minutes)

A summary of measurements of the fragmentation of charm quarks into a specific hadron is given. Measurements performed in photoproduction and deep inelastic scattering in e+-p, pp and e+e- collisions are compared, using up-to-date branching ratios. Within uncertainties, all measurements agree, supporting the hypothesis that fragmentation is independent of the specific production process. Compared to individual measurements, the averaged fragmentation fractions have significantly reduced uncertainties. Implications of results for other physical quantities are considered.

Primary author: Dr ZENAIEV, Oleksandr (DESY)

Co-authors: Dr VERBYTSKYI, Andrii (Max-Planck-Institut für Physik); Dr LISOVYI, Mikhailo (Physikalisches Institut der Universität Heidelberg)

Presenter: Dr ZENAIEV, Oleksandr (DESY)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **124** Type: **not specified**

Measurements of CP violation in charm decays at LHCb

Tuesday, April 12, 2016 10:00 AM (15 minutes)

Most recent results on CP violation searches in the charm sector are presented. These include the world's most precise measurements of direct and indirect CP asymmetries in the singly-Cabibbo-suppressed modes D0->pipi and D0->KK, based on the 3/fb data sample collected by LHCb during Run I.

Primary author: VECCHI, stefania (infn - Ferrara)

Presenter: Mr MARINO, Pietro (SNS and INFN-Pisa)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **125** Type: **not specified**

Recent results on Bc properties and decays from LHCb

Tuesday, April 12, 2016 12:40 PM (15 minutes)

Precision measurements of the Bc mass, lifetime and relative production cross-section, and the observation of several new decay modes were achieved using the 3 fb-1 of data collected by the LHCb experiment during the first run of the LHC. These results provide useful input for QCD effective models.

Primary author: VECCHI, stefania (infn - Ferrara)

Presenter: Dr YIN, Hang (Central China Normal Univerisity)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **126** Type: **not specified**

DDbar and DD pair production at the LHCb in the parton Reggeization approach

Tuesday, April 12, 2016 9:00 AM (15 minutes)

We study the inclusive DDbar and DD pair production in proton-proton collisions at the LHC at leading order of the parton Reggeization approach endowed with universal scale-depended fragmentation functions for c-quark to D-meson and for gluon to D-meson transitions. We have described DDbar and DD correlations in azimuthal angle, as well as transverse momentum, rapidity, and invariant mass distributions measured in the forward region of rapidity by the LHCb Collaboration at the LHC (2 < y < 4) without free parameters. We have used Reggeized amplitudes for the processes RR->gg and RR->ccbar which are obtained accordingly to Feynman rules of the L.N. Lipatov effective theory of Reggeized partons, and Kimber-Martin-Ryskin model for unintegrated gluon distribution function in a proton with Martin-Stirling-Thorne-Watt collinear parton distributions as inputs.

Primary author: Mr KARPISHKOV, Anton (Samara State Aerospace University)

Co-authors: Dr SHIPILOVA, Aleksandra (Samara State Aerospace University); Prof. SALEEV, Vladimir (Samara State Aerospace University)

Presenter: Mr KARPISHKOV, Anton (Samara State Aerospace University)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **127** Type: **not specified**

Central Exclusive production at LHCb

Tuesday, April 12, 2016 4:50 PM (15 minutes)

The cross-section for central exclusive production of J/psi and Psi(2S) mesons at 13 TeV is measured using the LHCb detector. Proton dissociative backgrounds are significant reduced compared to previous measurements through the use of forward shower counters, recently installed for Run 2. Cross-section ratios to previous measurements at 7 TeV allow more precise tests of theoretical predictions and constraints on the parton distribution functions

Primary author: VECCHI, stefania (infn - Ferrara)

Presenter: Prof. MCNULTY, Ronan (University College Dublin)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **128** Type: **not specified**

W, Z and top production measurements at LHCb

Wednesday, April 13, 2016 3:40 PM (15 minutes)

LHCb's unique forward acceptance allow for measurements of EW and hard QCD processes at large rapidity. In this talk the latest LHCb results on W, Z and top production are presented.

Primary author: VECCHI, stefania (infn - Ferrara)

Presenter: SESTINI, Lorenzo (Padova)

Session Classification: WG1/WG3 joint session (EW+PDF)

Track Classification: Structure Functions and Parton Densities

Contribution ID: **129** Type: **not specified**

13 TeV cross-section measurements at LHCb

Tuesday, April 12, 2016 2:30 PM (15 minutes)

By using the very first proton-proton collision data of the LHC Run II, LHCb performed a series of measurements, notably including the cross-sections for heavy boson, quarkonia, beauty and charm productions. The results have been carried out by exploiting a new scheme for the LHCb software trigger that gives the possibility to finalise physics analyses directly from data objects produced by the online reconstruction. Physics results will be discussed with some emphasis on the performance and technical implementation of this novel trigger approach.

Primary author: VECCHI, stefania (infn - Ferrara)

Presenter: SZUMIAK, Tomasz (Cracow-AGH)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **130** Type: **not specified**

Recent developments in APFEL

Wednesday, April 13, 2016 4:50 PM (15 minutes)

APFEL is a numerical code specialized for PDF fits that provides a fast and accurate solution of the DGLAP equations up to NNLO in QCD and LO in QED. In addition to PDF evolution, APFEL also provides a module that computes deep-inelastic scattering cross sections in several mass schemes up to NNLO in QCD. In this contribution I will present the most recent developments carried out in the APFEL framework. They include: the implementation of the intrinsic charm contributions to the FONLL structure functions, the computation of the polarized evolution up to NNLO in QCD, the small-x resummed evolution up to NLL, the implementation of the single-inclusive cross sections needed for the determination of fragmentation functions (FFs). APFEL is currently used by the NNPDF collaboration and is interfaced to the xFitter public code and thus all these developments are or will be used to improve the determination of PDFs and FFs.

Primary author: Dr BERTONE, Valerio (University of Oxford)

Presenter: Dr BERTONE, Valerio (University of Oxford)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **131** Type: **not specified**

The ATLAS Tile Calorimeter, its performance with 13 TeV proton-proton collisions, and its upgrades for the high luminosity LHC

Thursday, April 14, 2016 9:23 AM (20 minutes)

The Tile Calorimeter (TileCal) is the central hadronic calorimeter of the ATLAS experiment at the LHC. Jointly with the other calorimeters it is designed for reconstruction of hadrons, jets, tau-particles and missing transverse energy. It also assists in the muon identification. A summary of the upgrades and performance results for TileCal using pp collisions from the initial LHC Run II at 13 TeV will be presented. For the high luminosity era a major upgrade of the TileCal electronics is planned, and the ongoing developments for on- and off-detector systems, together with expected performance characteristics and recent beam tests of prototypes, will be described.

Primary author: Prof. WHITE, Andy (University of Texas at Arlington)

Presenter: DAVIDEK, Tomas (Charles University, Prague)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **132** Type: **not specified**

The Mu2e Experiment at Fermilab

Wednesday, April 13, 2016 4:30 PM (20 minutes)

The Mu2e Experiment at Fermilab will search for coherent, neutrinoless conversion of muons into electrons in the field of a nucleus with a sensitivity improvement of a factor of 10,000 over previous experiments. Such a charged lepton flavor-violating reaction probes new physics at a scale inaccessible with direct searches at either present or planned high energy colliders. The experiment both complements and extends the current search for muon decay to electron+gamma at MEG and searches for new physics at the LHC. We will present the physics motivation for Mu2e, the novel design of the muon beamline and the detector, and the current status of the experiment.

Summary

We will present the physics motivation and status of the Mu2e experiment at Fermilab.

Primary author: CORCORAN, Marjorie (Rice University)

Presenter: MORESCALCHI, Luca (Pisa)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **133** Type: **not specified**

Charm hadroproduction in the atmosphere, QCD and neutrino astronomy

Tuesday, April 12, 2016 3:30 PM (15 minutes)

We update predictions for lepton fluxes from the hadroproduction of charm quarks in the scattering of primary cosmic rays with the Earth's atmosphere. The calculation of charm-pair hadroproduction applies the latest results from perturbative QCD through next-to-next-to-leading order and modern parton distributions, together with estimates on various sources of uncertainties. Our predictions for the lepton fluxes turn out to be compatible, within the uncertainty band, with recent results in the literature. However, by taking into account contributions neglected in previous works, our total uncertainties are much larger. The predictions are crucial for the interpretation of results from neutrino experiments like IceCube, when disentangling signals of neutrinos of astrophysical origin from the atmospheric background.

Primary author: MOCH, Sven-Olaf (UHH)

Presenter: MOCH, Sven-Olaf (UHH)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **134** Type: **not specified**

PDF4LHC recommendations for LHC Run II: A critical appraisal

Tuesday, April 12, 2016 12:20 PM (15 minutes)

We review the current status in the determination of parton distribution functions in view of the precision requirements for LHC in the run II.

Primary author: MOCH, Sven-Olaf (UHH)

Presenter: Mrs PLACAKYTE, Ringaile (DESY)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **135** Type: **not specified**

Update of MMHT PDFs

Tuesday, April 12, 2016 9:00 AM (15 minutes)

We present continuing work on the the MMHT PDFs. We discuss the changes in the PDFs and predictions due to variation in heavy quark masses. We present in detail the impact of the final combined HERA cross section data, and examine the fit quality. We also highlight plans for the future, in particular the potential impact of data sets not included in the current fit, and of new theoretical calculations.

Summary

Update of MMHT PDFs.

Primary author: Prof. THORNE, Robert (University College London)

Co-authors: Prof. MARTIN, Alan (IPPP, Durham); Dr HARLAND-LANG, Lucian (University College London); Dr MOTYLINSKI, Patrick (University College London)

Presenter: Prof. THORNE, Robert (University College London)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **136** Type: **not specified**

Determination of the top-quark mass from single top-quark production in hadronic collisions

Wednesday, April 13, 2016 12:20 PM (15 minutes)

We determine the mass of the top quark from cross section data for the hadro-production of single top quarks in the t- and s-channel reactions. We apply QCD perturbative corrections up to next-to-next-to-leading order terms from soft-gluon resummation to extract the top-quark mass in well-defined renormalization schemes. The cross section for the production of single top quarks is dominated by the light quark-flavor distributions in the proton, which allows for a mass determination largely independent of the gluon distribution.

Primary authors: Dr ALEKHIN, Sergey (Universität Hamburg); Dr THIER, Stephan (Universität Hamburg); Prof. MOCH, Sven-Olaf (Universität Hamburg)

Presenter: Dr THIER, Stephan (Universität Hamburg)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **137** Type: **not specified**

New observables in quarkonium production

Thursday, April 14, 2016 12:00 PM (20 minutes)

In this talk, I will focus on the study of associated-quarkonium production in a number of channels at the LHC. First, I will address the case of quarkonium-pair production [1,2,3] which has recently been studied by LHCb [4], CMS [5] and D0 [6,7]. I will argue that the inclusion of Double-Parton Scattering (DPS) and Next-to-Leading Order (NLO) contributions are necessary to account for the existing data. I will then address the case of quarkonium + vector boson [8,9,10] which has recently been studied by ATLAS [11,12].

References:

[1] J/Psi -pair production at large momenta: Indications for double parton scatterings and large alpha_s^5 contributions. By J.P. Lansberg, H.S. Shao. arXiv:1410.8822 [hep-ph]. Phys.Lett. B751 (2015) 479-486.

[2] Production of J/psi+eta(c) vs. J/psi+J/psi at the LHC: Impact of Real alpha_s^5 corrections. By J.P. Lansberg, H.-S. Shao. [arXiv:1308.0474 [hep-ph]]. Phys.Rev.Lett. 111 (2013) 122001.

[3] Double-quarkonium production at a fixed-target experiment at the LHC (AFTER@LHC). By J.P. Lansberg, H.S. Shao. arXiv:1504.06531 [hep-ph]. Nucl.Phys. B900 (2015) 273-294.

[4] Observation of J/psi pair production in pp collisions at sqrt{s}=7 TeV. By LHCb Collaboration. arXiv:1109.0963 [hep-ex]. Phys.Lett. B707 (2012) 52-59.

[5] Measurement of prompt J/psi pair production in pp collisions at sqrt{s} = 7 TeV. By CMS Collaboration. arXiv:1406.0484 [hep-ex]. JHEP 1409 (2014) 094.

[6] Observation and studies of double J/psi production at the Tevatron. By D0 Collaboration. arXiv:1406.2380 [hep-ex]. Phys.Rev. D90 (2014) 11, 111101.

[7] Evidence for simultaneous production of J/psi and Upsilon mesons. By D0 Collaboration. [arXiv:1511.02428 [hep-ex]].

[8] Next-to-leading-order QCD corrections to the yields and polarisations of J/Psi and Upsilon directly produced in association with a Z boson at the LHC. By B. Gong, J.P. Lansberg, C. Lorce, J.X. Wang. [arXiv:1210.2430 [hep-ph]]. JHEP 1303 (2013) 115.

[9] Reassessing the importance of the colour-singlet contributions to direct J/psi + W production at the LHC and the Tevatron. By J.P. Lansberg, C. Lorce. [arXiv:1303.5327 [hep-ph]]. Phys.Lett. B726 (2013) 218-222.

[10] Next-to leading order QCD corrections to quarkonium + vector bosons hadroproduction. J.P. Lansberg, H.S. Shao, L.P. Sun (work in progress).

[11] Observation and measurements of the production of prompt and non-prompt J/psi mesons in association with a Z boson in pp collisions at sqrt{s} = 8 TeV with the ATLAS detector. By ATLAS Collaboration. arXiv:1412.6428 [hep-ex]. Eur.Phys.J. C75 (2015) 5, 229.

[12] Measurement of the production cross section of prompt J/psi mesons in association with a W^+/- boson in pp collisions at sqrt{s} = 7 TeV with the ATLAS detector. By ATLAS Collaboration. arXiv:1401.2831 [hep-ex]. JHEP 1404 (2014) 172.

Primary author: LANSBERG, Jean-Philippe (IPN Orsay - Paris Sud U. - CNRS/IN2P3)

Presenter: LANSBERG, Jean-Philippe (IPN Orsay - Paris Sud U. - CNRS/IN2P3)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **138** Type: **not specified**

Incoherent diffraction and structure fluctuations at small x

Tuesday, April 12, 2016 11:00 AM (15 minutes)

Exclusive vector meson production can be used to directly probe the gluon density of a hadron. Measuring the cross section differentially in the momentum transfer t makes it possible to determine the transverse density profile (via coherent diffraction) and density fluctuations (incoherent diffraction) of the target hadron. This knowledge on the geometric fluctuations of the proton is particularly important for understanding collective phenomena observed in proton-nucleus collisions.

We calculate coherent and incoherent diffractive vector meson production in photon-proton and photon-nucleus scattering. The dipole model used in the calculation is constrained by the proton structure function data. By implementing sub-nucleon scale fluctuations using the constituent quark model or the IP-glasma framework we demonstrate that incoherent gamma-p scattering is sensitive to small-scale fluctuations. We discuss to what extent the current HERA diffractive deep inelastic scattering data can be used to constrain the proton structure fluctuations and how an Electron Ion Collider (EIC) can improve the picture.

Before an EIC, the only processes that can be used to study diffraction with nuclear targets at high energy are ultraperipheral heavy ion collisions. We present an updated CGC calculation where a dipole model constrained by more precise combined HERA structure function data is used, and calculate diffractive cross sections at sqrt(s)=5 TeV. We discuss how access to the ultraperipheral cross section at different energies can help to study the nuclear wave function and its fluctuations.

Primary author: Dr MÄNTYSAARI, Heikki (Brookhaven National Laboratory)

Co-authors: Dr SCHENKE, Björn (Brookhaven National Laboratory); Dr LAPPI, Tuomas (University of Jyväskylä)

Presenter: Dr MÄNTYSAARI, Heikki (Brookhaven National Laboratory)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **139** Type: **not specified**

Next-to-leading order Balitsky-Kovchegov equation with resummation

Tuesday, April 12, 2016 9:40 AM (15 minutes)

The Color Glass Condensate framework has been successfully applied to many high-energy scattering processes, and it has also been seen as a powerful tool to describe initial state of heavy ion collisions. An important next step for the CGC phenomenology is to perform these calculations at next-to-leading order accuracy, which would allow a qualitative test of the saturation picture. A necessary ingredient in these calculations is the solution to the CGC evolution equation, the Balitsky-Kovchegov (BK) equation, at NLO accuracy.

In our previous work [1] it was shown that the NLO BK equation is unstable and results in an unintegrated gluon distribution to decrease as momentum fraction x decreases. It could also drive the dipole amplitude to become negative even with physically relevant initial conditions. We show that when large single and double logarithmic corrections [2,3] are resumed in the equation, the evolution becomes stable and a physical solution is obtained. We determine the optimal way to include a maximal amount of full NLO result in the resummation by fixing the constant under the resummed large transverse logarithm.

By direct numerical solution we show that the as^2 terms that are not enhanced by large logarithms can be neglected at large saturation scales (late in the evolution). However, these numerically demanding terms have a significant effect close to phenomenologically relevant initial conditions. The NLO evolution obtained in this work should be suitable for phenomenological calculations with NLO cross sections.

The work presented in this talk is published in [4].

References

[1] T. Lappi and H. Mäntysaari, Direct numerical solution of the coordinate space Balitsky-Kovchegov equation at next to leading order, Phys. Rev. D91 (2015) [arXiv:1502.02400 [hep-ph]]

[2] E. Iancu, J. D. Madrigal, A. H. Mueller, G. Soyez and D. N. Triantafyllopoulos, Resumming double logarithms in the QCD evolution of color dipoles, Phys. Lett. B744 (2015) 293 [arXiv:1502.05642 [hep-ph]].

[3] E. Iancu, J. D. Madrigal, A. H. Mueller, G. Soyez and D. N. Triantafyllopoulos, Collinearly-improved BK evolution meets the HERA data, arXiv:1507.03651 [hep-ph].

[4] T. Lappi, H. Mäntysaari, Next-to-leading order Balitsky-Kovchegov equation with resummation. arXiv:1601.06598

Primary author: Dr MÄNTYSAARI, Heikki (Brookhaven National Laboratory)

Co-author: Dr LAPPI, Tuomas (University of Jyväskylä)

Presenter: Dr MÄNTYSAARI, Heikki (Brookhaven National Laboratory)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **140** Type: **not specified**

Search for SUSY in jets+ MET final state

Tuesday, April 12, 2016 11:40 AM (15 minutes)

The results of inclusive searches for supersymmetry with all-hadronic events produced in proton-proton collision at 13 TeV are summarized. The data sample corresponds to an integrated luminosity of 2.3 fb-1 collected in 2015. The searches are based on jet multiplicity, bottom-quark jet multiplicity, and variables characterizing total event energy and missing transverse momentum. The results are interpreted in models of gluino pair production

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: MAHAKUD, Bibhuprasad (Tata Institute of Fundamental Research-A in Mumbai, India)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **141** Type: **not specified**

Electroweak production of SUSY in diTau final states

Tuesday, April 12, 2016 12:20 PM (15 minutes)

A search for electroweak production of supersymmetric particles is performed with two tau leptons in the final state. These results are based on 18.1 to 19.6 fb^{-1} of proton-proton collisions at $\sqrt{s}$ = 8\TeV collected with the CMS detector at the CERN Large Hadron Collider. The observed events are found to be consistent with the standard model prediction. Upper limits are set on the masses of the lightest chargino and the lightest neutralino, assuming the third generation sleptons are the lightest sleptons and their masses are at a middle point between the chargino and the neutrralino.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: BAKHSHIANSOHI, Hamed (Institute for Studies in Theoretical Physics & Mathematics (IPM) in Tehran, Iran)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **142** Type: **not specified**

Search for low mass Higgs-boson like resonances at CMS

Tuesday, April 12, 2016 2:30 PM (15 minutes)

A search is performed on the 8 TeV LHC data for additional scalars and pseudoscalar with masses below the newly discovered higgs boson h(125). These searches are motivated within several BSM theories, most significantly extensions of the non mininal extensions of the MSSM like the NMSSM, where additional scalar and pseudoscalar states are expected. The mass range from 350 MeV to 110 GeV is explored with different final states. The current status of these searches will be reviewed and prospects will be given to extend these searches in the Run2 of the LHC.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: COURBON, Benoit (Institut de Physique Nucléaire, IN2P3-CNRS)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **143** Type: **not specified**

Search for additional heavy scalar/pseudoscalar neutral Higgs bosons at CMS

Tuesday, April 12, 2016 3:10 PM (15 minutes)

Recent results on searches for additional scalar and pseudo-scalar neutral Higgs bosons are presented. These searches are well motivated within a variety of BSM models, from the MSSM or NMSSM to more general two Higgs doublet models. Heavy neutral scalar higgs (H) or pseudoscalar (A) are searched in different final states. These studies are based on pp collision data collected at centre-of-mass energies of 7 and 8 TeV by the CMS collaboration at the LHC.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: DEWANJEE, Ram Krishna (Tata Institute of Fundamental Research in Mumbai, India)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **144** Type: **not specified**

Search for exotic and rare Higgs boson decays at CMS

Tuesday, April 12, 2016 10:00 AM (15 minutes)

Recent results on searches for exotic production and rare decays of the Higgs boson H(125) are presented. The current status of the searches for invisible and quasi invisible decays, decays to J/Psi+Gamma, and lepton flavour violation (emu, etau, mutau) decays of the boson will be reviewed, based on pp collision data collected at centre-of-mass energies of 7 and 8 TeV by the CMS collaboration at the LHC. Prospects will be given to extend these searches in the Run2 of the LHC.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Mr TROENDLE, Daniel (Uni Hamburg)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **145** Type: **not specified**

Searches for BSM physics in diphoton final state at CMS

Wednesday, April 13, 2016 11:15 AM (15 minutes)

Many physics scenarios beyond the standard model predict the existence of heavy resonances decaying to diphotons. This talk presents searches for BSM physics in the diphoton final state at CMS, focusing on the recent results obtained using data collected at the LHC in 2015.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: QUITTNAT, Milena Eleonore (Institute for Particle Physics, ETH Zürich in Zürich, Switzerland)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **146** Type: **not specified**

Searches for BSM physics in dilepton, multilepton, and lepton+MET final states at CMS

Wednesday, April 13, 2016 12:00 PM (15 minutes)

Many physics scenarios beyond the standard model predict the existence of new particles decaying to dilepton, multilepton, and lepton+MET final states. This talk presents searches for BSM physics in these three final states at CMS, focusing on the recent results obtained using data collected at the LHC in 2015.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: THOMAS, Laurent (University of Florida in Gainesville, FL, United States)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **147** Type: **not specified**

Searches for dark matter at CMS

Wednesday, April 13, 2016 11:45 AM (15 minutes)

Many theories predict candidates to the dark matter particles that are light enough to be produced at the LHC. This talk presents the searches for dark matter at CMS, focusing on the recent results obtained using data collected in 2015.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: SRIMANOBHAS, Phat (Chulalongkorn University in Bangkok, Thailand)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **150** Type: **not specified**

An investigation of the HERA combined data at low Q^2

Tuesday, April 12, 2016 9:40 AM (15 minutes)

In the HERAPDF2.0 PDF analysis it was noted that the fit chi^2 worsens significantly at low Q^2 for both NLO and NNLO fits. The turn over of the reduced cross section at low-x and low Q^2 due to the contribution of the longitudinal cross section F_L is also not very well described. In this paper the prediction for F_L is highlighted and the corresponding extraction of F_2 from the data is further investigated, showing discrepancies with description of HERAPDF2.0 at low x and Q^2. The effect of adding a simple higher twist term of the form ~constant/Q^2 to the description of F_L is investigated. This results in a significantly better description of the reduced cross-sections, F2 and FL at low x, Q^2 and a significantly lower χ^2 for the NNLO fit as compared to the NLO fit. This is not the case if the higher twist term is added to F_2.

Primary authors: Prof. COOPER-SARKAR, Amanda (Oxford); Prof. FOSTER, Brian (Hamburg University, Oxford); Dr ABT, Iris (MPI); Dr WICHMANN, Katarzyna (DESY); Prof. WING, Matthew (UCL); Mr MYRONENKO, Volodymyr (DESY)

Presenters: Prof. COOPER-SARKAR, A. (Oxford); Prof. COOPER-SARKAR, Amanda (Oxford); Prof. COOPER-SARKAR, Amanda (Oxford University)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **151** Type: **not specified**

Charm in Deep-Inelastic Scattering

Wednesday, April 13, 2016 5:10 PM (15 minutes)

I will discuss the extension of the FONLL variable flavour number scheme to account for a possible intrinsic component of the charm PDF. I will present the results of a PDF fit which includes a fitted charm PDF in the NNPDF framework, and discuss phenomenological implications.

Primary author: Mr ROTTOLI, Luca (University of Oxford)

Presenter: Mr ROTTOLI, Luca (University of Oxford)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **152** Type: **not specified**

Coherent photo-nuclear production of vector mesons at mid-rapidities in Pb-Pb collisions

Wednesday, April 13, 2016 4:50 PM (15 minutes)

ALICE has measured the coherent photo-nuclear production of ρ^0, J/ψ and $\psi(2S)$ vector mesons at mid-rapidity in ultra-peripheral collisions of lead nuclei. These processes provide information on the gluon structure of the nuclear target at low Bjorken-x. The talk will cover the results from LHC Run1 data, as well as discuss the current status and prospects for analyses with LHC Run2 data.

Primary author: Prof. CONTRERAS, Guillermo (Czech Technical University)

Presenter: Prof. CONTRERAS, Guillermo (Czech Technical University)

Session Classification: WG4/WG5 joint session (HF+diffraction)

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **153** Type: **not specified**

Iterative Monte Carlo analysis of spin-dependent parton distributions

Wednesday, April 13, 2016 9:50 AM (15 minutes)

We present a comprehensive new global QCD analysis of polarized inclusive deep-inelastic scattering, including the latest high-precision data on longitudinal and transverse polarization asymmetries from Jefferson Lab and elsewhere. The analysis is performed using a new iterative Monte Carlo fitting technique which generates stable fits to polarized parton distribution functions (PDFs) with statistically rigorous uncertainties. Inclusion of the Jefferson Lab data leads to a reduction in the PDF errors for the valence and sea quarks, as well as in the gluon polarization uncertainty at x > 0.1. The study also provides the first determination of the flavor-separated twist-3 PDFs and the d 2 moment of the nucleon within a global PDF analysis.

Primary authors: ACCARDI, Alberto (Hampton University); ETHIER, Jacob (College of William and Mary); KUHN, Sebastian (Old Dominion University); MELNITCHOUK, Wally (jefferson lab); SATO, nobuo (jefferson lab)

Presenter: SATO, nobuo (jefferson lab)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **154** Type: **not specified**

New results from the NA48 experiment at CERN

Thursday, April 14, 2016 9:00 AM (15 minutes)

Searches for lepton number violation and resonances in the K+- −>pi mu mu decays at the NA48/2 experiment

The NA48/2 experiment at CERN collected a large sample of charged kaon decays into final states with multiple charged particles in 2003-2004.
A new upper limit on the rate of the lepton number violating decay K+- −> pi-+ mu+- mu+- obtained from this sample is reported: 8.6 × 10^−{11} at 90% CL, which improves by more than an order of magnitude
upon the previous measurements. Searches for two-body resonances in the K+- −>pi mu mu decays (including heavy neutral leptons and inflatons) in the accessible range of masses and lifetimes are also presented.

Primary author: Dr LAZZERONI, Cristina (University of Birmingham, UK)

Presenter: MARCHEVSKI, Radoslav (Johannes-Gutenberg-Universitaet Mainz)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **155** Type: **not specified**

Recent results from the NA62 experiment at CERN

Thursday, April 14, 2016 9:20 AM (15 minutes)

Neutral pion form factor measurement by the NA62 experiment

The NA62 experiment at CERN collected a large sample of charged kaon decays with a highly efficient trigger for decays into electrons in 2007. The kaon beam represents a source of tagged neutral pion decays in vacuum. A measurement of the electromagnetic transition form factor slope of the neutral pion in the time-like region from ~1 million fully reconstructed pi0 Dalitz decay is presented. The limits on dark photon production in pi0 decays from the earlier kaon experiment at CERN, NA48/2, are also reported.

Search for K+ to pi+ nu nu at NA62

K+->pi+nunu is one of the theoretically cleanest meson decay where to look for indirect effects of new physics complementary to LHC searches. The NA62 experiment at CERN SPS is designed to measure the branching ratio of this decay with 10% precision. NA62 took data in pilot runs in 2014 and 2015 reaching the final designed beam intensity. The quality of data acquired in view of the final measurement will be presented.

Primary author: Dr LAZZERONI, Cristina (University of Birmingham, UK)

Presenter: ALIBERTI, Riccardo (Mainz University)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **156** Type: **not specified**

Probing Gluon Helicity with Dijets from √s = 510 GeV Polarized Proton Collisions at STAR

Wednesday, April 13, 2016 12:00 PM (15 minutes)

The production of jets in polarized proton collisions at STAR is dominated by quark-gluon and gluon-gluon scattering processes. The dijet longitudinal double-spin asymmetry (A_LL) is sensitive to the polarized parton distributions and may be used to extract information about the gluon helicity contribution (ΔG) to the spin of the proton. Previous STAR jet measurements at √s = 200 GeV show evidence of polarized gluons for gluon momentum fractions above 0.05. The measurement of dijet A_LL at √s = 510 GeV will extend the current constraints on ΔG to lower gluon momentum fractions and allow for the reconstruction of the partonic kinematics at leading order. Preliminary results from the dijet A_LL measurements from ~80 pb^(-1) of ~53% polarized proton data taken during the 2012 RHIC run will be presented.

Primary author: RAMACHANDRAN, Suvarna (STAR Collaboration, University of Kentucky)

Presenter: RAMACHANDRAN, Suvarna (STAR Collaboration, University of Kentucky)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **157** Type: **not specified**

Progress in the NNPDF global analysis

Tuesday, April 12, 2016 9:20 AM (15 minutes)

In this talk we present recent progress in the NNPDF global analysis, in particular work towards an updated NNPDF3.1 release. Recent developments include the inclusion of the combined HERA data and of several new LHC and Tevatron experiments, theoretical improvements such as the FONLL GM-VFN scheme with heavy quark masses, fits with heavy quark mass variations and with intrinsic charm, and updates in fitting methodology.

Primary author: Mr NNPDF, Collaboration (University of Oxford)

Presenter: Dr ROJO, Juan (University of Oxford)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **158** Type: **not specified**

Dipole model analysis of the new HERA data

Tuesday, April 12, 2016 10:00 AM (15 minutes)

I analyse, within a dipole model, the inclusive DIS cross section data, obtained from the last HERA measurements (2015). I show that these
high precision data are very well described within the dipole model framework, which is complemented with a valence quark structure functions. I also discuss the role of higher twist corrections to the standard PDFs fit.

This analysis I have done in collaboration with Henri Kowalski and we are going to publish it soon.

Summary

Description within dipole model of the new HERA data
Higher twist correction to the standard PDFs fit

Primary author: Dr LUSZCZAK, Agnieszka (Institute of Nuclear Physics)

Presenters: Dr LUSZCZAK, Agnieszka (Institute of Nuclear Physics); LUSZCZAK, agnieszka (Cracow university)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **159** Type: **not specified**

Ultra-Peripheral J/Psi Production at Forward Rapidities in Pb-Pb Interactions

Wednesday, April 13, 2016 3:10 PM (15 minutes)

Ultra-Peripheral Pb-Pb collisions, in which the two nuclei pass close to each other but at an impact parameter greater than the sum of their radii, provide information about the initial state of nuclei. In particular, J/psi production in such collisions proceeds by photon-gluon interactions, and gives access to nuclear PDFs. The ALICE collaboration has published measurements of UPC J/Psi production in LHC Run 1 in the rapidity range -4.0 < y < -2.5, and has obtained a substantially larger data set in 2015 from LHC Run 2. In this talk, the latest available results will be given.

Primary author: Ms GRAHAM, Katie (University of Birmingham)

Presenter: Ms GRAHAM, Katie (University of Birmingham)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **160** Type: **not specified**

Vector meson photoproduction in ultra-peripheral p-Pb collisions measured using the ALICE detector

Wednesday, April 13, 2016 9:40 AM (15 minutes)

The strong electromagnetic fields generated by ultra-relativistic heavy ions offer the possibility to study
gamma-gamma, gamma-nucleus and gamma-proton processes at the LHC in ultra-peripheral Pb-Pb and p-Pb collisions (UPC).
As exclusive photoproduction of vector mesons is sensitive to the gluon distribution of the interacting target it
allows one to study saturation and shadowing phenomena.

Here we report on the ALICE measurement of vector meson photoproduction in p-Pb UPC at sqrt(s_NN) = 5.02 TeV.
In these asymmetric collisions, the photon is most likely coming from the Pb nucleus. As a result, the center-of-mass energy
of the photon-proton system is constrained by the the rapidity of the vector meson which is measured in the laboratory frame
with respect to the proton beam direction. We present the results on vector meson photoproduction in several intervals
of the photon-proton center-of-mass energy.

Primary author: ADAM, Jaroslav (FNSPE CTU in Prague)

Presenter: ADAM, Jaroslav (FNSPE CTU in Prague)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **161** Type: **not specified**

Diffractive production of heavy mesons at the LHC within k_t -factorization approach

Wednesday, April 13, 2016 4:30 PM (15 minutes)

We discuss diffractive production of open charm and bottom mesons at the LHC [1]. The differential cross sections for single- and central-diffractive mechanisms for $c\bar{c}$ and $b\bar{b}$ pair production are calculated in the framework of the Ingelman-Schlein model corrected for absorption effects. In this approach one assumes that the pomeron has a well defined partonic structure, and that the hard process takes place in a pomeron-proton or proton-pomeron (single diffraction) or pomeron-pomeron (central diffraction) processes. Here, leading-order
gluon-gluon fusion and quark-antiquark anihilation partonic subprocesses are taken into consideration. Both pomeron flux factors as well as parton distributions in the pomeron are taken from the H1 Collaboration analysis of diffractive structure function and diffractive dijets at HERA. The extra corrections from subleading reggeon exchanges are explicitly calculated and are also taken into consideration. Predictions for single- and central-diffractive
production in the case of inclusive D and B mesons, as well as $D\bar{D}$ correlations are presented, including detector acceptance of the ATLAS, CMS and LHCb Collaborations. The experimental aspects of possible standard and dedicated measurements are carefully discussed.

For the first time, the differential cross sections for the diffractive $c\bar{c}$ pair production are calculated in the framework of the k_t -factorization approach, i.e. effectively including higher-order corrections. The unintegrated (transverse momentum dependent) diffractive parton distributions in proton are calculated with the help of the Kimber-Martin-Ryskin prescription where collinear diffractive PDFs are used as input. The latter are obtained
by means of the Ingelman-Schlein model. Several quark-level differential cross sections are shown, including one-dimensional distribution and two-dimensional correlation distributions
(e.g. $\varphi_{c\bar{c}}$ - azimuthal angle correlations or pair transverse momentum p_t distributions. The hadronization of charm quarks is taken into account by means of fragmentation function technique. Predictions for single-diffractive production of D^0 meson including detector
acceptance of the ATLAS experiment are presented. Crucial aspects of possible standard and dedicated measurements within the ATLAS detector are also discussed.

[1] M. Luszczak, R. Maciula and A. Szczurek,
Single- and central-diffractive production of open
charm and bottom mesons at the LHC: theoretical predictions and experimental capabilities,
Phys. Rev. D 91 (2015), 054024.
[2] M. Luszczak, R. Maciula, A. Szczurek and M. Trzebinski, Diffractive charm production at the LHC within k_t -factorization approach,
a paper in preparation.
E-mail:
luszczak@ur.edu.pl

Primary author: Dr LUSZCZAK, Marta (University of Rzeszow)

Co-authors: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics, Polish Academy of Sciences); Dr MACIULA, Rafal (Institute of Nuclear Physics, Polish Academy of Sciences)

Presenter: Dr LUSZCZAK, Marta (University of Rzeszow)

Session Classification: WG4/WG5 joint session (HF+diffraction)

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **162** Type: **not specified**

From deep-inelastic structure functions to two-photon dilepton production in proton-proton collisions

Thursday, April 14, 2016 11:20 AM (15 minutes)

We investigate different methods to incorporate the effect of photons in hard processes.
We compare two different approaches used for calculating cross sections for two-photon $pp \to l^+ l^- X$ process.
In one of the approaches photon is treated as a collinear parton in the proton. In the second approach recently proposed a k_t-factorization method is used. We discuss how results of the collinear parton model depend on the initial condition for the QCD evolution and discuss an approximate treatment where photon is excluded from the combined QCD-QED evolution.
We demonstrate that it is not necessary to put photon into the evolution equation as often done recently but it is sufficient to use a simplified approach in which photon couples to quarks and antiquarks which by themselves undergo DGLAP evolution equations.
Our k_t-factorization results (inelastic photon fluxes in the nucleon) depend on deep-inelastic structure function.
We discuss sensitivity of the results to the choice of structure function parametrization and experimental cuts in the k_t-factorization approach. We find that results are sensitive to the region of x and Q^2 where pQCD DGLAP evolution does not apply.
We compare results of our calculations with recent experimental data for dilepton production and find that in most cases the contribution of the photon-photon mechanism is rather small.
We discuss how to enhance the photon-photon contribution.
We also compare our results to those of recent measurements of exclusive and semi-exclusive e^+e^- pair production with new experimental data obtained by the CMS collaboration.
The presentation will be based on our recent papers
[1], [2].

[1] G.~G.~da Silveira, L.~Forthomme, K.~Piotrzkowski, W.~Sch\"afer and A.~Szczurek,
"Central $\mu^+ \mu^-$ production via photon-photon fusion in proton-proton collisions with proton dissociation,"
JHEP {\bf 1502}, 159 (2015)
[arXiv:1409.1541 [hep-ph]].

[2] M. {\L}uszczak, W. Sch\"afer and A. Szczurek,
"Two-photon dilepton production in proton-proton collisions: two alternative approaches,"
[arXiv:1510.00294 [hep-ph]].

Primary author: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics, Polish Academy of Sciences)

Co-authors: Dr LUSZCZAK, Marta (University of Rzeszow); Dr SCHAFER, Wolfgang (Institute of

Nuclear Physics, Polish Academy of Sciences)

Presenter: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics, Polish Academy of Sciences)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **163** Type: **not specified**

JLEIC – A High Luminosity Polarized Electron-Ion Collider at Jefferson Lab

Wednesday, April 13, 2016 9:23 AM (20 minutes)

The new NSAC Long Range Plan endorses construction of a high energy high luminosity polarized electron-ion collider in US for reaching new QCD frontier. JLEIC, a Jefferson Lab ring-ring design of electron-ion collider based on the CEBAF recirculating linac, will enable collisions of electrons with energy up to 10 GeV and either protons with energy up to 100 GeV, or heavy ions with energy up to 40 GeV/u. Both the proton beam and the light-ion beams will have high polarization above 70%. JLEIC will accommodate two physics detectors, a primary one with full acceptance and a secondary high-luminosity one with less demanding specification. By implementing the multi-phase traditional electron cooling in both the ion booster ring and the ion collider ring, ultrahigh luminosity close to 1034 cm-2s-1 per detector with large acceptance can be achieved. We will present the recent progress in the JLEIC design.

Primary author: Dr ZHANG, Yuhong (Jefferson Lab)

Presenter: Dr ZHANG, Yuhong (Jefferson Lab)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **164** Type: **not specified**

A High Energy e-p/A Collider Based on CepC-SppC

Wednesday, April 13, 2016 9:46 AM (20 minutes)

The recent proposal of CepC and SppC, the next energy frontier e+e- and pp circular colliders by IHEP, China, in a common accelerator complex, provides an opportunity to realize collisions of protons or ions with electrons or positrons in an ultra-high range of center-of-mass energy up to 4.2 TeV. This paper presents a preliminary design study of this high energy e-p/A collider based on the CepC-SppC facility. The design parameters for different operational scenarios and anticipated luminosities (up to middle of 10^33 cm^-2 s^-1) will be given. We also discuss two staging approaches to realize this collider with a low cost and at an earlier time. The both first-phase approaches will be able to cover the well-studied science program of LHeC, with a luminosity several times higher than LHeC.

Primary author: Dr ZHANG, Yuhong (Jefferson Lab)

Presenter: Dr ZHANG, Yuhong (Jefferson Lab)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **165** Type: **not specified**

Associated production of electroweak bosons and heavy mesons at LHCb and prospects to observe double parton interactions

Thursday, April 14, 2016 12:12 PM (20 minutes)

The production of weak gauge bosons in association with heavy flavored mesons at the LHCb conditions is considered, and a detailed study of the different contributing processes is presented including single and double parton scattering mechanisms. We conclude finally, that double parton scattering dominates the production of same-sign WD states, as well as the production of W-bosons associated with B-mesons. The latter processes can thus be regarded as new useful DPS indicators.

Primary author: Dr MALYSHEV, Maxim (SINP MSU)

Co-authors: Dr SNIGIREV, Alexander (SINP MSU); Dr LIPATOV, Artem (SINP MSU); Dr BARANOV, Sergey (Lebedev Institute of Physics)

Presenter: Dr MALYSHEV, Maxim (SINP MSU)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **166** Type: **not specified**

Exclusive diffractive production of $\pi^+\pi^-$ pairs within tensor pomeron approach

Tuesday, April 12, 2016 5:30 PM (15 minutes)

We discuss exclusive central diffractive dipion production in the reactions $pp \to pp\pi^+\pi^-$ and $p\bar{p} \to p\bar{p}\pi^+\pi^-$ at high energies. The calculation is based on a tensor pomeron model and the amplitudes for the processes are formulated in an effective field-theoretic approach [1]. We include the purely diffractive dipion continuum, and the scalar and tensor resonances decaying into the $\pi^+\pi^-$ pairs [2, 3] as well as the photoproduction contribution (ρ^0, Drell-S\"oding) [4]. We discuss how two pomerons couple to tensor meson $f_2(1270)$ and the interference effects of resonance and dipion continuum for the first time. The theoretical results are compared with existing STAR, CDF, and CMS experimental data. Predictions for planned or being carried out experiments (ALICE, ATLAS) are presented. We show the influence of the experimental cuts on the integrated cross section and on various differential distributions for outgoing particles. Distributions in rapidities and transverse momenta of outgoing protons and pions as well as correlations in azimuthal angle between them are presented. We find that the relative contribution of resonant $f_2(1270)$ and dipion continuum strongly depends on the cut on proton transverse momenta (or four-momentum transfer squared $t_{1,2}$) which may explain some controversial observations made by different ISR experiments in the past. The cuts may play then the role of a $\pi\pi$ resonance filter. We suggest some experimental analyses to fix model parameters
related to the pomeron-pomeron-meson coupling.

References

1. C. Ewerz, M. Maniatis, and O. Nachtmann, Annals Phys. 342 (2014) 31
2. P. Lebiedowicz, O. Nachtmann, and A. Szczurek, Annals Phys. 344 (2014) 301
3. P. Lebiedowicz, O. Nachtmann, and A. Szczurek, arXiv:hep-ph/1601.04537
4. P. Lebiedowicz, O. Nachtmann, and A. Szczurek, Phys. Rev. D91 (2015) 074023

Primary author: Dr LEBIEDOWICZ, Piotr (Institute of Nuclear Physics, Polish Academy of Sciences)

Co-authors: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics, Polish Academy of Sciences); Prof. NACHTMANN, Otto (Institut fur Theoretische Physik, Universitat Heidelberg)

Presenter: Dr LEBIEDOWICZ, Piotr (Institute of Nuclear Physics, Polish Academy of Sciences)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **167** Type: **not specified**

The PDF4LHC 2015 recommendations for Run II

Tuesday, April 12, 2016 12:00 PM (15 minutes)

We present an updated recommendation for the usage of sets of parton distribution functions at the LHC Run II. We propose a new prescription for the combination of a suitable subset of the available PDF sets, which is presented in terms of a single combined PDF set. We discuss tools which allow for the delivery of this combined set in terms of optimized sets of Hessian eigenvectors or Monte Carlo replicas, and their usage, and provide some examples of their application to LHC phenomenology, with particular emphasis on the implications of the PDF4LHC15 combined sets Higgs physics.

Primary authors: Dr ROJO, Juan (University of Oxford); Prof. NADOLSKY, Pavel (Southern Methodist University); Prof. THORNE, Robert (University College London); Dr CARRAZZA, Stefano (CERN)

Presenter: Dr ROJO, Juan (University of Oxford)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **168** Type: **not specified**

Final results on the spin dependent structure function g_1^d from COMPASS

Wednesday, April 13, 2016 11:00 AM (15 minutes)

The COMPASS experiment at CERN SPS has taken data with a polarised muon beam scattering off a polarised LiD target from 2002-2004. The same measurement was also performed in 2006 increasing the statistics by roughly a factor of two.
The new results from 2006 data on the longitudinal double spin asymmetry A_1^d on the spin dependent structure function g_1^d will be shown and compared to the previous results from 2002-2004. Using the combined data set the first moment of g_1^d is calculated. This quantity is used to calculate the singlet axial charge a_0, which is equal to Delta Sigma in the MSbar scheme. Using also the axial charges a_3 and a_8 the first moments of the quark helicity distributions are obtained. In addition the influence on the Bjorken sum rule will be discussed.
Supported by BMBF and GRK Symmetry Breaking (DFG/GRK 1581)

Primary author: Mr WILFERT, Malte (Johannes-Gutenberg-Universitaet Mainz)

Presenter: Mr WILFERT, Malte (Johannes-Gutenberg-Universitaet Mainz)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **169** Type: **not specified**

The CJ15 PDFs

Tuesday, April 12, 2016 11:40 AM (15 minutes)

We present a new set of leading twist parton distribution functions, referred to as "CJ15", which take advantage of developments in the theoretical treatment of nuclear corrections as well as new data. The analysis includes for the first time data on the free neutron structure function from Jefferson Lab and new high-precision charged lepton and W -boson asymmetry data from Fermilab. These significantly reduce the uncertainty on the d/u ratio at large values of x and provide new insight on the partonic structure of bound nucleons.

Primary author: ACCARDI, Alberto (Hampton U. and Jefferson Lab)

Co-authors: OWENS, Jeff (Florida State U.); MELNITCHOUK, Wally (Jefferson Lab)

Presenter: ACCARDI, Alberto (Hampton U. and Jefferson Lab)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **170** Type: **not specified**

Pion structure function from leading neutron electroproduction and SU(2) flavor asymmetry

Wednesday, April 13, 2016 12:40 PM (15 minutes)

We examine the efficacy of pion exchange models to simultaneously describe leading neutron electroproduction at HERA and the d-bar - u-bar flavor asymmetry in the proton. A detailed chi^2 analysis of the ZEUS and H1 cross sections, when combined with constraints on the pion flux from Drell-Yan data, allows regions of applicability of one-pion exchange to be delineated. The analysis disfavors several models of the pion flux used in the literature, and yields an improved extraction of the pion structure function and its uncertainties at parton momentum fractions in the pion of 4 x 10^{-4} < x_pi < 0.05 at a scale of Q^2=10 GeV^2. Based on the fit results, we provide estimates for leading proton structure functions in upcoming tagged deep-inelastic scattering experiments at Jefferson Lab on the deuteron with forward protons.

Primary author: Dr MELNITCHOUK, Wally (Jefferson Lab)

Co-authors: JI, Chueng-Ryong (North Carolina State University); MCKENNEY, Joshua (University of North Carolina); SATO, Nobuo (Jefferson Lab)

Presenter: Dr MELNITCHOUK, Wally (Jefferson Lab)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **171** Type: **not specified**

Significance of gluon density for soft and hard processes at LHC

Thursday, April 14, 2016 9:45 AM (15 minutes)

We study the role of the non-perturbative input to the transverse momentum dependent (TMD) gluon density in hard processes at the LHC.
We derive the input TMD gluon distribution at a low scale $\mu_0^2 \sim 1$~GeV^2
from a fit of inclusive hadron spectra measured at low
transverse momenta in pp collisions at the LHC
and demonstrate that the best description of these spectra
for larger hadron transverse momenta
can be achieved by matching the derived TMD gluon distribution
with the exact solution of the Balitsky-Fadin-Kuraev-Lipatov (BFKL)
equation obtained at low x and small gluon transverse momenta
outside the saturation region, see for example [1].
Then, we
extend the input TMD gluon density to higher μ^2 numerically using
the Catani-Ciafoloni-Fiorani-Marchesini (CCFM) gluon evolution equation.
Special attention
is paid to phenomenological applications of the obtained
TMD gluon density to some LHC processes, which are sensitive to the gluon
content of a proton [2].
References.
[1] Yu.V.Kovchegov, Phys. Rev. D61, 074018 (2000).
[2] A.A.Grinyuk, A.V.Lipatov, G.I.Lykasov, N.P.Zotov, Phys. Rev. D93, 014035 (2016).

Summary

The new unintegrated gluon density (MD2015) is proposed. Its application to the analysis of the DIS and inelastic p-p processes at the LHC energies allows us to describe rather satisfactorily the charm and beauty contribution to the proton structure function F2 and the longitudinal structure function FL, and many observables on the soft and hard p-p reactions.

Primary authors: Dr LIPATOV, Artem (Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, 119991 Moscow, Russia); Prof. LYKASOV, Gennady (JINR)

Co-authors: Mr GRINYUK, Andrei (JINR); Dr ZOTOV, Nikolai (Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, 119991 Moscow, Russia)

Presenter: Prof. LYKASOV, Gennady (JINR)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **172** Type: **not specified**

Light-by-light scattering in UPC at the LHC

Wednesday, April 13, 2016 9:00 AM (15 minutes)

We will discuss diphoton semi(exclusive) production
in ultraperipheral $PbPb$ collisions at energy of $\sqrt{s_{NN}} = 5.5$ TeV (LHC).
The calculation is based on equivalent photon approximation in
the impact parameter space.
The cross sections for elementary $\gamma\gamma \to \gamma\gamma$
subprocess are calculated including two different mechanisms:
\begin{itemize}
\item box diagrams with leptons and quarks in the loops and
\item a vector-meson dominance (VDM-Regge) contribution
with virtual intermediate hadronic (vector-like) excitations of the photons.
\end{itemize}
We get much higher cross sections in $PbPb$ collisions (310 nb)
than in earlier calculation from the literature 35 ± 7 nb\footnote{D. d'Enterria and G.G. da Silveira,
Phys. Rev. Lett. \textbf{111} (2013) 080405}.
This opens a possibility to study the $\gamma\gamma \to \gamma\gamma$
(quasi)elastic scattering at the LHC.

We will present many interesting differential distributions which could
be measured by the ALICE, CMS or ATLAS Collaborations.
We will show the range of energy $W_{\gamma\gamma}$ where elastic
$\gamma\gamma$ scattering could be measured in the heavy-ion collisions.

\vspace{2cm}
This talk will be based on our recent paper:\\
- M. K{\l}usek-Gawenda, P. Lebiedowicz and A. Szczurek, arXiv/nucl-th:1601.07001.

Primary author: Dr KLUSEK-GAWENDA, Mariola (Institute of Nuclear Physics, Polish Academy of Sciences)

Co-authors: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics, Polish Academy of Sciences); Dr LEBIEDOWICZ, Piotr (Institute of Nuclear Physics, Polish Academy of Sciences)

Presenter: Dr KLUSEK-GAWENDA, Mariola (Institute of Nuclear Physics, Polish Academy of Sciences)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **173** Type: **not specified**

Forward production of Drell-Yan dileptons at high energies and low dilepton invariant masses in a k_t-factorization approach: Do we see onset of saturation?

Thursday, April 14, 2016 9:40 AM (15 minutes)

We discuss Drell-Yan production of dileptons at high energies
in forward rapidity region in a hybrid high-energy approach
which uses unintegrated gluon distributions in one proton and collinear
quark/antiquark distributions in the second proton.
Corresponding momentum-space formula for the differential cross sections
in high-energy approximation has been derived and will be presented.
The relation to the commonly used dipole approach is discussed.
We conclude and illustrate that some results of the dipole approaches
are too approximate, as far as kinemtics is considered, and in fact
cannot be used when comparing with real experimental data.
We find that the dipole formula is valid only in very forward/backward
rapidity regions ($|y| > 5$) that cannot be studied experimentally
in the moment.
We performed calculations of some differential cross sections for
low-mass dilepton production by the LHCb and ATLAS collaborations.
In distinction to most dipole approaches, we include all the four
Drell-Yan structure functions, although the impact of interference
structure functions is rather small for the relevant experimental
cuts.
We find that both side contributions ($gq/\bar{q}$ and $q/\bar{q}g$)
have to be included even for the LHCb rapidity coverage which
is in contradiction with what is usually done in the dipole approach.
We present results for different unintegrated gluon distributions from
the literature (some of them include saturation effects).
We see no clear hints of saturation even at small M_{ll}
when comparing with the LHCb data.
The presentation will be based on our upcoming paper [1].

[1]
W. Sch\"afer and A. Szczurek, a paper in preparation, to appear 02/16.

Primary author: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics PAN, Krakow and Rzeszow University, Rzeszow)

Co-author: SCHAFER, Wolfgang (Institute of Nuclear Physics PAN, Krakow)

Presenters: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics PAN, Krakow and Rzeszow University, Rzeszow); SCHAFER, Wolfgang (Institute of Nuclear Physics PAN, Krakow)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **174** Type: **not specified**

Charged-Current Deep Inelastic Scattering at Third Order

Tuesday, April 12, 2016 12:36 PM (20 minutes)

For Deep Inelastic neutrino-proton scattering in the combination $\nu P - \bar{\nu} P$, we compute the exact $\mathcal{O}(\alpha_s^3)$ perturbative QCD corrections to the charged-current structure functions F_2, F_L and F_3. These results supersede previous approximations based on the first few Mellin moments by providing all-N expressions for the coefficient functions. We discuss the numerical size of the third-order corrections and their behaviour in the threshold and high-energy limits.

Primary authors: Prof. VOGT, Andreas (University of Liverpool); Dr VERMASEREN, Jos (nikhef); Mr DAVIES, Joshua (University of Liverpool); Prof. MOCH, Sven-Olaf (University of Hamburg)

Presenter: Mr DAVIES, Joshua (University of Liverpool)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **175** Type: **not specified**

Searching for optimal conditions for exploration of double-parton scattering in four-jet production at the LHC

Thursday, April 14, 2016 11:48 AM (20 minutes)

Double-parton scattering (DPS) effects were discussed recently for different reactions. So far no clear and spectacular effect was observed for jet production where single-parton scattering (SPS) contributions dominate. We discuss four-jet production at the LHC. We calculate cross section for both single-parton scattering (SPS) using the ALPGEN code and for double-parton scattering (DPS) in collinear approach [1] as well as in k_t-factorization approach [2]. Our results are compared with experimental data obtained recently by the CMS Collaboration [3]. We show that the ALPGEN code relatively well describes distributions in rapidity of each of the four jets ordered by their transverse momenta. The SPS mechanism does not explain the distributions at large rapidity for the leading, second, third and fourth jet. The DPS mechanism improves the agreement with the experimental data in this corner of the phase space. We try to find better conditions where the relative DPS contribution is enhanced. This would open a possibility to explore the DPS effects experimentally. The total cross sections for the DPS mechanism obtained witin the k_t-factorization approach are slightly smaller than in the case of the collinear approach. Application of the k_t-factorization framework extends our former analysis of different correlation observables that may be useful for further experimental identification of the DPS effects in four-jet sample \cite{MS2016}. Results obtained in the two approaches are compared and appearing differences are discussed.

[1] R. Maciula and A. Szczurek, Searching for and exploring double-parton scattering effects in four-jet production at the LHC, Phys. Lett. B 749 (2015) 57-62.

[2] R. Maciula et al., a paper in preparation.

[3] S. Chatrchyan et al. [CMS Collaboration], Measurement of four-jet production in proton-proton collisions at $\sqrt{s} = 7$ TeV, Phys. Rev. D 89, 092010 (2014).

Primary authors: Prof. SZCZUREK, Antoni (the Institute of Nuclear Physics PAS); Dr MACIULA, Rafal (the Institute of Nuclear Physics PAS)

Presenter: Dr MACIULA, Rafal (the Institute of Nuclear Physics PAS)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **176** Type: **not specified**

The ZEUS data preservation project

Thursday, April 14, 2016 9:00 AM (20 minutes)

The ZEUS data preservation (ZEUS DP) project assures continued access to the data and documentation related to the experiment.
It aims to provide the ability to continue the generation of valuable scientific results from these data in the future.
This talk presents analysis opportunities within the ZEUS DP project and its benefits for the physics community.
The implications of the preserved data are discussed in the context of current data analyses, verification of contemporary and future theoretical models and the planning of future experiments and analyses.
The detailed documentation on the data preservation effort can serve as an example for the data preservation efforts in current and future experiments.

Primary author: Dr VERBYTSKYI, Andrii (Max-Planck Institut für Physik)

Presenter: Dr VERBYTSKYI, Andrii (Max-Planck Institut für Physik)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **177** Type: **not specified**

Interpreting the 750 GeV diphoton signal as technipion

Wednesday, April 13, 2016 4:30 PM (15 minutes)

We discuss a scenario in which the enhancement in the diphoton
final state at $M_{\gamma\gamma}$ = 750 GeV, recently observed
by the ATLAS and CMS collaborations, is a technipion. We consider two
different detailed minimal scenarios. In a first one
(vector-like technicolor model)
we assume that the vector-boson fusion is a dominant production mechanism.
In a second one (one family walking technicolor model) the technipion
is produced dominantly by the gluon-gluon fusion.
We adjust parameters of the model (coupling constant) to the size
of the signal at $\sqrt{s}$ = 13 TeV
and discuss the size of the signal at lower energies (LHC, Tevatron)
for $\gamma\gamma$ and jet-jet final states,
where it was not observed and check consistency with the existing data.
The signal is compared with the background diphoton contributions.
As background contributions we include $q\bar{q}$ annihilation,
gluon-gluon fusion via quark boxes, as well as
photon-photon fusion via lepton, quark and W-bosons boxes.
In the latter case (background) as well as for the technipion production
(signal) we include elastic-elastic, elastic-inelastic,
inelastic-elastic and inelastic-inelastic photon-photon processes,
where "inelastic" means associated e.m. dissociation of a proton.
In both cases we observe the dominance of inelastic-inelastic processes.
We consider also an alternative partonic approach with $2 \to 3$
subprocess (with off-shell photons) and compare it to the
approach with on shell photons.
We predict the signal cross section for purely exclusive
$pp \to pp\gamma\gamma$ procesess at $\sqrt{s}$ = 13 TeV
to be about 0.5 fb. Such a cross section would be measurable
with integrated luminosity about 20 fb^{-1}.
In all considered cases (other experiments) the signal is below
the background or/and below the threshold set by statistics
although some tension can be seen.
The presentation will be based on our upcoming paper [1].

[1] P. Lebiedowicz, M. {\L}uszczak, R. Pasechnik and A. Szczurek,
a paper in preparation.

Primary author: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics PAN, Krakow and Rzeszow University, Rzeszow)

Co-authors: Dr LUSZCZAK, Marta (Rzeszow University, Rzeszow); Dr LEBIEDOWICZ, Piotr (Institute of Nuclear Physics PAN, Krakow); Dr PASECHNIK, Roman (Lund University, Sweden)

Presenter: Prof. SZCZUREK, Antoni (Institute of Nuclear Physics PAN, Krakow and Rzeszow University, Rzeszow)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **178** Type: **not specified**

New single- and double-parton scattering mechanisms for double charmed meson production

Tuesday, April 12, 2016 9:20 AM (15 minutes)

Some time ago two of us predicted that at large energies relevant for the LHC the production of double charm should be dominated by the double-parton scattering (DPS) mechanism [1]. Those studies of double $c\bar{c}$ production was extended next to the k_t-factorization approach which includes effectively higher-order QCD effects [2,3]. A relatively good description of the LHCb experimental data [4] was achieved for both the total yield and the dimeson correlation observables. The single-parton scattering (SPS) $gg \to c\bar{c}c\bar{c}$ contribution was discussed carefully in both collinear [3] and k_t-factorization [5] approaches. Their contribution to the $c\bar{c}c\bar{c}$ cross section was found to be rather small and was not able to describe details of the LHCb data.

Here we discuss production of D^0D^0 (and $\bar{D}^0\bar{D}^0$) pairs within an alternative approach where $g \to D$ fragmentation is included [6]. We consider double-parton scattering (DPS) mechanisms of double $c\bar{c}$ production and subsequent $cc \to D^0D^0$ hadronization as well as double g and mixed $gc\bar{c}$ production with $gg \to D^0D^0$ and $gc \to D^0D^0$ hadronization calculated with the help of the scale dependent hadronization functions of Kniehl et al. Single-parton scattering (SPS) mechanism of digluon production is also taken into account. We compare our results with several correlation observables in azimuthal angle $\varphi_{D^0D^0}$ between D^0 mesons or in dimeson invariant mass $M_{D^0D^0}$. The inclusion of new mechanisms with $g \to D^0$ fragmentation leads to larger cross sections, than when including only DPS mechanism with standard scale independent $cc \to D^0D^0$ fragmentation functions. Some consequences of the presence of the new mechanisms are discussed. In particular a larger σ_{eff} is needed to describe the LHCb data. There is a signature that σ_{eff} may depend on transverse momentum of c quarks and/or $\bar{c}$ antiquarks.

[1] M. Luszczak, R. Maciula and A. Szczurek, Production of two $c\bar{c}$ pairs in double-parton scattering, Phys. Rev. D 85, 094034 (2012).

[2] R. Maciula and A. Szczurek, Production of $c\bar{c}c\bar{c}$ in double-parton scattering within k_t-factorization approach - meson-meson correlations, Phys. Rev. D 87, 074039 (2013).

[3] A. van Hameren, R. Maciula and A. Szczurek, Single-parton scattering versus double-parton scattering in the production of two $c\bar{c}$ pairs and charmed meson correlations at the LHC, Phys. Rev. D 89, 094019 (2014).

[4] R. Aaij et al. [LHCb Collaboration], Observation of double charm production involving open charm in pp collisions at $\sqrt{s}$ = 7 TeV, J. High Energy Phys. 06, 141 (2012); [J. High Energy Phys. 03, 108 (2014)].

[5] A. van Hameren, R. Maciula and A. Szczurek, Production of two charm quark-antiquark pairs in single-parton scattering within the k_t-factorization approach, Phys. Lett. B 748, 167 (2015).

[6] R. Maciula and V. A. Saleev, A. V. Shipilova and A. Szczurek, arXiv:1601.06981 [hep-ph].

Primary authors: Prof. SZCZUREK, Antoni (the Institute of Nuclear Physics PAS); Dr MACIULA, Rafal (the Institute of Nuclear Physics PAS); Dr ALEXANDRA, Shipilova (Samara State Aerospace University); Prof. SALEEV, Vladimir (Samara State Aerospace University)

Presenter: Prof. SZCZUREK, Antoni (the Institute of Nuclear Physics PAS)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **179** Type: **not specified**

Electron Polarimetry at JLEIC

Thursday, April 14, 2016 12:09 PM (20 minutes)

Polarized beams will play a crucial role in the physics program planned for future electron-ion colliders. The large luminosities available at these facilities imply excellent statistical precision; hence it is important to have comparable precision in the experimental systematic uncertainties. Knowledge of the polarization of the electron and ion beams is one such key systematic uncertainty.

This presentation will focus on the design of a Compton polarimeter to measure the electron beam polarization at the Electron Ion Collider at Jefferson Lab (JLEIC). The JLEIC Compton polarimeter builds on techniques developed at Jefferson Lab, which have resulted in measurements of electron beam polarization to better than 1% (dP/P). The JLEIC polarimeter makes use of a dipole chicane which will also be used as part of a low-Q2 electron tagger. This chicane facilitates the detection of both the Compton scattered electron and the backscattered photon. The initial design has emphasized electron detection. A Compton polarimeter emphasizing detection of the backscattered photon is also under consideration for a possible second interaction region.

Options for the Compton polarimeter laser system, the polarimeter design and layout, and initial background simulations will be discussed.

Primary author: Dr GASKELL, Dave (Jefferson Lab)

Presenter: Dr GASKELL, Dave (Jefferson Lab)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **180** Type: **not specified**

xFitter project

Wednesday, April 13, 2016 5:30 PM (15 minutes)

An accurate knowledge of the Parton Distribution Functions (PDF) plays a critical role for the precision tests of the Standard Model (SM) and impact substantially the theory predictions of Beyond SM high mass production.

We present the xFitter project (former HERAFitter) which provides a unique open-source software framework for the determination of the proton's PDFs and for the interpretation of the physics analyses in the context of Quantum Chromodynamics.
We highlight the new xFitter software release which includes many new features and additions, e.g. the possibility of the inclusion of photon PDF, updated variable and fixed-flavour schemes for heavy quarks, interface to the APFEL library and n-space evolution program MELA, updates to the latest theory calculations, fast grid tools and many more.

We will also report the highlighted results based on the xFitter functionalities, as well as novel studies performed by xFitter.

Primary authors: Dr PLACAKYTE, Ringaile (DESY); Dr RADESCU, Voica (Oxford)

Presenter: Mr ZENAIEV, Oleksandr (DESY)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **181** Type: **not specified**

Boosting Higgs pair production in the $b\bar{b}b\bar{b}$ final state with multivariate techniques

Wednesday, April 13, 2016 5:30 PM (15 minutes)

The measurement of Higgs pair production will be a cornerstone of the LHC program in the coming years. Double Higgs production provides a crucial window upon the mechanism of electroweak symmetry breaking and has a unique sensitivity to the Higgs trilinear coupling. We study the feasibility of a measurement of Higgs pair production in the b¯bb¯b final state at the LHC. Our analysis is based on a combination of traditional cut- based methods with state-of-the-art multivariate techniques. We account for all relevant backgrounds, including the contributions from light and charm jet mis-identification, which are ultimately comparable in size to the irreducible 4b QCD background. We demonstrate the robustness of our analysis strategy in a high pileup environment. For an integrated luminosity of L = 3 ab−1, a signal significance of S/√B ⊠ 3 is obtained, indicating that the b¯bb¯b final state alone could allow for the observation of double Higgs production at the High Luminosity LHC.

Primary author: Dr HARTLAND, Nathan (Oxford)

Presenter: Dr HARTLAND, Nathan (Oxford)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **182** Type: **not specified**

Recent BABAR results on charmed mesons

Tuesday, April 12, 2016 11:00 AM (15 minutes)

Based on the full data set recorded with the BABAR detector at center-of-mass energies at and near the Upsilon(4S) resonance, and corresponding to an integrated luminosity of approximately 468 fb-1, we measure the D0-D0bar mixing parameters using a time-dependent amplitude analysis of the decay D0 -> pi+pi-pi0.
With the same BABAR data set, we also measure the mass difference, Delta m, between the D*(2010)+ and the D+ using the decay chain D*(2010)+ -> D+ pi0 with D+ -> K- pi+ pi+. We additionally combine this result with a previous BABAR measurement of m(D*(2010)+) - m(D0) and obtain results that are approximately seven times more precise than the present world averages.

Primary author: Dr ANULLI, fabio (INFN Sezione di Roma)

Presenter: BEVAN, Adrian John (Queen Mary University of London)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **183** Type: **not specified**

Study of three-body charmonium decays in BABAR

Thursday, April 14, 2016 12:20 PM (20 minutes)

We study the reaction e+ e− -> gamma_ISR J/psi, where J/psi -> pi+ pi- pi0, and J/psi -> K+ K- pi0, using events obtained from the Initial State Radiation process. We measure the relative J/psi branching fraction and perform a Dalitz plot analysis of both J/psi decay modes using an isobar and a Veneziano model.
We present also an analysis of the process gamma gamma -> K anti-K pi. We observe the decays eta_c -> K_S K+- pi-+ and eta_c -> K+ K- pi0 and perform a Dalitz analysis of both eta_c decay modes. We also extract the mass dependent K_pi S-wave amplitude and phase using a model-independent partial wave analysis approach.
These studies have been performed using the entire BABAR dataset collected at the PEP-II e+e- collider.

Primary author: Dr ANULLI, fabio (INFN Sezione di Roma)

Presenter: FIORAVANTI, Elisa (INFN and Uniersity of Ferrara)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **184** Type: **not specified**

Low-energy hadronic cross sections measurements at BABAR, and implication for the g-2 of the muon

Thursday, April 14, 2016 10:00 AM (15 minutes)

The BABAR Collaboration has an intensive program studying hadronic cross sections at low-energy e+e- annihilation, accessible via initial-state radiation. Our measurements allow significant improvements in the precision of the predicted value of the muon anomalous magnetic moment. These improvements are necessary for shedding light on the current ~3 sigma difference between the predicted and the experimental values.
We have published results on a number of processes with two to six hadrons in the final state, and other final state are currently under investigation. We report here on the most recent results obtained by analysing the entire BABAR dataset.

Primary author: Dr ANULLI, fabio (INFN Sezione di Roma)

Presenter: BERNARD, Denis (Ecole Polytechnique)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **185** Type: **not specified**

Photoproduction of J/ψ and $Upsilon$ states in exclusive and proton-dissociative diffractive events

Wednesday, April 13, 2016 5:30 PM (15 minutes)

The amplitude for $\gamma p \to Vp$, where V is a J/ψ or Υ ground state or excited vector meson, is calculated in a pQCD k_T-factorization approach.
We use this amplitude to predict
the cross section for exclusive photoproduction of $J/\psi, psi'$, Υ mesons in proton-proton collisions.
Calculations are performed for a variety of unintegrated gluon distributions, and we compare to LHCb data.
Here we especially focus on the possibilty of constraining saturation effects.
Compared to earlier calculations we include both Dirac and Pauli electromagnetic form factors.
We discuss the role of the $Q\bar{Q}$ light-cone wave
functions for differential distributions for ratios
such as $\sigma(\psi')/\sigma(J/\psi)$.
Absorption effects are always taken into account.

We also discuss the related diffractive production in proton dissociative events.
Here special emphasis is put on electromagnetic dissociation , which is calculable without additional free parameters.
Besides being of interest in their own right, dissociative events constitute an important experimental background to exclusive production.
We also comment on the role of dissociative photoproduction for other states, e.g. light vector mesons.

The talk will be based on

A. Cisek, W. Scha\"fer and A. Szczurek, JHEP 1504 (2015) 159
and ongoing work by the same authors.

Primary authors: Dr CISEK, Anna (University of Rzeszow); Prof. SZCZUREK, Antoni (Institute of Nuclear Physics PAN); Dr SCHAFER, Wolfgang (Institute of Nuclear Physics PAN)

Presenter: Dr SCHAFER, Wolfgang (Institute of Nuclear Physics PAN)

Session Classification: WG4/WG5 joint session (HF+diffraction)

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **187** Type: **not specified**

The Gottfried Sum Rule Revisited

Wednesday, April 13, 2016 9:00 AM (15 minutes)

Significant progress has recently been made, both experimentally and theoretically, in extracting the neutron structure function from deuterium data. Of particular note are the new CTEQ-JLab (CJ) nuclear corrections for large x PDF extraction, and the Jefferson Lab "BONUS" experiment, where a novel tagged proton spectator approach was employed to isolate the neutron target in electron-deuteron scattering. The BONUS data, combined with a wealth of precision deuterium data from Jefferson Lab, SLAC, and NMC, the latter now all with state-of-the-art CJ nuclear corrections applied, has been used to re-evaluate the Gottfried Sum rule integrand F2n-F2p. Results of this analysis will be presented, and compared with the well-known results from NMC which lacked precision neutron extraction.

Primary author: Prof. NICULESCU, Ioana (James Madison University)

Co-authors: Prof. ACCARDI, Alberto (Hampton University); Dr KEPPEL, Cynthia (Thomas Jefferson National Accelerator Facility); Prof. NICULESCU, Gabriel (James Madison University); Dr MELNITCHOUK, Wally (Thomas Jefferson National Accelerator Facility)

Presenter: Dr KEPPEL, Cynthia (Thomas Jefferson National Accelerator Facility)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **188** Type: **not specified**

Angular Distributions of Drell-Yan Dimuons at Fermilab Experiment 906/SeaQuest

Wednesday, April 13, 2016 9:20 AM (15 minutes)

The Lam-Tung relation, a pertubative QCD, "Callan-Gross-like" correlation of the azimuthal and polar angles of leptonic products relative to the initial hadronic plane in multiple frames, defines a standard component of any analysis using Drell-Yan as a nucleon probe. In at least three experiments involving Drell-Yan between various species of pions and nuclei at CERN and Fermilab, the existence of what appears to be (at leading-order) a double-spin flip in a single photon process manifests itself as a cosine modulation in dilepton azimuthal distributions. This modulation suggests significant non-perturbative effects, including the Boer-Mulders distribution, a nonzero correlation between the motion and spin of transversely polarized (anti)quarks within their encompassing unpolarized nucleon. Fermilab Experiment 866/NuSea saw a Lam-Tung violation in proton-induced Drell-Yan characterized by a smaller cosine dilepton azimuthal modulation relative to previous experiments conducted with pions and heavier nuclear targets with lower energy beams from the SPS at CERN. SeaQuest is investigating the difference with greater precision and at a higher x range than any previous Drell-Yan experiment. Studies of the angular distributions of dimuons in SeaQuest will be presented.

Primary author: Mr RAMSON, Bryan (University of Michigan)

Presenter: Mr RAMSON, Bryan (University of Michigan)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **189** Type: **not specified**

Comparison of the F2 Structure Function in Iron as Measured by Charged Lepton and Neutrino Probes

Wednesday, April 13, 2016 11:20 AM (15 minutes)

World data for the F2 structure function for Iron, as measured by multiple charged lepton and neutrino scattering experiments, are compared. Data obtained from charged lepton and neutrino scattering at larger values of x are in remarkably good agreement with a simple invocation of the 18/5 rule, while a discrepancy in the behavior of the data obtained from the different probes well beyond the data uncertainties is observed in the shadowing/anti-shadowing transition region where the Bjorken scaling variable x is less than 0.15. The data are compared to theoretical calculations. Details and results of the data comparison will be presented.

Primary author: Dr CYNTHIA, Keppel (Thomas Jefferson National Accelerator Facility)

Co-authors: Prof. CHRISTY, M. Eric (Hampton University); Dr KALANTARIANS, Narbe (Hampton University)

Presenter: Dr CYNTHIA, Keppel (Thomas Jefferson National Accelerator Facility)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **190** Type: **not specified**

Ultra-Peripheral Collisions with gold ions in STAR

Wednesday, April 13, 2016 10:00 AM (15 minutes)

In 2010 and 2011, the STAR Collaboration collected a large sample of triggers for ultra-peripheral collisions.In this talk, I will present several new results involving photonuclear interactions in ultra-peripheral relativistic heavy ion collisions (UPCs). I will present an analysis of 384,000 photoproduced pion pairs, coming from rho, omega and direct pion pair production.The omega component is clearly visible through its interference with the rho peak. Measurements of the relative amplitudes of the three components will be presented, along with the phase angle between the rho and omega components. The squared momentum transfer (t) spectrum shows coherent and incoherent components. The coherent component exhibits visible diffraction minima, characteristic of the gold target nucleus. The large data sample also allows us to explore higher mass final states.I will present measurements of J/psi photoproduction and of a high-mass dipion final state.

Primary author: Dr KLEIN, Spencer (Lawrence Berkeley National Laboratory)

Presenter: Dr KLEIN, Spencer (Lawrence Berkeley National Laboratory)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **191** Type: **not specified**

Extracting Spin Dependent Parton Distributions from Deeply Virtual Scattering Processes

Thursday, April 14, 2016 11:30 AM (15 minutes)

Spin and transverse momentum dependent parton distributions - GPDs, TMDs and GTMDs - are at the interface between the non-perturbative regime of QCD hadron structure and observable quantities. The distributions appear as linear superpositions and convolutions within helicity amplitudes for parton-nucleon scattering processes, which, in turn, occur in amplitudes for leptoproduction processes. The phenomenological extraction of the amplitudes, and hence the distributions, is a challenging task. We will present relations between crucial quark-nucleon or gluon-nucleon helicity amplitudes and the rich array of angular distributions in Deeply Virtual Compton Scattering, Time-like Compton Scattering and novel Multi-hadron photon processes. These provide an important window into the spin structure of the nucleons.

Primary author: Prof. GOLDSTEIN, Gary (Tufts University)

Co-author: Prof. LIUTI, Simonetta (University of Virginia)

Presenter: Prof. GOLDSTEIN, Gary (Tufts University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **192** Type: **not specified**

The evolution of the virtual photon-proton cross section with coherence length

Tuesday, April 12, 2016 9:00 AM (15 minutes)

Assuming the form $\sigma^{\gamma P} \propto l^{\lambda_{\rm eff}}$ at fixed Q^2 for the behavior of the virtual-photon proton scattering cross section, where l is the coherence length of the photon fluctuations, it is seen that the extrapolated values of $\sigma^{\gamma P}$ for different Q^2 cross for $l \approx 10^8$~fm. It is argued that this behavior is not physical, and that the behavior of the cross sections must change before this coherence length l is reached. The behavior is compared to expectations to expectations from various models.

Primary author: CALDWELL, Allen (Max Planck Institute)

Presenter: CALDWELL, Allen (Max Planck Institute)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **193** Type: **not specified**

Resonance production in Pomeron-Pomeron collisions at the LHC

Tuesday, April 12, 2016 5:50 PM (15 minutes)

A Regge pole model for Pomeron-Pomeron total cross section in the resonance region $\sqrt{M^2} \leq 5$ GeV is presented. The cross section is saturated by direct-channel contributions from the Pomeron as well as from two different f trajectories, accompanied by the isolated $\mathrm{f}_0(500)$ resonance dominating the $\sqrt{M^2} \leq 1$ GeV region. A slowly varying background is taken into account. The calculated Pomeron-Pomeron total cross section cannot be measured directly, but is an essential part of central diffractive processes. In preparation of future calculations of central resonance production at the hadron level,
and corresponding measurements at the LHC, we normalize the Pomeron-Pomeron cross section at large masses $\sigma_t^{PP}(\sqrt{M^2} \to \infty) \approx 1$ mb as suggested by QCD-motivated estimates.

Primary author: Dr SCHICKER, Rainer (Phys. Inst., Heidelberg)

Co-authors: Prof. JENKOVSZKY, Laszlo (Bogolyubov Inst. for Theor. Physics, Kiev); Prof. FIORE, Roberto (Dept. of Physics, Nat. Inst. of Nuclear Physics, University of Calabria)

Presenter: Dr SCHICKER, Rainer (Phys. Inst., Heidelberg)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **194** Type: **not specified**

Polarised Drell-Yan Process in the COMPASS Experiment

Tuesday, April 12, 2016 3:00 PM (15 minutes)

The COMPASS experiment at CERN has been contributing to the knowledge on the nucleon structure, and its description in terms of the Transverse Momentum Dependent Parton Distribution Functions (TMD PDFs), accessed through the SIDIS process. In 2014/2015 the data taking was dedicated to the polarised Drell-Yan (DY) measurement with a negative pion beam and a transversely polarised proton target, as well as unpolarised nuclear targets. These data are now being analysed. The predicted sign
change in the Sivers distribution when accessed from DY with respect to SIDIS will be measured. The details on the experimental setup, the covered phase space, a preliminary first look into data distributions and predictions for the full data sample will be presented.

Primary author: QUARESMA, Márcia (LIP - Lisbon)

Presenter: QUARESMA, Márcia (LIP - Lisbon)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **196** Type: **not specified**

Quark and Gluon collinear and TMD parton distributions from HERA DIS data

Thursday, April 14, 2016 9:00 AM (20 minutes)

We describe a new approach to solve the coupled quark and gluon evolution DGLAP evolution equations with a Monte Carlo method. We show that this method is equivalent to other methods. We apply this method to extract quark and gluon parton densities collinear and as transverse momentum dependent (TMD) distributions using the precision HERA DIS data.
The Monte Carlo method for the solution of the evolution equation allows to estimate also large x threshold resummation effects.

Primary author: JUNG, Hannes (DESY)

Co-authors: LELEK, Aleksandra (DESY); HAUTMANN, Francesco (Oxford University)

Presenter: LELEK, Aleksandra (DESY)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **197** Type: **not specified**

Physics case of the very high energy electron-proton collider

Tuesday, April 12, 2016 5:44 PM (21 minutes)

The possibility of using plasma wakefield acceleration to build an electron-proton collider (VHEeP) at a centre-of-mass energy of 9 TeV was presented at the DIS2015 workshop. In this talk, the physics case is further developed, with more detailed studies at low parton momentum fractions, x, down to 10^-8. The VHEeP collider also has sensitivity to the production of leptoquarks approaching the kinematic limit and thus extends the reach currently accessible. Other exotic physics such as a quark sensitivity can also be probed at higher energies or smaller distances. These and other studies are presented, demonstrating that an ep collider with an energy a factor of 30 above HERA has sensitivity to new physical phenomena.

Primary authors: CALDWELL, Allen (MPI Munich); WING, Matthew (UCL)

Presenter: WING, Matthew (UCL)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **198** Type: **not specified**

The t-dependence of the pure DVCS cross-section at COMPASS

Wednesday, April 13, 2016 5:20 PM (15 minutes)

A major part of the COMPASS-II program will be dedicated to the investigation of generalized parton distributions (GPDs)
and transverse momentum dependent parton distributions (TMDs), which aim for the most complete
description of the partonic structure of the nucleon.

GPDs are experimentally accessible via lepton-induced exclusive reactions, in particular
the Deeply Virtual Compton Scattering (DVCS)
and Deeply Virtual Meson Production (DVMP). At COMPASS, those processes are investigated using an high intensity
muon beam of 160 GeV and a 2.5 m-long liquid hydrogen target. In order to optimize the selection of exclusive reactions at those
energies, the target is surrounded by a new barrel-shaped time-of-flight system to detect the recoiling particles.

COMPASS-II covers the up to now unexplored x_{Bj} domain ranging from 0.01 to 0.15.
The option to change simultaneously the charge and polarization of the muon beam allows to perform DVCS measurements on a proton target and to
access the Compton form factor related to the dominant GPD H, and thus to provide new experimental constraints
on the theoretical GPD models in the intermediate x_{Bj} regime.

From the sum of cross-sections measured with positive and negative beam polarity, the pure DVCS cross-section can be extracted.
Pilot measurements for the COMPASS II program allow for an extraction of the t-dependence of the pure DVCS cross-section in a single x_{Bj} bin.
This provides first information on the nucleon transverse size in an up to now uncharted x_{Bj} regime.

Primary author: Mr JÖRG, Philipp (University of Freiburg)

Presenter: Mr JÖRG, Philipp (University of Freiburg)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **199** Type: **not specified**

Measurement of double helicity asymmetries (A_{LL}) in π^0 and $\pi^\pm$ production at mid-rapidity in longitudinally polarized $p+p$ collisions at $\sqrt{s}$ = 510 GeV with PHENIX experiment

Wednesday, April 13, 2016 11:40 AM (15 minutes)

One of the main goals of the RHIC spin program is the determination of the gluon helicity contribution to the proton spin. This can be accessed by measuring double spin asymmetries (A_{LL}) of pion production at mid-rapidity in longitudinally polarized proton collisions with the PHENIX experiment. The ordering of the asymmetries with the charge of the final state pions can in addition directly infer the sign of the gluon spin contribution.
Charged and neutral pions are reconstructed in the central PHENIX tracking system and electromagnetic calorimeters, respectively. The asymmetries are evaluated between collisions of bunches with the same and opposite helicity after correcting for differences in luminosity and for beam polarizations.
The A_{LL} measurements of pion production at $\sqrt{s}$ = 200 GeV have been published previously. To extend our understanding of the gluon polarization to a lower gluon momentum fraction (x), high statistics data was collected at a higher $\sqrt{s}$ = 510 GeV in 2012-2013. We present the recently published π^0 production results and the status of the $\pi^\pm$ A_{LL} measurements at mid-rapidity at $\sqrt{s}$ = 510 GeV. The neutral pion result confirms a positive contribution of the gluon spins to the proton spin for $x > 0.05$ and provides additional constraints on the gluon polarization down to $x \sim 0.01$.

Primary author: Mr MOON, Taebong for the PHENIX collaboration (Yonsei Univ./RIKEN)

Presenter: SEIDL, Ralf (RIKEN)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **200** Type: **not specified**

Measurement of forward direct photon production in p–A at LHC with ALICE – a probe for nuclear PDFs and saturation

Tuesday, April 12, 2016 2:28 PM (20 minutes)

Direct photon production at forward rapidity is a promising probe for the gluon content of protons and nuclei at small x. In particular, the measurement of the nuclear modification factor for direct photons in p–A collisions at the LHC should provide a crucial test for gluon saturation. We discuss the unique role of such a photon measurement in the context of other measurements at the LHC and also of possible future measurements at EIC. To allow us to perform this measurement, a new forward calorimeter (FoCal) is proposed as an upgrade to the ALICE experiment. The proposed detector covers the range 3.5 < eta⊠ < 5 which probes the gluon distributions at x ~ 10^-5 and Q ~ pT > 4 GeV. We will discuss performance studies of such a detector, which demonstrate that extremely high-granularity calorimetry is required for a successful measurement, and show a few recent results from R&D for this project.

Primary author: Prof. PEITZMANN, Thomas (Utrecht University)

Presenter: Prof. PEITZMANN, Thomas (Utrecht University)

Session Classification: WG1/WG7 joint session (PDF+future exp.)

Track Classification: Future Experiments

Contribution ID: **201** Type: **not specified**

Charged pion, kaon, and unidentified hadron multiplicities in semi-inclusive deep-inelastic scattering (SIDIS) from COMPASS

Tuesday, April 12, 2016 5:30 PM (15 minutes)

The latest measurements of charged pion, kaon, and unidentified hadron multiplicities in semi-inclusive deep-inelastic scattering from the COMPASS experiment at CERN are presented. The data were collected using a 160 GeV muon beam incident on an isoscalar 6LiD target. The large statistics collected cover a wide kinematic range in photon virtuality: 1 < Q2 < 50 (GeV/c)2, relative virtual-photon energy: 0.1 < y < 0.7 , Bjorken scaling variable: 0.004 < x < 0.4, and relative hadron energy: 0.2 < z < 0.85. In addition, we present the charge sum of the multiplicities integrated over z. The results of the pion and unidentified hadron sums are in very good agreement with LO expectations, while the results of the kaon sum show a different x dependence than that predicted using the current DSS ratio of fragmentation functions Dstr/Dfav.

Primary author: Dr KUNNE, Fabienne (CEA Saclay DSM/IRFU/SPhN/LSN)

Presenter: Dr SEDER, Erin (CEA Saclay DSM/IRFU/SPhN/LSN)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **203** Type: **not specified**

Prompt double J/ψ production in proton-proton collisions at the LHC

Thursday, April 14, 2016 11:40 AM (20 minutes)

We provide a detailed study of prompt double J/ψ production within the non-relativistic QCD (NRQCD) framework in proton-proton collisions at the LHC. We confront the recent LHC data with the results obtained at leading-order (LO) in the NRQCD framework within two approaches of the collinear factorization and the kT-factorization. We show that the LHCb data can be fairly described within the kT-factorized LO NRQCD, while the collinearly factorized LO NRQCD significantly overshoots the LHCb data at low J/ψ-pair invariant mass. We show that the LO NRQCD formalism cannot describe the recent CMS data, with about one order of magnitude discrepancy. If the CMS data are confirmed, this indicates rather large higher-order corrections for prompt double J/ψ production. We provide various predictions which can further test the NRQCD-based approach at the LHC in a kinematic region that LO contributions dominate.

Primary author: REZAEIAN, Amir (niversidad Tecnica Federico Santa Maria)

Co-author: BARANOV, Sergey (Lebedev Institute of Physics)

Presenter: BARANOV, Sergey (Lebedev Institute of Physics)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **204** Type: **not specified**

Single spin asymmetries of forward neutron production in polarized p+p and p+A collisions at sqrt(s)=200 GeV

Tuesday, April 12, 2016 11:00 AM (15 minutes)

In high-energy hadron collisions, most energy goes into the forward region.
However, particle production mechanisms in the forward region are not well
understood as perturbative QCD is not applicable at small momentum transfers.
We study single spin asymmetries (A_N) of forward neutron production
in the PHENIX experiment using a transversely polarized proton beam.
In 2015, we took data for p + A collisions for the first time with
Au and Al beams at sqrt(s_NN)= 200 GeV and observed a surprising A dependence.
The results will be presented in the conference together with discussions
on possible mechanisms that could explain the A_N results of
forward neutron production.

Primary author: Dr TANIDA, Kiyoshi (Japan Atomic Energy Agency)

Presenter: Dr TANIDA, Kiyoshi (Japan Atomic Energy Agency)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **205** Type: **not specified**

The gluon Sivers asymmetry measurements at COMPASS

Tuesday, April 12, 2016 3:20 PM (15 minutes)

The Sivers effect describes the correlation between the spin of the nucleon and the orbital motion of partons. For gluons it has been measured at COMPASS via J/Ψ production and via high-p_T hadron pair production in Semi-Inclusive Deep Inelastic Scattering of a 160 GeV/c muon beam off transversely polarised proton and deuteron targets by determining the amplitude of the modulation of the Sivers angle ϕ^{Siv} distribution. Both the approach using J/Ψ channel and high-p_T hadron pair selection will be described in detail and the results given.

Primary author: Mr SZABELSKI, Adam (University of Trieste)

Presenter: Mr SZABELSKI, Adam (University of Trieste)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **206** Type: **not specified**

Nuclear parton distributions from the nCTEQ group

Wednesday, April 13, 2016 11:40 AM (15 minutes)

We present the nCTEQ15 global analysis of nuclear parton distribution functions (nPDFs). The main addition to the previous nCTEQ analysis is
the introduction of PDF uncertainties based on a modified Hessian method. Another important improvement is the inclusion of pion production data from RHIC providing additional constraints on gluon PDF. In this presentation we briefly discuss the framework of our analysis and concentrate on the comparison of our results with those of other groups providing nPDFs. Additionally we present predictions for selected results from the LHC heavy ion collisions.

Primary author: KUSINA, Aleksander (LPSC Grenoble)

Presenter: KUSINA, Aleksander (LPSC Grenoble)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **207** Type: **not specified**

The CT14 MC replicas

Wednesday, April 13, 2016 5:50 PM (15 minutes)

The Parton Distribution Functions(PDFs) are the non-perturbative input of the theoretical calculation of physical observable in a hadron collider. In the era of precision measurement, the uncertainty estimation of the PDFs is sensitive to the searching of new physics. In this talk, the CT14 Monte Carlo replica and its comparison with the CT14 Hessian sets would be presented.

Primary author: Dr HOU, Tie-Jiun (Southern Methodist University)

Co-authors: Prof. YUAN, C.–P. (Michigan State University); Prof. SCHMIDT, Carl (Michigan State University); Prof. STUMP, Daniel (Michigan State University); Prof. HUSTON, Joey (Michigan State University); Prof. PUMPLIN, Jon (Michigan State University); Dr GAO, Jun (Argonne National Laboratory); Dr GUZZI, Marco (University of Manchester); Prof. NADOLSKY, Pavel (Southern Methodist University); Prof. DULAT, Sayipjamal (Xinjiang University)

Presenter: Dr HOU, Tie-Jiun (Southern Methodist University)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **208** Type: **not specified**

A determination of mc(mc) from HERA data using a matched heavy quark scheme

Tuesday, April 12, 2016 5:10 PM (15 minutes)

In this talk I will present a novel determination of the mass of the charm quark extracted by analyzing the statistical quality of fits of parton distribution functions (PDFs) to inclusive and exclusive charm deep-inelastic scattering (DIS) cross-section data from Runs I and II of the HERA collider. We employ the running mass definition in the MSbar scheme, which improves the perturbative stability as compared to the pole-mass definition, in the framework of the FONLL general-mass scheme. The analysis is based on the xFfitter framework, with structure functions computed in the FONLL scheme as implemented in the APFEL code.

Primary author: Dr BERTONE, Valerio (University of Oxford)

Presenter: Dr BERTONE, Valerio (University of Oxford)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **209** Type: **not specified**

TMDlib and TMDplotter

Thursday, April 14, 2016 10:05 AM (12 minutes)

We present the TMDlib project which contains a collection on transverse momentum dependent (TMD) parton distributions obtained in different frameworks. The TMDplotter is a a web based plotting tool for TMD parton distributions as well as for collinear parton distributions included in LHAPDF. TMDplotter has additional plotting features, such as parton luminosities for collinear and TMD parton distributions.

Primary author: JUNG, Hannes (DESY)

Co-authors: HAUTMANN, Francesco (Oxford University); SCHELLER, Johannes (DESY); CONNOR, Patrick (DESY)

Presenter: CONNOR, Patrick (DESY)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **210** Type: **not specified**

TMD studies with a fixed-target experiment using the LHC beams

Wednesday, April 13, 2016 2:30 PM (20 minutes)

We report on the opportunities for spin physics and Transverse-Momentum Dependent distribution (TMD) studies at a future multi-purpose fixed-target experiment using the proton LHC beams extracted by a bent crystal or using an internal gas target. The LHC multi-TeV beams allow for the most energetic fixed-target experiments ever performed, opening new domains of particle and nuclear physics and complementing that of collider physics, in particular that of RHIC and the EIC projects. The luminosity achievable with AFTER@LHC surpasses that of RHIC by more that 3 orders of magnitude in a similar energy region. In unpolarised proton-proton collisions, AFTER@LHC allows for measurements of TMDs such as the Boer-Mulders quark distributions, the distribution of unpolarised and linearly polarised gluons in unpolarised protons. Using polarised targets, one can measure transverse single-spin asymmetries (SSA) of quark and gluon sensitive probes, such as, respectively, Drell-Yan pair and quarkonium production. The fixed-target mode has the advantage to allow for measurements in the target-rapidity region, namely at large x in the polarised nucleon. We will present figures-of-merit for Drell-Yan SSA and prospects for SSA for gluon sensitives probes.

Primary author: LANSBERG, Jean-Philippe (IPN Orsay - Paris Sud U. - CNRS/IN2P3)

Presenter: LANSBERG, Jean-Philippe (IPN Orsay - Paris Sud U. - CNRS/IN2P3)

Session Classification: WG6/WG7 joint session (spin+future exp.)

Track Classification: Future Experiments

Contribution ID: **211** Type: **not specified**

The Higgs singlet extension at LHC Run 2

Wednesday, April 13, 2016 4:50 PM (15 minutes)

I discuss the current status of theoretical and experimental constraints on the real Higgs singlet extension of the Standard Model. For the second neutral (non-standard) Higgs boson the full mass range from 1 GeV to 1 TeV accessible at past and current collider experiments is considered. I present benchmark scenarios for searches for an additional Higgs state in the real Higgs singlet extension of the Standard Model in Run 2 of the LHC.I will furthermore discuss electroweak corrections to the H to hh partial decay width within this model.

Primary author: Dr ROBENS, Tania (IKTP, TU Dresden)

Presenter: Dr ROBENS, Tania (IKTP, TU Dresden)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **213** Type: **not specified**

AdS/QCD predictions for diffractive ϕ meson production

Tuesday, April 12, 2016 11:40 AM (15 minutes)

We use the holographic light front wavefunction for the ϕ meson obtained from AdS/QCD, in conjunction with the Color Glass Condensate dipole cross-section whose parameters are fitted to the most recent precise combined HERA data on inclusive Deep Inelastic Scattering, to compute the rate for diffractive ϕ electro-production. Our predictions are in good agreement with the available data collected at the HERA collider.

Primary author: Prof. AHMADY, Mohammad (Mount Allison University)

Co-authors: Dr SHARMA, Neetika (Indian Institute of Science Education and Research Mohali); Dr SANDAPEN, Ruben (Acadia University)

Presenter: Prof. AHMADY, Mohammad (Mount Allison University)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **214** Type: **not specified**

On the asymptotic behaviour of parton distribution functions at small and large x

Wednesday, April 13, 2016 6:10 PM (15 minutes)

The behaviour of parton distribution functions (PDFs) at sufficiently small and large values of momentum fractions is expected to be governed by a power law, as a result of Regge theory and spectator counting rules respectively. I investigate in which regions of momentum fraction and energy such an asymptotic behaviour emerges, based on recent determinations of PDFs from a global analysis of experimental data. I discuss how these compare with theoretical expectations provided by perturbative and non-perturbative quantum chromodynamics (QCD) and models of nucleon structure, I examine how much the latter can be discriminated by the data, and I comment on how these are related to our first-principle understanding of QCD.

Primary author: Dr NOCERA, Emanuele Roberto (Rudolf Peierls Centre for Theoretical Physics University of Oxford)

Presenter: Dr NOCERA, Emanuele Roberto (Rudolf Peierls Centre for Theoretical Physics University of Oxford)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **215** Type: **not specified**

Stability structure of the GLR equation

Thursday, April 14, 2016 12:40 PM (15 minutes)

We investigate the stability of the saturation regime of the Gribov-Levin-Ryskin equation against azimuthal perturbations, and argue that the appearance of unstable modes could lead to the "spontaneus symmetry breaking" of azimuthal symmetry in high energy pp and AA collisions. We discuss the phenomenology of this hypothesis in light of the "harmonic flow" observable seen in heavy ion collisions.

Primary authors: Prof. TORRIERI, Giorgio (IfgW-Unicamp); Mr GAMBINI, Guillermo (IFGW-Unicamp)

Presenter: Mr GAMBINI, Guillermo (IFGW-Unicamp)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **216** Type: **not specified**

The spin structure of the proton at low x and low Q2 in two-dimensional grids from COMPASS

Wednesday, April 13, 2016 11:20 AM (15 minutes)

The longitudinal double spin asymmetries A₁^p and the spin dependent structure function of the proton g₁^p were extracted from COMPASS data in the region of low x and low Q². The data were taken on 2007 and 2011 from scattering of polarised muons off polarised protons, resulting in a sample that is 150 times larger than the one from the previous experiment SMC that pioneered searches in this kinematic region.

For the first time, A₁^p and g₁^p were evaluated in this region in two-dimensional grids of kinematic variables: (x,Q²), (ν,Q²), (x,ν) and (Q²,x). The following kinematic region was investigated: 4.0x10⁻⁵«i>x<4.0x10⁻², 0.001«i>Q²<1 (GeV/c)² and 14<ν<194 GeV. The obtained results can be confronted with theoretical models.

Primary author: NUNES, Ana Sofia (LIP-Lisbon)

Presenter: NUNES, Ana Sofia (LIP-Lisbon)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **217** Type: **not specified**

The path through sPHENIX and fsPHENIX toward an EIC detector at eRHIC

Wednesday, April 13, 2016 11:23 AM (20 minutes)

eRHIC is one of the options proposed as a high luminosity, polarized Electron-Ion Collider (EIC) that is based on using one of the RHIC hadron rings and a multipass Energy Recovery Linac. A beam of polarized electrons with an energy up to 21 GeV would collide with a variety of ion species, from polarized protons with a top energy of 250 GeV to fully-stripped uranium ions with energies up to 100 GeV/u. It will allow for covering a center-of-mass energy range up to 145 GeV for polarized e+p, and up to 90 GeV for e+A (for large A) collisions. One of the possible detectors to perform precision studies of the partonic structure of hadronic matter will be an upgraded PHENIX detector. The path will lead through the detector that will be built around the BaBar magnet, sPHENIX, with its components at midrapidity $|\eta|<1$ followed by an sPHENIX-Forward upgrade and additional modifications specific to the successive EIC detector. We will discuss the approach that leads to that EIC detector and present goals and requirements for a broad set of measurements from day-1 of eRHIC.

Primary author: Dr DEHMELT, Klaus (Stony Brook University)

Presenter: Dr DEHMELT, Klaus (Stony Brook University)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **219** Type: **not specified**

Double parton interactions in diphoton + dijet events, J/ψi+J/ψ events, and J/ψ+Y events in proton-antiproton collisions at √s=1.96 TeV

Thursday, April 14, 2016 12:36 PM (20 minutes)

We use a sample of diphoton + dijet events collected using the D0 detector at the Fermilab Tevatron Collider to measure the effective cross section of double parton interactions in proton-antiproton collisions at √s=1.96 TeV. We also study the simultaneous production of two heavy quarkonia (two J/ψ or J/ψ and Y) to extract the effective cross section of double parton interactions. We report the first evidence for the simultaneous production of J/ψ and Y.

Primary authors: Mr TUCHMING, Boris (CEA Saclay); Mr BERTRAM, Iain (Lancaster University)

Presenter: Mr BERTRAM, Iain (Lancaster University)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **220** Type: **not specified**

Search for new exotic QCD states in proton-antiproton collisions at D0

Thursday, April 14, 2016 9:20 AM (15 minutes)

We have used the full D0 dataset consisting of 10.4 fb-1 of proton-antiproton collision data to search for new exotic QCD states. We report on the results in specific channels.

Primary authors: Mr TUCHMING, Boris (CEA Saclay); Mr BERTRAM, Iain (Lancaster University)

Presenter: Mr BERTRAM, Iain (Lancaster University)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **221** Type: **not specified**

Correlations in back-to-back hadron production in SIDIS

Tuesday, April 12, 2016 12:00 PM (15 minutes)

The Deep Inelastic Scattering (DIS) proved to be a great tool in testing
the theory of strong interactions, which was a major focus in last decades.
Semi-Inclusive DIS (SIDIS), with detection of an additional hadron, allowed first studies of 3D structure of the nucleon, moving the main focus from testing the QCD to understanding of strong interactions and quark-gluon dynamics
to address a number of puzzles accumulated in recent years. Detection of two hadrons in SIDIS, which is even more complicated, provides access to details of quark-gluon interactions inaccessible in single-hadron SIDIS, providing a new avenue to study the complex nucleon structure. Although, the Target Fragmentation Region (TFR) of DIS, when the hadrons are created from the target remnant, carries important information about the spin and flavor structure of
the nucleon, it has not been studied systematically in experiments due to lack of experimental data and theory fundamentals.
In this contribution we present first measurements of single spin asymmetry in semi-inclusive production of protons and charged pions in hard scattering kinematics (Q2 > 1 GeV2, W2 > 4 GeV2), performed by the CLAS collaboration using 5.5 GeV and 5.7 GeV longitudinally polarized electron beams
scattering off the unpolarized liquid-hydrogen target. The large acceptance of the CLAS detector at Jefferson Lab, allowing detection of two hadrons produced back-to-back in the current and target fragmentation regions, provides
a unique possibility to study the nucleon structure in target fragmentation region, and to explore the presence of possible correlations of target and current fragmentation regions.

Primary authors: AVAGYAN, Harut (JLab); MIRAZITA, Marco (LNF-INFN); PISANO, Silvia (LNF-INFN)

Presenter: AVAGYAN, Harut (JLab)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **222** Type: **not specified**

Azimuthal distributions in unpolarized SIDIS

Tuesday, April 12, 2016 12:20 PM (15 minutes)

Studies of spin-azimuthal asymmetries in semi-inclusive production of hadrons have been widely recognized as key objectives of the JLab 12 GeV upgrade and a driving force behind the construction of the Electron Ion Collider. Various assumptions involved in preliminary extraction of underlying transverse momentum dependent partonic distributions (TMDs) from available data, have yet to allow credible estimates of systematic errors associated with those assumptions.
One of the challenges in extraction of underlying transverse momentum dependent partonic distributions from precision measurements of hard scattering processes is the clear understanding of the QCD fundamentals of quark-gluon correlations and higher twist effects.
In recent years it became clear, that observables which are constructed by taking ratios are not ideal grounds for studies of TMDs, and in particular transverse momentum of TMDs and their evolution effects, which are the most intriguing part of 3D non-perturbative partonic distributions.
The high-statistics data samples from HERMES and COMPASS collaborations have been used in phenomenological analyses to extract information on the flavor dependence of unpolarized TMD distribution and fragmentation functions. The hadron multiplicities study is now being extended to a multi-dimensional analysis, in particular looking to the transverse momentum dependence and its correlations
with other kinematic variables, including the azimuthal angle between lepton scattering and hadron production planes.
In this contribution we present recent studies of azimuthal dependences of charged pion distributions in SIDIS using the CLAS data at 5.5 GeV, and comparison with measurements performed at higher energy by the HERMES
collaboration.

Primary authors: AVAGYAN, Harut (JLab); JOO, Kyungseon (UConn); HARRISON, Nathan (UConn)

Presenter: AVAGYAN, Harut (JLab)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **223** Type: **not specified**

Saturation effect in TMD parton distributions obtained from HERA data

Thursday, April 14, 2016 9:25 AM (12 minutes)

We apply a MC method to solve the evolution equations but use
a gluon density from saturation models as input. The sea and valence quark disributions are obtained from fits to HERA precision data.
We obtain TMD parton distributions (gluon and quarks) satisfying
saturation conditions.

Primary author: JUNG, Hannes (DESY)

Co-authors: HAUTMANN, Francesco (Oxford University); TAHERI MONFARED, Sara (IPM Istanbul)

Presenter: TAHERI MONFARED, Sara (IPM Istanbul)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **225** Type: **not specified**

Inclusive cross sections for pairs of identified light charged hadrons and single protons from Belle e+e− annihilation data

Tuesday, April 12, 2016 5:50 PM (15 minutes)

Inclusive cross sections and azimuthal asymmetries were extracted from
e+e− annihilation data collected with the Belle detector. These data were
taken at the KEKB e+e− collider at a center-of-mass energy of around
sqrt(s) = 10.58 GeV. The cross sections for single-hadron and hadron-pair production provide very clean information on the spin-independent fragmentation functions, which describe the spin-independent hadronization of quarks into final-state hadrons. The cross-section measurement for single protons extend the earlier measurements of single-pion and single-kaon production, providing new constraints on the fragmentation functions. Measurements of single-hadron cross sections, however, do not distinguish between favored and disfavored fragmentation. Measurements of hadron pairs, where the hadrons are nearly back to back, do provide sensitivity to favored and disfavored fragmentation, thereby providing additional invaluable input for the analysis of the nucleon structure studied in semi-inclusive deep-inelastic scattering and proton-proton collisions The recent status of the Belle measurement for single-proton cross sections and cross sections for various combinations of pairs of pions and kaons as well as of azimuthal asymmetries will be presented.

Primary author: Ms VAN HULSE, Charlotte (University of the Basque Country)

Presenter: Ms VAN HULSE, Charlotte (University of the Basque Country)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **226** Type: **not specified**

Exclusive meson production at HERMES

Wednesday, April 13, 2016 5:40 PM (15 minutes)

The HERMES experiment has extensively studied exclusive meson production in deep-inelastic scattering of the 27.6 GeV electron/positron beam of HERA by various gaseous targets internal to the storage ring. Recent results on exclusive omega production are presented: spin-density matrix elements using unpolarized and longitudinally polarized leptons and unpolarized hydrogen and deuterium targets, and azimuthal distributions for scattering from transversely polarized protons. In addition, an analysis of ratios of helicity-amplitudes for exclusive production of rho mesons from transversely polarized protons is presented.

Primary author: Mr SCHNELL, Gunar (University of the Basque Country Bilbao)

Presenter: MANAENKOV, Sergey (B.P. Konstantinov Petersburg Nuclear Physics Institute - PNPI)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **227** Type: **not specified**

Transverse-momentum dependent semi-inclusive deep-inelastic scattering at HERMES

Tuesday, April 12, 2016 12:40 PM (15 minutes)

Semi-inclusive deep-inelastic lepton-nucleon scattering provides a powerful tool for unraveling the multi-dimensional internal spin-momentum structure of the nucleon. In particular, the dependence on transverse momentum of the produced hadron allows the study of numerous novel effects like the Sivers and Collins mechanism. The HERMES experiment, with its versatile gas target internal to the HERA lepton storage ring, had taken data with various polarized and unpolarized nuclear-polarized gas targets. Results are presented on the azimuthal distribution of identified hadrons (pions, kaons, and protons) from scattering longitudinally polarized leptons by unpolarized protons and deuterons as well as from scattering both unpolarized and longitudinally polarized leptons by transversely polarized protons. Emphasis is given on the multi-dimensional dependences of these single- and double-spin asymmetries.

Primary author: Mr SCHNELL, Gunar (University of the Basque Country Bilbao)

Presenter: Ms VAN HULSE, Charlotte (University of the Basque Country)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **228** Type: **not specified**

Bose–Einstein correlations in hadron-pairs from lepto-production on nuclei ranging from hydrogen to xenon

Tuesday, April 12, 2016 9:15 AM (20 minutes)

Bose–Einstein correlations of like-sign charged hadrons produced in deep-inelastic electron and positron scattering are studied in the HERMES experiment using nuclear targets of 1H, 2H, 3He, 4He, N, Ne, Kr, and Xe. A Gaussian approach is used to parametrize a two-particle correlation function determined from events with at least two charged hadrons of the same sign charge. This correlation function is compared to two different empirical distributions that do not include the Bose–Einstein correlations. Clear signals of Bose–Einstein correlations for all target nuclei without a significant variation with the nuclear target mass are found. Also, no evidence for a dependence on the invariant mass W of the photon-nucleon system is found when the results are compared to those of previous experiments.

Primary author: Mr SCHNELL, Gunar (University of the Basque Country Bilbao)

Presenter: Dr KARYAN, Gevorg (Yerevan Physics Institute)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **229** Type: **not specified**

Next-generation nuclear DIS with spectator tagging at EIC

Wednesday, April 13, 2016 12:09 PM (20 minutes)

An Electron-Ion Collider (EIC) would enable next-generation measurements of DIS on light nuclei (deuteron, 3He, …) with detection of nucleons and fragments in the forward region and measurement of their recoil momentum (”spectator tagging”). Such experiments allow one to control the nuclear configuration during the high-energy process and could be used for (a) precision measurements of neutron spin structure using in electron-deuteron DIS with proton tagging, eliminating nuclear binding through on-shell extrapolation in the recoil momentum; (b) controlled measurements
of the nuclear modifications of quark/gluon densities (EMC effect) in defined nuclear configurations; (c) novel studies of diffraction and nuclear shadowing at x « 0.1.
We review the physics applications of spectator tagging at EIC, summarize the experimental and theoretical challenges, and report process simulations and physics impact studies from a dedicated R&D project.

Primary author: Mr WEISS, Christian (Jefferson Lab)

Co-authors: HYDE, Charles (Old Dominion University); HIGINBOTHAM, Doug (Jefferson Lab); PARK, Kijun (Old Dominion University); STRIKMAN, Mark (Penn State University); SARGSIAN, Misak (Florida International University); NADEL-TURONSKI, Pawel (Jefferson Lab); GUZEY, Vadim (Petersburg NPI); COSYN, Wim (Ghent University)

Presenter: COSYN, Wim (Ghent University)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **230** Type: **not specified**

Beyond CT14: Hera 2 data, special PDF sets and more

Tuesday, April 12, 2016 11:00 AM (15 minutes)

We discuss recent activities of the CT global analysis group. This includes an update of CT14 to include the HERA1+2 combined data set, discussion of CT14 special sets such as CT14QED, intrinsic charm or asymmetric strange studies, and other current analyses based on CT14.

Primary author: SCHMIDT, Carl (Michigan State University)

Presenter: SCHMIDT, Carl (Michigan State University)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **231** Type: **not specified**

Probing nuclear gluons with heavy flavors at an Electron-Ion Collider

Tuesday, April 12, 2016 6:10 PM (15 minutes)

We study the prospects for measuring nuclear modifications of the gluon density (gluonic EMC effect, antishadowing, shadowing) using open heavy flavor production (charm, beauty) at a future Electron-Ion Collider (EIC). Such direct measurements complement indirect studies of nuclear gluons through DGLAP evolution and could substantially advance our understanding of QCD in nuclei. Building on the experience with HERA, we discuss (a) the expected heavy quark production rates on nuclei at EIC; (b) the possible methods of charm/beauty reconstruction at EIC and their requirements; (c) prospects of open charm/beauty measurements at $x > 0.1$; (d) specifics of nuclear ratio measurements of heavy meson production. We report about results from an on-going R&D project dedicated to heavy flavor production at EIC (process simulations, physics impact).

Primary author: WEISS, Christian (Jefferson Lab)

Co-authors: HYDE, Charles (Old Dominion University); NGUYEN, Dien (University of Virginia); HIGINBOTHAM, Doug (Jefferson Lab); CHUDAKOV, Eugene (Jefferson Lab); STRATMANN, Marco (University at Tubingen); STRIKMAN, Mark (Penn State University); FURLETOV, Sergey (Jefferson Lab); FURLETOVA, Yulia (Jefferson Lab)

Presenter: WEISS, Christian (Jefferson Lab)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **232** Type: **not specified**

Tagged spectator DIS off a polarized spin-1 target

Tuesday, April 12, 2016 10:10 AM (15 minutes)

We cover the general structure of the SIDIS cross section with a polarized beam and spin-1 target. The cross section is characterized by 41 structure functions of which 23 are unique to the spin-1 target case. Next, we study a specific example, namely DIS off a polarized deuteron with a slow detected nucleon in the final state ("tagged spectator DIS"). The reaction is studied in the impulse approximation using the virtual nucleon approximation. In these approximations, 25 structure functions are non-zero (16 of which are sensitive to the deuteron tensor polarization). Finally, we discuss possibilities of measurements of the structure functions at JLab12 and an EIC and their sensitivity to neutron structure functions.

Primary authors: Dr WEISS, Christian (Jefferson Lab); Prof. SARGSIAN, Misak (Florida International University); Prof. COSYN, Wim (Ghent University)

Presenter: Prof. COSYN, Wim (Ghent University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **233** Type: **not specified**

Impact of heavy flavor (extrinsic & intrinsic) for LHC processes

Tuesday, April 12, 2016 5:30 PM (15 minutes)

As the energy of the LHC increases, the heavy quarks play a more significant role. We examine both the impact of the heavy quarks on
the predictions for processes such as boson production (both with and without an associated heavy quark), and consider methods to constrain the heavy quark PDFs.

Primary author: Prof. OLNESS, Fred (SMU)

Presenter: Prof. OLNESS, Fred (SMU)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **234** Type: **not specified**

Parton-shower effects in vector-boson-fusion processes

Wednesday, April 13, 2016 6:15 PM (20 minutes)

Production of electroweak bosons via vector-boson fusion (VBF) is one of the main process classes to study during the run-2 phase of the LHC. Its double-DIS-like structure gives rise to the characteristic signature of two tagging jets in the forward regions of the detectors, and distinguishes it from QCD-induced processes, which exhibit much more central jet activity. VBF processes allow to study the triple and quartic gauge couplings and test them for new-physics effects.

In this talk, we investigate the effects of combining NLO QCD results with parton-shower effects using the latest versions of VBFNLO 3 and Herwig 7. A consistent treatment of renormalization and factorization scale variations in the hard process and the parton shower allows to assign more reliable theory uncertainty predictions to key distributions like the central rapidity gap. Additionally, we compare the effect of parton-shower and new-physics effects on distributions and study how to distinguish the two.

Primary author: RAUCH, Michael (ITP, KIT)

Presenter: RAUCH, Michael (ITP, KIT)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **235** Type: **not specified**

SHiP: a new facility with a dedicated detector for studying tau neutrino properties and nucleon structure functions

Wednesday, April 13, 2016 4:53 PM (20 minutes)

SHIP is a new general purpose fixed target facility, whose Technical Proposal has been recently reviewed by the CERN SPS Committee, who recommended that the experiment proceeds further to a Comprehensive Design phase. In its initial phase, the 400GeV proton beam extracted from the SPS will be dumped on a heavy target with the aim of integrating 2×10^{20} pot in 5 years. A dedicated detector downstream the target will allow to probe a variety of models with light long-lived exotic particles and masses below a few GeV/c^2. Another dedicated detector will allow the study of neutrino cross-sections and angular distributions, and it will be the focus of the talk. ν_τ deep inelastic scattering cross sections will be measured with a statistics 1000 times larger than currently available, with the extraction of the F_4 and F_5 structure functions, never measured so far and allow for new tests of lepton non-universality with sensitivity to BSM physics. Moreover, ν_τ's will be distinguished from $\bar{\nu}_\tau$'s, thus providing the first observation of the $\bar{\nu}_\tau$. With ν_μ scattering it will be possible to reduce by about 50\% the current uncertainty on the strange content of the nucleon in the range of the x variable between 0.05 and 0.3, complementary to LHC measurements. Eventually, it will be possible to improve existing limits on dark photons decaying into dark matter particles, with the elastic scattering of these ones on electrons. The detector will be based on several techniques developed for the OPERA experiment at LNGS.

Primary author: Dr BONIVENTO, walter (infn)

Presenter: BUONAURA, Ahnnarita (University of Naples)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **237** Type: **not specified**

Measurement of WW and WZ production cross section at 8TeV and 13 TeV and limits on anomalous triple gauge couplings with the ATLAS detector (WG3)

Tuesday, April 12, 2016 4:30 PM (15 minutes)

Measurements of the cross sections of the production of pairs of electroweak gauge bosons at the LHC constitute stringent tests of the electroweak sector of the Standard Model and provide a model-independent means to search for new physics at the TeV scale. The ATLAS collaboration has performed measurements of integrated and differential cross sections of the production of WW and WZ pairs in both fully leptonic and semi-leptonic final states, both at 8 TeV and 13 TeV collision energy. These measurements are compared to predictions at up to NNLO+NNLL in pQCD.
First integrated measurements of the WW and WZ pair production cross sections using fully leptonic final states at 13 TeV using data corresponding to 3.2 /fb are presented.
Detailed studies of integrated and differential cross sections have been performed using data corresponding to 20.3 /fb at a centre-of-mass energy of 8 TeV. The measurements are performed as a function of hadronic jet multiplicity, a variety of kinematic variables calculated from the leptons and for the case of the WZ events also for the ratio of W+Z over W-Z events. Semi-leptonic final states are used to complement studies at higher transverse momentum of the vector bosons.
Constraints on new physics are provided by setting limits on anomalous triple gauge couplings for charged vector bosons.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: Mr SOCHER, Felix (Institut für Kern- und Teilchenphysik, Dresden)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **238** Type: **not specified**

Measurement of the ZZ(*) and Zgamma production cross sections at 8 TeV and 13 TeV and limits on anomalous triple gauge couplings with the ATLAS detector (WG3)

Tuesday, April 12, 2016 4:50 PM (15 minutes)

Measurements of the cross sections of the production of pairs of electroweak gauge bosons at the LHC constitute stringent tests of the electroweak sector of the Standard Model and provide a model-independent means to search for new physics at the TeV scale.
The ATLAS collaboration has measured inclusive and differential cross sections of the production of ZZ pairs and Z and photon pairs, using final states with the Z decaying to charged leptons or neutrinos.
First integrated measurements of the ZZ pair production cross sections using fully leptonic final states at 13 TeV using data corresponding to 3.2 /fb are presented.
Detailed studies of integrated and differential cross sections have been performed using data corresponding to 20.3 /fb at a centre-of-mass energy of 8 TeV. The measurements are performed as a function of a variety of kinematic variables calculated from the leptons, like the transverse momentum or rapidity of the vector bosons. For the case of the production of four charged leptons a measurement of the four-lepton invariant mass spectrum ranging from 80 to 1000 GeV was performed, where several distinct physics processes give rise to the production of 4-lepton final state. All measurements are compared to calculations at up to NNLO in pQCD. Constraints on new physics are provided by setting limits on anomalous triple couplings between neutral vector bosons, which are forbidden at tree level in the Standard Model.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: GKAITATZIS, Stamatios (Aristotle Univ. of Thessaloniki)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **239** Type: **not specified**

Electroweak production of single vector bosons, vector boson scattering, and triple gauge-boson production with the ATLAS detector (WG3)

Tuesday, April 12, 2016 5:10 PM (15 minutes)

The production of single W and Z bosons with two jets at high invariant mass has been studied by the ATLAS collaboration in detail using data corresponding to 20.3 /fb at a centre-of-mass energy of 8 TeV. Integrated and differential cross sections are measured in many different phase space regions with varying degree of sensitivity to the electroweak production in vector boson fusion. The cross section for the electroweak production has been extracted for both integrated and for the first time differential distributions. The results have also been used to derive limits on anomalous triple gauge couplings.
Vector-boson scattering processes provide a unique way to probe the mechanism of electroweak symmetry breaking. Similar physics can be probed by studying the production of three gauge bosons. The results can also be used for a model-independent search for new physics at the TeV scale via anomalous quartic gauge couplings.
The ATLAS collaboration has studied vector boson scattering in final states with two gauge bosons and two forward jets in 20.3 /fb of 8TeV proton-proton collision data, in particular two same-sign W bosons, a WZ boson pair, and a W or Z boson in association with an isolated photon. The studies are complemented by a search for anomalous vector boson production of WW+WZ pairs in their semileptonic decays to lnujj in association with two forward jets.
A measurement of exclusive production of W boson pairs produced by the interaction of two photons will be presented. This topology is found to provide strong constraints on anomalous quartic gauge couplings.
The collaboration has used this data set as well to study the production of three gauge bosons. A search was carried out for the production of three W bosons. The cross sections for the production of a W or Z boson in association with two isolated photons has been measured. For the Z boson, decays into charged leptons as well as neutrinos have been studied.

Primary author: Dr SHABALINA, Elizaveta (University of Gottingen)

Presenter: Mr GUMPERT, Christian (TU Dresden)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **240** Type: **not specified**

Perturbative QCD, resummation and non-perturbative aspects in SIDIS processes

Tuesday, April 12, 2016 9:30 AM (15 minutes)

I will address the study of semi-inclusive deep inelastic scattering cross sections as functions of the transverse momentum, q_T. Soft gluon resummation is performed using the original Collins-Soper-Sterman (CSS) formalism or, equivalently, the improved Transverse Momentum Dependent (TMD) framework.
The focus of this talk is the matching between the region where fixed order perturbative QCD can successfully be applied and the region where soft gluon resummation is necessary. Interestingly, the commonly used prescription of matching through the so-called Y-factor cannot be applied, at least in the SIDIS kinematical configurations considered. In particular, the non-perturbative component of the resummed cross section turns out to play a crucial role and should not be overlooked even at relatively high energies. Moreover, I will show the theoretical uncertainties of the transverse momentum resummed cross sections in the CSS formalism related to the scale parameters C_1, C_2 and C_3, and their interplay with the uncertainties of the non perturbative parameters g_1, g_2 and g_3.

Primary authors: Dr PROKUDIN, Alexei (Berks); Dr GONZALEZ HERNANDEZ, Jose Osvaldo (Jefferson Lab); Dr BOGLIONE, Mariaelena (University of Turin (Italy)); Dr MELIS, Stefano (University of Turin)

Presenter: Dr BOGLIONE, Mariaelena (University of Turin (Italy))

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **241** Type: **not specified**

The LHeC project and detector

Tuesday, April 12, 2016 4:53 PM (25 minutes)

The Large Hadron Electron Collider is the proposal of an upgrade of the LHC to study ep/eA collisions with a centre-of-mass energy in the TeV regime using an about 60 GeV electron beam. In the future, the lepton beams could be combined with the HE-LHC or FCC hadron beams, to study DIS at even higher energies. In this talk we will present an update of the status of the project, with emphasis on the accelerator development, the design of a demonstrator for the high-current multi-pass energy recovery concept and an overview on further developments towards an update of the 2012 LHeC Conceptual Design Report in the coming years.

Primary author: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela, Spain)

Presenter: NEWMAN, Paul

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **242** Type: **not specified**

A detector for energy-frontier DIS

In this talk, the status of the design of a detector for studying energy-frontier DIS at the LHeC and the FCC-he will be presented. Its different parts will be discussed: interaction region, tracking, EM calorimeter, solenoid, hadronic calorimeter and muon detector. Besides, the software framework that is currently employed, developed within DD4HEP, will also be presented.

Primary author: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela, Spain)

Presenter: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela, Spain)

Track Classification: Future Experiments

Contribution ID: **243** Type: **not specified**

PDF and $alpha_s$ determination at the LHeC and FCC-he

Tuesday, April 12, 2016 2:51 PM (20 minutes)

An update is presented on the possibilities for precision QCD studies at the LHeC and the FCC-he. Specifically, we will show recent results on the determination of nucleon PDFs with complete flavour decomposition and of the value of the strong coupling constant with per mille accuracy. The implications of such measurements on Higgs physics and on high mass BSM searches at the HL-LHC will be discussed.

Primary author: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela, Spain)

Presenter: Prof. COOPER-SARKAR, Amanda (Oxford University)

Session Classification: WG1/WG7 joint session (PDF+future exp.)

Track Classification: Future Experiments

Contribution ID: **246** Type: **not specified**

Small-x physics at the LHeC

Tuesday, April 12, 2016 6:08 PM (20 minutes)

In this talk we will present a review on the possibilities for small-x studies at the LHeC and the FCC-he. We focus on the possibilities of discriminating standard DGLAP approaches from resummation and saturation scenarios in inclusive, semi-inclusive and exclusive observables. We also discuss the opportunities for studying a totally new kinematic regime in diffractive production, and for analysing the 3D proton structure through different observables constraining GPDs.

Primary author: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela, Spain)

Presenter: GWENLAN, Claire (Oxford)

Session Classification: WG7 Future Experiments

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **247** Type: **not specified**

eA physics at the LHeC

Tuesday, April 12, 2016 3:37 PM (20 minutes)

In this talk we will present a review on the possibilities for nuclear studies at the LHeC and the FCC-he. We will show an update on the possibilities for a precise determination of nuclear PDFs, and their complete unfolding, in a kinematic region never explored before in DIS. We will also discuss diffractive and exclusive observables and the possibilities which these offer for constraining nuclear GPDs and for disentangling the relevance of non-linear dynamics in nuclei. Finally, we will show prospects for jet physics and for studies of QCD radiation in the nuclear medium, of relevance for ultra-relativistic heavy-ion collisions.

Primary author: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela, Spain)

Presenter: Dr HELENIUS, Ilkka (Lund University)

Session Classification: WG1/WG7 joint session (PDF+future exp.)

Track Classification: Future Experiments

Contribution ID: **248** Type: **not specified**

Cancellation of Glauber gluon exchange in the double Drell-Yan process

Thursday, April 14, 2016 10:05 AM (20 minutes)

An essential part of any factorisation proof is the demonstration that the exchange of Glauber gluons cancels for the considered observable. In this talk I will show that this can be done for the double Drell-Yan process (the double parton scattering process in which a pair of electroweak gauge bosons is produced), both for the integrated cross section and for the cross section differential in the boson transverse momenta.

Primary authors: Prof. SCHAFER, Andreas (Regensburg University); Mr OSTERMEIER, Daniel (Regensburg University); Dr GAUNT, Jonathan (Nikhef and VU); Dr DIEHL, Markus (DESY); Mr PLOESSL, Peter (Regensburg University)

Presenter: Dr GAUNT, Jonathan (Nikhef and VU)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **250** Type: **not specified**

Understanding Jets in HI Collisions

Tuesday, April 12, 2016 11:24 AM (20 minutes)

Review of MC for heavy ions.

Primary author: Dr ZAPP, Korinna (CERN)

Presenter: Dr ZAPP, Korinna (CERN)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **251** Type: **not specified**

Hadronisation Models and Colour Reconnection

Tuesday, April 12, 2016 8:45 AM (25 minutes)

Review of hadronisation models.

Primary author: Mr BIERLICH, Christian

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **252** Type: **not specified**

Recent development in parton shower multijet merging

Wednesday, April 13, 2016 2:20 PM (25 minutes)

Review of multijet merging.

Primary author: Dr BELLM, Johannes (IPPP, Durham Unviversity)

Presenter: Dr BELLM, Johannes (IPPP, Durham Unviversity)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **253** Type: **not specified**

Status and Perspectives of NNLO plus Parton Shower Matching

Wednesday, April 13, 2016 11:00 AM (25 minutes)

Review of NNLO+PS

Primary author: Dr ALIOLI, Simone (CERN)

Presenter: Dr ALIOLI, Simone (CERN)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **254** Type: **not specified**

New Insights into Coloumb Gluons

Wednesday, April 13, 2016 5:00 PM (20 minutes)

Coloumb gluons and ordering variable.

Primary author: Dr ANGELES MARTINEZ, Rene (University of Manchester)

Presenter: Dr ANGELES MARTINEZ, Rene (University of Manchester)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **255** Type: **not specified**

The new ABM16 PDFs

Tuesday, April 12, 2016 11:20 AM (15 minutes)

A new update of the ABM PDFs is presented, which, among other data, includes the new combined HERA DIS data from run II.

Primary author: ALEKHIN, Sergey (UHH)

Presenters: ALEKHIN, Sergey (UHH); Dr ALEKHIN, Sergey (Institute for High Energy Physics (Protvino, Russia)); Dr ALEKHIN, Sergey (Universität Hamburg); ALEKHIN, Sergey (DESY)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **256** Type: **not specified**

Double gluon distribution from the single gluon distribution

Wednesday, April 13, 2016 10:00 AM (15 minutes)

Multi parton distribution functions (MPDs) are interesting in view of the study of Multi Parton Interactions in hadron-hadron collisions.
We use the Stirgling-Gaunt sum rules to construct explicitly an initial condition for the double gluon distribution function starting from the known MSTW form of the single gluon distribution function. The result is parameter free. We also consider the evolution of the distribution function with a hard scale numerically and discuss the perspective for the extension of the results to the quark sector.

Primary authors: STASTO, Anna (The Pennsylvania State University); LEWANDOWSKA, Emilia (Institute of Nuclear Physics, PAN, Cracow); GOLEC-BIERNAT, Krzysztof (Institue of Nuclear Physics, Polish Academy of Sciences); SERINO, Mirko (Institute of Nuclear Physics, PAN, Cracow); ZACHARY, Snyder (University of Colorado at Boulder)

Presenter: SERINO, Mirko (Institute of Nuclear Physics, PAN, Cracow)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **257** Type: **not specified**

Parton shower development

Wednesday, April 13, 2016 4:30 PM (25 minutes)

Review of recent development in parton showers.

Primary author: Dr NAGY, Zoltan (DESY Theory Group)

Presenter: Dr NAGY, Zoltan (DESY Theory Group)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **258** Type: **not specified**

Searches for diboson resonances with the ATLAS detector at the LHC

Tuesday, April 12, 2016 3:30 PM (15 minutes)

Resonant production of two bosons (gammagamma, VV, VH and HH) is a clear hint for physics beyond the Standard Model, potentially related to the nature of electroweak symmetry breaking mechanism in the SM. Searches for diboson resonances have been performed in gammagamma and in final states with different
numbers of leptons and jets including cases where the two jets are merged into one because of the large boost. ATLAS searches for diboson resonances with LHC Run 2 data at 13 TeV are summarized in this talk.

Primary author: Prof. ORESTANO, Domizia (Roma Tre University and INFN)

Presenter: BUESCHER, Daniel (Uni Freiburg)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **259** Type: **not specified**

A dedicated eRHIC detector design

Wednesday, April 13, 2016 11:00 AM (20 minutes)

The 2015 Long Range Plan for Nuclear Science in the US recommended a high-energy high-luminosity polarized Electron-Ion Collider
as the highest priority for new facility construction following the completion of presently ongoing projects. The main physics topics to be explored at this new facility are (i) the polarized sea quark and gluon
distributions in the nucleon, (ii) QCD dynamics of the low-x, high density gluon regime, (iii) hadronization in the vacuum and the nuclear medium [1]. One of the considered construction options is the addition of a high-energy polarized electron beam to the existing RHIC hadron machine, converting it into an Electron-Ion Collider (eRHIC) [2]. A dedicated eRHIC detector, designed to efficiently register and identify deep inelastic electron scattering (DIS) processes in a wide range of center-of-mass energies available with the new collider is one of the key elements of such an upgrade. The progress on the detector design work will be shown, and the new simulation results will be presented.

[1] A. Accardi et al., ``Electron Ion Collider: The Next QCD Frontier - Understanding the glue

arXiv:1212.1701v3 (2014).

[2] E.C. Aschenauer et al., ``eRHIC design study (An Electron-Ion Collider at BNL)'', arXiv:140

Primary author: Dr KISELEV, Alexander (Brookhaven National Lab)

Presenter: Dr KISELEV, Alexander (Brookhaven National Lab)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **260** Type: **not specified**

Higgs physics at the LHeC and FCC-he

Tuesday, April 12, 2016 5:21 PM (20 minutes)

In this talk, we review the possibilities for Higgs studies at the LHeC and the FCC-he. Specifically, we will show recent results on the determination of the $H \to b\bar{b}$ coupling, and on the progress in the $H \to c\bar{c}$. We will then discuss the possibility to study at LHeC the coupling of Higgs to the 'dark sector. The final topic is HH production at FCC-he and the sensitivity to anomalous (=BSM) couplings.

Primary author: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela, Spain)

Presenter: BEHNKE, Olaf (DESY)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **261** Type: **not specified**

TMD Physics at 12-GeV Jefferson Lab with SoLID

Wednesday, April 13, 2016 3:39 PM (20 minutes)

(for the SoLID Collaboration)
The Solenoidal Large Intensity Device (SoLID) has been proposed in Hall A at Jefferson Lab, which will fully utilize the great physics potential of the 12-GeV energy upgrade by combining high luminosities and large acceptance. Three of five highly-rated approved experiments are the semi-inclusive deep inelastic scatterings (SIDIS) of 11 GeV and 8.8 GeV electron beams on transversely and longitudinally polarized 3He targets and a transversely polarized proton target with detection of charged pions and electrons in coincidence to study the transverse momentum dependent parton distributions (TMDs). The SoLID SIDIS experiment will provide 4-d (x, z, Q2, PT) mappings of Sivers, Collins, pretzelostiy and worm-gear asymmetries in the valence quark region with high precision. In this talk, we will present the expected physics results from SoLID SIDIS measurements on TMD extractions, transversity distributions, and the tensor charge of u and d quarks. The constraint on quark electric dipole moments (EDMs) with the tensor charge measurement and neutron EDM experiments will also be discussed. This work is supported in part by the US Department of Energy under contract numbers DE-FG02-03ER41231 and by the Duke Kunshan University.

Primary author: Dr LIU, Tianbo (Duke University and DKU)

Presenter: Dr LIU, Tianbo (Duke University and DKU)

Session Classification: WG6/WG7 joint session (spin+future exp.)

Track Classification: Spin Physics

Contribution ID: **262** Type: **not specified**

Studying quasi-real photon structure at EIC

Thursday, April 14, 2016 11:23 AM (20 minutes)

A future Electron-Ion Collider (EIC) facility will deliver electron-nucleon luminosity of 10^33⊠-10^34cm⊠^-2sec⊠^-1 for collisions of polarized electron and protons and heavy ions over a wide range in center-of-mass energies (40 GeV to 145 GeV). One of its promising physics programs is to study the partonic structure of quasi-real photons. By utilizing di-jet measurement in photoproduction events, one can effectively access the underlying parton dynamics of the photon through the selection of the resolved photon components. In this talk, we discuss the feasibility of a di-jet cross section measurement as a function of the jet transverse momentum and tagging resolved photon processes at an EIC. First studies show that the behavior of parton distributions in photon can be well studied at an EIC. The possibility to distinguish between jets originating from gluons and from quarks is discussed to extract information regarding the gluon content in the photon. This work also enables further studies on polarized photon PDFs.

Primary author: Ms CHU, Xiaoxuan (Brookhaven National Lab)

Presenter: Ms CHU, Xiaoxuan (Brookhaven National Lab)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **263** Type: **not specified**

Relation between the on-shell and $\overline{\mathrm{MS}}$ mass at four loops

Wednesday, April 13, 2016 11:00 AM (15 minutes)

In this talk the relation between heavy quark masses defined in the on-shell and $\overline{\mathrm{MS}}$ scheme is discussed at four-loop order in QCD. Special emphasis is put on the top quark mass where the four-loop result is used to estimate the remaining renormalon uncertainty. The relation between the $\overline{\mathrm{MS}}$ and on-shell mass can also be used to establish precise relations between so-called threshold masses and the $\overline{\mathrm{MS}}$ mass which has important applications both for bottom and top.

Primary author: Prof. STEINHAUSER, Matthias (KIT)

Presenter: Prof. STEINHAUSER, Matthias (KIT)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **264** Type: **not specified**

Single inclusive forward hadron production at next-to-leading order

Thursday, April 14, 2016 10:00 AM (15 minutes)

We discuss single inclusive hadron production from a high energy quark scattering off a strong target color field in the Color Glass Condensate formalism. Recent calculations of this process at the next-to-leading order accuracy have led to negative cross sections at large transverse momenta. We identify the origin of this problem in an oversubtraction of the rapidity divergence into the Balitsky-Kovchegov evolution equation for the target. We propose a new way to implement the kinematical restriction on the emitted gluons to overcome this difficulty.

Primary authors: Dr DUCLOUE, Bertrand (University of Jyvaskyla); Dr LAPPI, Tuomas (University of Jyvaskyla); Dr ZHU, Yan (University of Jyvaskyla)

Presenter: Dr DUCLOUE, Bertrand (University of Jyvaskyla)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **265** Type: **not specified**

Forward J/ψ production in high energy proton-nucleus collisions

Wednesday, April 13, 2016 9:20 AM (15 minutes)

Forward J/ψ production and suppression in high energy proton-nucleus collisions can be an important probe of gluon saturation. We study this process in the Color Glass Condensate framework and show that using the Glauber approach to extrapolate the dipole cross section of a proton to a nucleus leads to results closer to experimental data than previous calculations in this framework. We also investigate the centrality dependence of the nuclear suppression in this model and show a comparison of our results with recent LHC data.

Primary authors: Dr DUCLOUE, Bertrand (University of Jyvaskyla); Dr MANTYSAARI, Heikki (Brookhaven National Laboratory); Dr LAPPI, Tuomas (University of Jyvaskyla)

Presenter: Dr DUCLOUE, Bertrand (University of Jyvaskyla)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **266** Type: **not specified**

Theory behind Heavy Quarkonium Production

Thursday, April 14, 2016 11:20 AM (20 minutes)

Over 30 years of the J/psi discovery the mechanisms behind quarkonium production are still not fully understood. The effective field theory framework of Nonrelativistic QCD (NRQCD) provides a rigorous factorization theorem for quarkonium production, which has become a standard description, also due to its phenomenological successes. In this talk we will review the state of the art in the field of quarkonium production as a whole, but in particular focus on open problems within the NRQCD approach, which have recently been laid open by LHC measurements of quarkonium polarization and of eta_c production rates.

Primary author: Dr BUTENSCHÖN, Mathias (Universität Hamburg)

Presenter: Dr BUTENSCHÖN, Mathias (Universität Hamburg)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **267** Type: **not specified**

BFKL effects and central rapidity dependence in Mueller-Navelet jet production at 13 TeV LHC

Tuesday, April 12, 2016 2:30 PM (15 minutes)

In this talk a study of the production of Mueller-Navelet jets at 13 TeV LHC will be presented, including the BFKL resummation effects and investigating three different variants of the BLM scale optimization method. It will be shown how the cross section and the azimuthal observables are affected by the exclusion of the events where, for a given rapidity interval between the two jets, one of these is produced in the central region.

Primary authors: Prof. PAPA, Alessandro (Università della Calabria and INFN-Cosenza (Italy)); Dr MURDACA, Beatrice (INFN-Cosenza (Italy)); Prof. IVANOV, Dmitry Yu. (Sobolev Institute of Mathematics & Novosibirsk State University, Russia); Mr CELIBERTO, Francesco Giovanni (Università della Calabria and INFN-Cosenza (Italy))

Presenter: Mr CELIBERTO, Francesco Giovanni (Università della Calabria and INFN-Cosenza (Italy))

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **268** Type: **not specified**

Inclusive four-jet production: a study of Multi-Regge kinematics and BFKL observables

Tuesday, April 12, 2016 2:50 PM (15 minutes)

In this talk a study of differential cross sections for the production of four jets in multi-Regge kinematics will be presented, the main focus lying on azimuthal angle dependences. The theoretical setup consists in the jet production from a single BFKL ladder with a convolution of three BFKL Green functions, where two forward/backward jets are always tagged in the final state. Furthermore, the tagging of two further jets in more central regions of the detectors with a relative separation in rapidity from each other is requested. It is found, as result, that the dependence on the transverse momenta and the rapidities of the two central jets can be considered as a distinct signal of the onset of BFKL dynamics.

Primary authors: Prof. SABIO VERA, Agustin (IFT UAM/CSIC Madrid); Dr CAPORALE, Francesco (IFT UAM/CSIC Madrid); Mr CELIBERTO, Francesco Giovanni (U. Calabria & INFN-CS (Italy); IFT UAM/CSIC Madrid); Dr CHACHAMIS, Grigorios (IFT UAM/CSIC Madrid)

Presenter: Mr CELIBERTO, Francesco Giovanni (U. Calabria & INFN-CS (Italy); IFT UAM/CSIC Madrid)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **269** Type: **not specified**

\bf Measurement of $W^{\pm}$ single spin asymmetries and W cross section ratio in polarized $p+p$ collisions at $\sqrt{s}=510$ GeV at STAR

Wednesday, April 13, 2016 12:20 PM (15 minutes)

The STAR experiment at RHIC has provided significant contributions to our understanding of the structure of the proton. The STAR experiment is well equipped to measure $W^{\pm} \rightarrow e^{\pm}+\nu$ in $\sqrt{s}=510$ GeV longitudinally polarized $p+p$ collisions at mid-rapidity ($|\eta|<1$). W single-spin asymmetries, A_L, measured as a function of decay positron (electron) pseudo-rapidity η for $W^+(W^-)$ are sensitive to the individual helicity polarizations of u and $\bar{d}$ (d and $\bar{u}$) quarks. Due to maximal violation of parity, during the production, W bosons couple to left-handed quarks and right-handed anti-quarks and hence offer direct probes of their respective helicity distributions in the nucleon. The published STAR A_L results (combination of 2011 and 2012 data) have been used by several theoretical analyses suggesting a significant impact in constraining the helicity distributions of anti-u and anti-d quarks. In 2013 STAR collected a large sample of data at $\sqrt{s}=510$ GeV with a total integrated luminosity of $\sim$300 pb^{-1} with an average beam polarization of $\sim$54\%. This resulted in an increase of a factor 3 in the figure of merit compared to the dataset used for previous analyses. The status of the analysis of the STAR 2013 W A_L will be presented along with the future plans for final W A_L results by combining both STAR 2012 and 2013 data of total integrated luminosity of about $\sim$400 pb^{-1}. \\
W cross section ratio (W^+/W^-) measurements at STAR are sensitive to unpolarized u, d, $\bar{u}$, and $\bar{d}$ quark distributions. At these kinematics, STAR is able to measure the quark distributions near Bjorken-x values of 0.1. The increased statistics will lead to a higher precision measurement of the W^+/W^- cross section ratio as well as allow for a measurement of its η dependence at mid-rapidity. An update of the W cross section ratio analysis from the STAR 2011, 2012 and 2013 runs is presented.

Primary author: Ms GUNARATHNE, Devika (Temple University)

Presenter: Prof. SURROW, Bernd (Temple University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **270** Type: **not specified**

Parton distributions at a 100 TeV hadron collider

Tuesday, April 12, 2016 3:14 PM (20 minutes)

We discuss the role of QCD and precision SM calculations for the physics program of a 100 TeV hadron collider. In particular, we discuss the role of parton distributions, jet and top quark production, electroweak and photon-induced corrections and global event properties at 100 TeV. This talk summarizes the Standard Model chapter of the FCC-hh Conceptual Design Report.

Primary author: ROJO, Juan (Oxford)

Presenter: ROJO, Juan (Oxford)

Session Classification: WG1/WG7 joint session (PDF+future exp.)

Track Classification: Future Experiments

Contribution ID: **271** Type: **not specified**

Inclusive and exclusive processes with a leading neutron in ep collisions

Tuesday, April 12, 2016 12:20 PM (15 minutes)

The color dipole formalism is extended to the study of exclusive processes associated with a leading neutron in ep collisions at high energies. We discuss the leading neutron production in $e + p \to e + n + X$ collisions at high energies and estimate the related observables, which were measured at HERA and may be analysed in future electron-proton (ep) colliders. We show that the recently released H1 leading neutron spectra can be reproduced using the color dipole formalism and that these spectra could help us to observe more clearly gluon saturation effects in future ep colliders. Moreover, the exclusive ρ, Φ and J/Ψ production, as well as the Deeply Virtual Compton Scattering, are analysed assuming a diffractive interaction between the color dipole and the pion emitted by the incident proton. We compare our predictions with the HERA data on ρ production and estimate the magnitude of the absorption corrections. We show that the color dipole formalism is able to describe the current data. Finally, we present our estimate for the exclusive cross sections which can be studied at HERA and in future electron-proton colliders.

Primary author: Prof. GONCALVES, Victor Paulo (Lund University)

Presenter: Prof. GONCALVES, Victor Paulo (Lund University)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **272** Type: **not specified**

Transverse single-spin asymmetry of weak bosons and Drell-Yan production in p+p collisions at STAR: present and future

Tuesday, April 12, 2016 11:40 AM (15 minutes)

Accessing the Sivers TMD function in proton+proton collisions through the measurement of transverse single
spin asymmetries (TSSAs) in Drell-Yan and weak boson production is an effective path to test the fundamental
QCD prediction of the non-universality of the Sivers function. Furthermore, it provides
data to study the spin-flavor structure of valence and sea quarks inside the proton and to test the evolution of parton distributions.
The TSSA amplitude, A_N, has been measured at STAR in proton+proton collisions at $\sqrt{s} = 500$~GeV, with a recorded integrated luminosity of 25 pb^{-1}.
Within relatively large statistical uncertainties, the current data favor theoretical models that include change of sign for the Sivers function relative to observations
in SIDIS measurements, if TMD evolution effects are small.
RHIC plans to run proton+proton collisions of transversely polarized beams at $\sqrt{s} = 510$~GeV in 2017, delivering an integrated luminosity of 400 pb^{-1}. This will allow STAR to perform a precise measurement of TSSAs in both Drell-Yan and and weak boson production. The present status and future plans for the Sivers function program at STAR will be discussed as well as other observables sensitive to the non-universality of the Sivers function via Twist-3, e.g. the TSSA of direct photons.

Primary author: Dr FAZIO, Salvatore (Brookhaven National Laboratory)

Presenter: Dr FAZIO, Salvatore (Brookhaven National Laboratory)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **273** Type: **not specified**

J/Psi Production in Ultra-Peripheral Collisions at STAR

Wednesday, April 13, 2016 2:30 PM (15 minutes)

In 2010, the STAR Collaboration collected a large sample of triggers for ultra-peripheral AuAu collisions. In this talk, I will present measurements from this sample of J/Psi production in association with neutrons from photonuclear breakup. Preliminary results for the cross section as a function rapidity and pT will be presented and compared to models; the large component at low pT demonstrates the coherent production of J/Psi off the Au nuclei.
In 2015, STAR also collected a sample of J/Psi mesons in ultra-peripheral pp and pAu collisions, where the protons were transversely polarized. The final state proton(s) were measured in the STAR Roman Pot system, constraining the kinematics of the process. I will present the prospects for measuring the asymmetry of J/Psi production with this sample. A non-zero asymmetry would be the first measure of the generalized parton distribution E for gluons, which is connected with the orbital angular momentum of partons in the nucleon.

Primary author: Dr SCHMIDKE, William (BNL)

Presenter: Dr SCHMIDKE, William (BNL)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **274** Type: **not specified**

Results of radiative and annihilation penguin decays at Belle

Tuesday, April 12, 2016 11:40 AM (15 minutes)

We present the results of radiative and annihilation penguin $B(B_s)$ decays at Belle. The $b \to s(d)\gamma$ processes are sensitive to physics beyond the Standard Model as new heavy particles can enter the loop and change the branching fractions and/or the kinematic variables. We report the results of fully inclusive $B \to X_{s,d}\gamma$ decay with both leptonic tagging and hadronic tagging methods. We also report the results of the exclusive decays $B(B_s) \to \phi\gamma$ and $B_s \to \gamma\gamma$.

Primary author: Dr DUTTA, Deepanwita (Tata Institute of Fundamental Research)

Presenter: Dr DUTTA, Deepanwita (Tata Institute of Fundamental Research)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **275** Type: **not specified**

Lorentz invariance relations for twist-3 functions and frame-independence of twist-3 cross sections

Tuesday, April 12, 2016 4:30 PM (15 minutes)

We derive a complete set of relations among twist-3 distribution and fragmentation functions based on the QCD equation-of-motion and identities among nonlocal operators which fully incorporate the constraints from Lorentz invariance. We show that the dynamical twist-3 functions constitute a complete set of twist-3 functions and other types of twist-3 functions can be expressed in terms of the dynamical ones and the twist-2 functions. We also show that those relations guarantee the frame-independence of the twist-3 observables.

Primary author: Prof. KOIKE, Yuji (Department of Physics, Niigata University)

Co-authors: Prof. METZ, Andreas (Temple University); Dr PITONYAK, Daniel (RIKEN BNL Research Center); Dr KANAZAWA, Koichi (Temple University); Dr SCHLEGEL, Marc (University of Tuebingen)

Presenter: Prof. KOIKE, Yuji (Department of Physics, Niigata University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **276** Type: **not specified**

Progress in the calculation of 3-loop corrections to the heavy flavor Wilson coefficients in DIS

Tuesday, April 12, 2016 4:50 PM (15 minutes)

We report on the current status of the ongoing calculation of 3-loop heavy flavor corrections to deep inelastic structure functions at large virtualities.

Primary authors: DE FREITAS, Abilio (DESY - Zeuthen); HASSELHUHN, Alexander (KIT); VON MANTEUFFEL, Andreas (J. Gutenberg University); BEHRING, Arnd (DESY - Zeuthen); SCHNEIDER, Carsten (RISC); RAAB, Clemens (RISC); WISSBROCK, Fabian (IHES); ABLINGER, Jakob (RISC); BLÜMLEIN, Johannes (DESY - Zeuthen); ROUND, Mark (RISC)

Presenter: DE FREITAS, Abilio (DESY - Zeuthen)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **277** Type: **not specified**

Heavy Flavour results from CMS

Tuesday, April 12, 2016 2:50 PM (15 minutes)

The available statistics of heavy flavored particles collected at the LHC in pp collisions at 7, 8 and 13 TeV provides an excellent opportunity to test the standard model and probe for new physics effects. A review of selected recent measurements on heavy flavors (production and propeties, rare decays, CP violation, exotic and standard quarkonia) by CMS based on LHC Run I and Run II data is presented.

Primary author: Prof. CMS, Collaboration (CINCO)

Presenter: Prof. CHEN, Kai-Feng (National Taiwan University)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **278** Type: **not specified**

eRHIC: an high-energy high-luminosity electron-ion collider at BNL

Wednesday, April 13, 2016 9:00 AM (20 minutes)

In this talk I present current design of our future electron-ion collider (EIC) at BNL, eRHIC. It is based on the existing Relativistic Heavy Ion Collider (RHIC) hadron facility, with two intersecting superconducting rings, each 3.8 km in circumference. We plan adding a polarized electron-beam with energy tunable within the 5-20 GeV range to collide with variety of species in the existing RHIC-accelerator complex. Specifically, the hadron species will include polarized protons (with a top energy of 250 GeV), polarized He3 ions (with a top energy of 170 GeV/u), and light and heavy fully striped ions (with energies up to 100 GeV/u). Our innovative design is based on one of the RHIC's hadron rings and a multi-pass energy-recovery linac (ERL). Using the ERL as the electron accelerator in our collider assures high luminosity reaching above 10^34 cm^-2 s^-1, and a c.m. energy range ranging from 30 GeV to 140 GeV. We are also considering a ring-ring eRHIC design, which has lower luminosity, as a back-up option.

Primary author: Prof. LITVINENKO, Vladimir (Stony Brook University)

Presenter: Prof. LITVINENKO, Vladimir (Stony Brook University)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **279** Type: **not specified**

The RHIC Cold QCD Plan for 2017 to 2023: A Portal to the EIC

Wednesday, April 13, 2016 2:53 PM (20 minutes)

The exploration of the fundamental structure of strongly interacting matter has always thrived on the complementarity of lepton scattering and purely hadronic probes. As the community eagerly anticipates a future electron ion collider (EIC) in the U.S., an outstanding scientific opportunity remains to complete "must-do" measurements in p+p and p+A physics at RHIC in the years preceding the EIC. It will be discussed how the new measurements will be essential for the quest to go beyond our current, one-dimensional picture of parton densities by correlating, for instance, the information on the contribution of a parton to the spin of the nucleon with its transverse momentum and spatial position. If one extends the scope from a nucleon to nuclei, questions about saturation, the partonic structure of nuclei and the propagation, attenuation and hadronization of colored quarks and gluons can be studied. The relevant measurements will be described together with improved detector capabilities at forward rapidities at both STAR and sPHENIX.

Primary author: Dr ASCHENAUER, Elke-Caroline (BNL)

Presenter: Dr ASCHENAUER, Elke-Caroline (BNL)

Session Classification: WG6/WG7 joint session (spin+future exp.)

Track Classification: Future Experiments

Contribution ID: **280** Type: **not specified**

JLEIC forward detector design and performance

Wednesday, April 13, 2016 11:46 AM (20 minutes)

The Electron-Ion Collider (EIC) is envisioned as the next-generation U.S. facility to study quarks and gluons in strongly interacting matter. The broad physics program of the EIC aims to precisely image gluons in nucleons and nuclei and to reveal the origin of the nucleon spin by colliding polarized electrons with polarized protons, polarized light ions, and heavy nuclei at high luminosity.

The Jefferson Lab EIC (JLEIC) design is based on a figure-8 shaped ring-ring collider. The luminosity, exceeding 10^33 $cm^{-2}s^{-1}$ in a broad range of the center-of-mass (CM) energy and maximum luminosity above 10^34 $cm^{-2}s^{-1}$, is achieved by high-rate collisions of short small-emittance low-charge bunches made possible by high-energy electron cooling of the ion beam and synchrotron radiation damping of the electron beam. The polarization of light ion species (p, d, ^3He) can be easily preserved and manipulated due to the unique figure-8 shape of the collider rings.

The focus of this presentation is put on the forward detection capabilities of the JLEIC primary detector designed to provide essentially full acceptance to all fragments produced in collisions. The forward hadron detection is done in three stages: (1) fragments with scattering angles down to a few degree are detected in a 2m long end-cap, (2) fragments up to a few degree are detected after passing through a 1m long 2Tm spectrometer dipole in front of the final focusing quads (FFQs), and (3) fragments up to about one degree pass through the apertures of the FFQs and are detected in a 4m space before and a 16m space after a second 4m long 20Tm spectrometer dipole. On the forward electron side, the large-angle reaction products are detected in the second end-cap. Electron scattered at small angles are detected in a low-Q^2 tagger consisting of large-aperture electron FFQs and a spectrometer dipole with a few meters of instrumented space on either side.

The combination of a high luminosity, highly polarized lepton and ion beams, and detectors fully integrated with the accelerator will allow JLEIC a unique opportunity to make breakthroughs in the investigation of the strong interaction.

Primary author: Dr YOSHIDA, Rik (JLab)

Presenter: Dr YOSHIDA, Rik (JLab)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **281** Type: **not specified**

The Detector Design of the Jefferson Lab EIC

Wednesday, April 13, 2016 12:32 PM (20 minutes)

The Electron-Ion Collider (EIC) is envisioned as the next-generation U.S. facility to study quarks and gluons in strongly interacting matter. The broad physics program of the EIC aims to precisely image gluons in nucleons and nuclei and to reveal the origin of the nucleon spin by colliding polarized electrons with polarized protons, polarized light ions, and heavy nuclei at high luminosity.

The Jefferson Lab EIC (JLEIC) design is based on a figure-8 shaped ring-ring collider. The luminosity, exceeding 10^33 $cm^{-2}s^{-1}$ in a broad range of the center-of-mass energy and maximum luminosity above 10^34 $cm^{-2}s^{-1}$, is achieved by high-rate collisions of short small-emittance low-charge bunches made possible by high-energy electron cooling of the ion beam and synchrotron radiation damping of the electron beam. The polarization of light ion species (p, d, ^3He) can be easily preserved and manipulated due to the unique figure-8 shape of the collider rings.

The focus of this presentation is put on the JLEIC primary detector that has been designed to support the full physics program of the EIC and to provide essentially full acceptance to all fragments produced in collisions. The detector has been fully integrated with the accelerator and extended to the forward electron and hadron regions to achieve exceptional small-angle acceptance and resolution as well as high-precision electron polarimetry and low-Q^2 tagging. The central-detector design allows for excellent tracking up to small angles and excellent hadron PID resulting and offers a great performance, in particular for semi-inclusive and exclusive measurements.

The combination of high luminosity, highly polarized lepton and ion beams, and a full acceptance, multi-purpose detector fully integrated with the accelerator will allow JLEIC a unique opportunity to make breakthroughs in the investigation of the strong interaction.

Primary author: Dr DIEFENTHALER, Markus (Jefferson Lab)

Presenter: Dr DIEFENTHALER, Markus (Jefferson Lab)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **282** Type: **not specified**

Twist-3 approach to hyperon polarization in unpolarized proton-proton collision

Tuesday, April 12, 2016 5:10 PM (15 minutes)

We study the transverse porlarization of hyperons produced in the high-energy unporlarized proton-proton collision in the framework of the collinear factorization. This phenomenon is one of the twist-3 observables and twist-3 distribution and fragmentation functions contribute. In this work, we focus on the former contribution and derive the LO complete cross-section. For the soft-gluon-pole term, we develope the"Master formula" which simplify the procedure of calculation and show explicitly that only the derivative term contributes. Moreover, we calculate the soft-felmion-pole contribution for the first time and show that it vanishes. These results provide a useful tool to explain the mechanism of the hyperon porlarization.

Primary author: Prof. KOIKE, Yuji (Niigata University)

Co-authors: Mr YABE, Kenta (Niigata University); Dr YOSHIDA, Shinsuke (Central China Normal University)

Presenter: Mr YABE, Kenta (Niigata University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **284** Type: **not specified**

Gluon transverse momentum dependent correlators in polarized high energy processes

Tuesday, April 12, 2016 9:00 AM (25 minutes)

We investigate the gluon transverse momentum dependent correlators as Fourier transform of matrix elements of nonlocal operator combinations. At the operator level these correlators include both field strength operators and gauge links bridging the nonlocality. In contrast to the collinear PDFs, the gauge links are no longer unique for transverse momentum dependent PDFs (TMDs) and also Wilson loops lead to nontrivial effects. We look at gluon TMDs for unpolarized, vector and tensor polarized targets. In particular a single Wilson loop operators become important when one considers the small-x limit of gluon TMDs.

Primary author: MULDERS, Piet (Nikhef and VU, Amsterdam)

Co-authors: BOER, Daniel (University of Groningen); COTOGNO, Sabrina (Nikhef and VU, Amsterdam); VAN DAAL, Tom (Nikhef and VU, Amsterdam); ZHOU, Yajin (Nikhef/VU, Amsterdam and Shandong University, Jinan); SIGNORI, andrea (Nikhef and VU, Amsterdam)

Presenter: MULDERS, Piet (Nikhef and VU, Amsterdam)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **285** Type: **not specified**

The high-energy radiation pattern from BFKLex

Tuesday, April 12, 2016 3:30 PM (15 minutes)

We will present a study of high-energy jet production in the multi-Regge limit making use of the Monte Carlo code BFKLex which includes collinear improvements in the form of double-log contributions. Making use of the anti-kt jet algorithm in the FastJet implementation, we will present results for the average transverse momentum and azimuthal angle of the produced jets when two tagged forward/backward jets are present in the final state. We also introduce a new observable which accounts for the average rapidity separation among subsequent emissions.

Primary author: Dr CHACHAMIS, Grigorios (IFT UAM-CSIC)

Presenter: Dr CHACHAMIS, Grigorios (IFT UAM-CSIC)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **286** Type: **not specified**

Inclusive three jet production at the LHC for 7 and 13 TeV collision energies

Tuesday, April 12, 2016 3:10 PM (15 minutes)

First, we define new observables sensitive to BFKL dynamics in the context of multijet production at the Large Hadron Collider. We propose the study of the inclusive production of three jets well separated in rapidity from each other, with two of them being very forward. We show that the tagging of a third jet in the central region of rapidity allows for a very strong test of the BFKL formalism. We study two projections on azimuthal angles for the differential cross section which allow for the definition of many different observables whose behavior when varying the pt and rapidity of the central jet is a distinct signal of BFKL dynamics. Then, we present a first full phenomenological study of ratios of correlation functions of products of cosines of azimuthal angle differences among the tagged jets.

Primary author: Dr CHACHAMIS, Grigorios (IFT UAM-CSIC)

Presenter: Dr CHACHAMIS, Grigorios (IFT UAM-CSIC)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **287** Type: **not specified**

Attacking one-loop multi-leg Feynman integrals with the Loop-Tree Duality method

Wednesday, April 13, 2016 12:20 PM (20 minutes)

We present a first numerical implementation of the Loop-Tree Duality (LTD) method for the direct numerical computation of multi-leg one-loop Feynman integrals. We discuss in detail the singular structure of the dual integrands and define a suitable contour deformation in the loop three-momentum space to carry out the numerical integration. Then, we apply the LTD method to the computation of ultraviolet and infrared finite integrals, and present explicit results for scalar integrals and tensor integrals with up to six legs (hexagons). The LTD method exhibits an excellent performance independently of the number of external legs.

Primary author: Dr CHACHAMIS, Grigorios (IFT UAM-CSIC)

Presenter: Dr CHACHAMIS, Grigorios (IFT UAM-CSIC)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **288** Type: **not specified**

Physics opportunities at an EIC beyond the ones discussed in the White Paper

Thursday, April 14, 2016 11:00 AM (20 minutes)

In this talk several new physics opportunities at an EIC beyond the key measurements discussed in the EIC White paper (arXiv:1212.1701) will be highlighted, this includes measurements with jets, how to get access to intrinsic kT and photon structure.
For all measurements first studies will be presented.

Primary author: Dr ASCHENAUER, Elke-Caroline (BNL)

Co-authors: Dr PAGE, Brian (BNL); Dr LEE, J.-H. (BNL); Dr BAKER, Mark (MDBPADS LLC); Dr CHU, Xiaoxuan (BNL/CCNU)

Presenter: Dr ASCHENAUER, Elke-Caroline (BNL)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **289** Type: **not specified**

Nuclear Effects in Deuterium and Global PDF fits

Wednesday, April 13, 2016 9:40 AM (15 minutes)

We present a detailed study of nuclear corrections in the deuteron (D) from an analysis of existing data from Deep Inelastic Scattering (DIS) off proton and D, Drell-Yan production in pp and pD interactions, $W^{\pm}$ and Z boson production in pp and $p\bar{p}$ collisions. In particular, we discuss the determination of the off-shell correction describing the modification of parton distributions (PDF) in bound nucleons in the context of global PDF fits. Results are compared with the ones obtained from the study of DIS data from heavy nuclei. We also discuss the sensitivity to various models for the deuteron wave function. As an important application we discuss the impact of nuclear corrections to the deuteron on the determination of the d quark distribution.

Primary authors: PETTI, Roberto (University of South Carolina); ALEKHIN, Sergey (DESY); KULAGIN, Sergey (INR)

Presenter: PETTI, Roberto (University of South Carolina)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **290** Type: **not specified**

Nuclear Parton Distributions

Wednesday, April 13, 2016 12:00 PM (15 minutes)

We present the status of our calculation of nuclear parton distribution functions on the basis of our recently developed semi-microscopic model, which takes into account a number of nuclear effects including nuclear shadowing, Fermi motion and nuclear binding, nuclear meson-exchange currents and off-shell corrections to bound nucleon distributions. We discuss in details the dependencies of nuclear effects on the type of parton distribution (nuclear sea vs. valence) as well as on the parton flavour (isospin). We discuss a number of applications ranging from Deep Inelastic Scattering to the Drell-Yan production.

Primary authors: PETTI, Roberto (University of South Carolina); KULAGIN, Sergey (INR)

Presenters: PETTI, Roberto (University of South Carolina); KULAGIN, Sergey (INR)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **291** Type: **not specified**

The International Linear Collider - Physics & Perspectives

Tuesday, April 12, 2016 4:30 PM (20 minutes)

With the discovery of the Higgs boson at LHC, all particles of the Standard Model have been observed experimentally, yet many questions are left unanswered. The discovery has intensified the planning for future high-energy colliders, which aim to probe the Standard Model and the mechanism of electroweak symmetry breaking with higher precision and to extend and complement the search for new particles currently under way at the LHC. The most mature option for such a future facility is the International Linear Collider ILC, an electron-positron collider with a center-of-mass energy of 500 GeV, and the potential for upgrades into the TeV region and/or into a photon collider. The ILC will fully explore the Higgs sector, including model-independent coupling and width measurements, direct measurements of the coupling to the top quark and the Higgs self-coupling, enable precision measurements of top quark properties and couplings as well as other electroweak precision measurements and provide extensive discovery potential for new physics complementary to the capabilities of hadron colliders. We will give an overview over the physics case of the ILC, put in context of the running scenario covering different center-of-mass energies, and discuss the current status and perspectives of this global facility.

Primary author: Dr SIMON, Frank (Max-Planck-Institute for Physics)

Presenter: VAN DER KOLK, Naomi (MPI Muenchen)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **292** Type: **not specified**

Recent COMPASS results on Transverse Spin and Momentum dependent distributions and fragmentation functions.

Tuesday, April 12, 2016 2:30 PM (25 minutes)

COMPASS is a fixed target experiment in operation at CERN since 2002 with a wide physics programme. By using either muon or hadron beams, both the study of the spin structure of the nucleon and the search of exotic states in hadron spectroscopy are performed.

An important part of this programme is the study of transverse spin and momentum dependent parton distribution and fragmentation functions. First measurements of HERMES and COMPASS showed sizeable Collins and Sivers asymmetries, allowing first extractions of TMD PDFs and FF. Now this field of research is entering the phase of precision measurements and is a central topic of many present and future experiments.

Recent COMPASS results on Collins and Sivers asymmetries and on multidimensional analysis of SSA will be reviewed together with the perspective for future measurements.

Summary

(On behalf of the COMPASS Collaboration)

Primary author: Dr BRESSAN, Andrea (University of Trieste and Trieste Division of INFN)

Presenter: Dr BRESSAN, Andrea (University of Trieste and Trieste Division of INFN)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **293** Type: **not specified**

New pole contribution to transverse-momentum-weighted single-transverse spin asymmetry in semi-inclusive deep inelastic scattering

Tuesday, April 12, 2016 9:50 AM (15 minutes)

In this talk, we discuss the new hard pole contribution to the transverse-momentum-weighted single-transverse spin asymmetry in semi-inclusive deep inelastic scattering. We perform the complete next-to-leading order calculation of the $P_{h\perp}$-weighted cross section and show that the new hard pole contribution is required in order to obtain the complete evolution equation for the Qiu-Sterman function derived by different approaches.

Primary author: Dr YOSHIDA, Shinsuke (Central China Normal University)

Presenter: Dr YOSHIDA, Shinsuke (Central China Normal University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **294** Type: **not specified**

Twist-3 effects on the double spin asymmetry A_{LT} in proton-proton collision.

Tuesday, April 12, 2016 4:50 PM (15 minutes)

We discuss the twist-3 contributions to the double-spin asymmetry A_{LT} for light hadron production in collisions between transversely and longitudinally polarized protons. So far only twist-3 effect in the transversely polarized proton have been studied for A_{LT}. In this talk, we discuss other possible twist-3 contributions in order to derive the complete leading-order cross section formula for A_{LT}.

Primary author: Dr YOSHIDA, Shinsuke (Central China Normal University)

Co-authors: Dr PITONYAK, Daniel (RIKEN BNL Research Center); Mr TAKAGI, Yoshihiro (Niigata University); Prof. KOIKE, Yuji (Niigata University)

Presenter: Dr YOSHIDA, Shinsuke (Central China Normal University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **295** Type: **not specified**

Measurement of Transverse Single Spin Asymmetries in π^0 Production from $p^\uparrow + p$ and $p^\uparrow + A$ Collisions at STAR

Tuesday, April 12, 2016 11:20 AM (15 minutes)

In 2015 the first collisions between polarized protons and nuclei occurred at the Relativistic Heavy Ion Collider (RHIC), at a center-of-mass energy of $\sqrt{s_{NN}} = 200$ GeV. Comparisons between spin asymmetries and cross-sections in $p + p$ production to those in $p + A$ production provide insight into nuclear structure, namely nuclear modification factors, nuclear dependence of spin asymmetries, and comparison to models with saturation effects. The transverse single spin asymmetry, A_N, has been measured in π^0 production in the STAR Forward Meson Spectrometer (FMS), an electromagnetic calorimeter covering a forward psuedorapidity range of $2.6 < \eta < 4$. Within this kinematic range, STAR has previously reported the persistence of large π^0 asymmetries with unexpected dependences on p_T and event topology in $p+p$ collisions. This talk will compare these dependences to those in $p + A$ production.

Primary author: Mr DILKS, Christopher (Pennsylvania State University)

Presenter: Mr DILKS, Christopher (Pennsylvania State University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **296** Type: **not specified**

The PANDA Experiment at FAIR

Thursday, April 14, 2016 10:09 AM (20 minutes)

The PANDA experiment in preparation to be setup at FAIR (Facility for Antiproton and Ion Research) in Darmstadt, Germany will cover many important aspects of hadron physics with cooled anti-proton beams of unprecedented intensity and precision in the momentum range between 1.5 and 15 GeV/c.

The versatile detector is designed to address a rich physics program.
This includes spectroscopy of QCD bound states ranging from charmonium to states composed of light quarks only, which comprises studies of the recently and yet not understood X, Y, and Z states and searches for other exotics. Production of hyperons will shed further light on the strong interaction in the intermediate region between the perturbative and non-perturbative regime. Time-like nuclear form factors and properties of hadrons in medium will be accessible and round up the experimental program.

In this talk aspects of the PANDA physics program will be highlighted. Major components of the detector are under construction. The current status of the experiment will be presented.

Primary author: PELIZAEUS, Marc (Ruhr-University Bochum)

Presenter: PELIZAEUS, Marc (Ruhr-University Bochum)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **297** Type: **not specified**

Sub-femtoscopic, Chromodynamic, Rutherford Scattering

Tuesday, April 12, 2016 9:20 AM (15 minutes)

Measurements of the lepto-production of vector mesons have always been pivotal in the development of a theory of hadron dynamics, challenging and elucidating the paradigm of the moment and thereby guiding our understanding of it to its present status in terms of QCD. Always with an experimentalist's appreciation of the momentous theoretical achievements of more recent years with QCD in mind, first steps in yet another new look at the measurements of such electro-production from the HERA ep collider is shown to provide simple and instructive insight in terms of what is truly chromodynamic Rutherford scattering within the dimension of confinement. The nature of further analysis of presently available data and the opportunities for progress in hadron dynamics in such terms with higher statistical sensitivity are mentioned.

Summary

The lepto-production of vector mesons (VM) is a unique QCD laboratory. By means of control of three experimental measureds, Q2, VM mass squared, and 4-momentum transfer squared t, with a simple leading-order diagram, and with the judicious application of the optical theorem, it is possible to seek a consistency in respect of the size of a quark's interaction with a colour singlet hadron. The outcome of a first, very preliminary, such attempt is presented which reveals consistency with the familiar paradigm due to confinement of constituent and current quarks. and which highlights how size matters most in chromodynamic Rutherford scattering.

Primary author: Prof. DAINTON, John (Cockcroft)

Presenter: Prof. DAINTON, John (Cockcroft)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **298** Type: **not specified**

NLL soft gluon resummation for associated ttH production

Wednesday, April 13, 2016 11:55 AM (20 minutes)

In this talk a short description of the soft gluon resummation for pp->ttbarH process will be given. This is the first application of the Mellin resummation technique in a 2->3 process. The absolute threshold resummation is performed up to NLL accuracy and matched to the known NLO QCD cross-section. Results for the total cross-section at the LHC and their theoretical uncertainties will be presented.

Primary author: Mr STEBEL, Tomasz (Jagiellonian University)

Co-authors: Prof. KULESZA, Anna (University of Münster); Dr MOTYKA, Leszek (Jagiellonian University); Dr THEEUWES, Vincent (University at Buffalo)

Presenter: Mr STEBEL, Tomasz (Jagiellonian University)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **299** Type: **not specified**

Neutron-skin effect and centrality dependence of high-pT observables in nuclear collisions

Wednesday, April 13, 2016 12:20 PM (15 minutes)

High-energy nuclear collisions are often classified in terms of centrality. Theoretically the centrality binning is obtained using the Woods-Saxon parametrization for nuclear density as an input for Glauber model. Traditionally the parametrization do not differentiate between protons and neutrons. However, according to measurements in nuclear physics, the density of neutrons decrease slower at the edge of the nuclei than the density of protons. This phenomenon is known as a neutron-skin effect and can have an influence to the centrality dependence of high-pT observables sensitive to electric charge in high-energy nuclear collisions. Potentially the phenomenon could also be measured in e+A collisions if a similar centrality binning can be performed. In this talk we present NLO pQCD predictions for the centrality dependence of the direct photon production at high-pT in Pb+Pb collisions at the LHC applying the neutron-skin effect and spatially dependent nuclear PDFs from EPS09s fit. Furthermore, we discuss about W production and the ratio between positively and negatively charged hadrons. The advantage of these observables would be that the nuclear modifications of the PDFs largely cancel out allowing one to separate these two competing centrality-dependent effects.

Primary author: Dr HELENIUS, Ilkka (Lund University)

Co-author: Dr PAUKKUNEN, Hannu (University of Jyväskylä)

Presenter: Dr HELENIUS, Ilkka (Lund University)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **300** Type: **not specified**

Fragmentation Functions beyond Next-To-Leading Order

Tuesday, April 12, 2016 3:37 PM (20 minutes)

With the ever increasing amount of precise data available for hadron production processes, the perturbative QCD framework is being extended to explore effects and corrections that go beyond the next-to-leading order (NLO) accuracy. Fixed order calculations at next-to-next-to-leading order (NNLO) are becoming the new necessary standard required for precision predictions and, consequently, the analysis of the non-perturbative structure of the hadron has to align to this standard. Moreover, relevant effects specific to some kinematical regions, such as the small-x and large-x regions in Semi-Inclusive electron-positron Annihilation (SIA), can be investigated through the means of resummation techniques and can be also included in the analysis of final state parton distribution functions. In this talk we present a first analysis of parton-to-pion fragmentation functions at next-to-next-to-leading order based on single-inclusive pion production in electron-positron annihilation, together with its extension to the small-x region where an all order resummation of large logarithmic contributions has to be included to further extend the lower cuts on the fit's domain.

Primary author: Mr ANDERLE, Daniele Paolo (Institut für Theoretische Physik Universität Tübingen)

Co-authors: Dr RINGER, Felix (Los Alamos National Lab); Dr STRATMANN, Marco (Institut für Theoretische Physik Universität Tübingen); Mr KAUFMANN, Tom (Institut für Theoretische Physik Universität Tübingen)

Presenter: Mr ANDERLE, Daniele Paolo (Institut für Theoretische Physik Universität Tübingen)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **302** Type: **not specified**

A Second Generation of Jefferson Lab 12-GeV Experiments - Towards Precision Spatial and Momentum Imaging of Hadrons

Wednesday, April 13, 2016 3:16 PM (20 minutes)

This talk will concentrate on the plans towards equipment and science utilizing the 12-GeV Upgrade at Jefferson Lab beyond the first three years of planned operations. Experiments are geared towards precision spatial and momentum imaging of hadrons utilizing specialized detector and/or target systems. For example, the Neutral-Particle Spectrometer in Hall C is presently under construction, and plans also exist for enhancements of equipment in Halls A and B towards detailed 3D imaging in the valence quark region.

Primary author: ENT, Rolf (Jefferson Lab)

Presenter: ENT, Rolf (Jefferson Lab)

Session Classification: WG6/WG7 joint session (spin+future exp.)

Track Classification: Future Experiments

Contribution ID: **303** Type: **not specified**

The Belle II Experiment

Wednesday, April 13, 2016 5:16 PM (20 minutes)

The Belle II experiment at the asymmetric e^+e^- SuperKEKB collider is a major upgrade of the Belle experiment, which ran at the KEKB collider at the KEK laboratory in Japan. The design luminosity of SuperKEKB is 8×10^{35}~cm^{-2}\,s^{-1}, which is about 40 times higher than that of KEKB. Commissioning of the main ring of SuperKEKB has started in February of this year and Belle~II is expected to accumulate an integrated luminosity of 50~ab^{-1} well within the next decade.
The experiment will focus on searches for new physics beyond the Standard Model via high precision measurements of heavy flavor and searches for rare signals. To reach these goals, the accelerator, detector, electronics, software, and computing systems are all being substantially upgraded. In this talk we present the status of the accelerator and of the different Belle II sub-detector upgrades.

Primary author: BELLE II COLLABORATION, Belle II Collaboration (DESY)

Presenter: Dr MARINAS, Carlos (University of Bonn)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **304** Type: **not specified**

Belle II early physics program of bottomonia spectroscopy

Wednesday, April 13, 2016 5:39 PM (20 minutes)

The Belle II experiment at the SuperKEKB collider is a major upgrade of the KEK "B factory" facility in Tsukuba, Japan. Phase 1 commissioning of the main ring of SuperKEKB has started in February 2016 and first physics data will be recorded in the second half of 2017 during the so-called Phase~2 commissioning, when the Belle II detector will be operated still without its vertex detector.

In this talk we describe a possible physics program for this early data run at different center-of-mass energies, in particular at the $\Upsilon(3S)$ and $\Upsilon(6S)$ resonances, amongst other energy points.

Primary author: BELLE II COLLABORATION, Belle II Collaboration (DESY)

Presenter: Dr YE, Hua (DESY)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **305** Type: **not specified**

Belle II studies of missing energy decays and searches for dark photon production

Wednesday, April 13, 2016 6:02 PM (20 minutes)

The Belle II experiment at the SuperKEKB collider is a major upgrade of the KEK "B factory" facility in Tsukuba, Japan. The machine is designed for an instantaneous luminosity of 8×10^{35}~cm^{-2}\,s^{-1}, and the experiment is expected to accumulate a data sample of about 50 ab^{-1} well within the next decade. With this amount of data, decays sensitive to physics beyond the Standard Model can be studied with unprecedented precision. One promising set of modes are physics processes with missing energy such as $B^+ \to \tau^+\nu$, $B \to D^{(*)}\tau\nu$, and $B \to K^{(*)}\nu\bar{\nu}$ decays. The Belle II data also allows searches for candidates for the dark photon, the gauge mediator of a hypothetical dark sector, which has received much attention in the context of dark matter models.

Primary author: BELLE II COLLABORATION, Belle II Collaboration (DESY)

Presenter: Dr INGUGLIA, Gianluca (DESY)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **306** Type: **not specified**

Collins function from recent e+e− data

Tuesday, April 12, 2016 6:10 PM (15 minutes)

New investigations on the Collins functions have been made possible by recent e+ e− annihilation data released by the BaBar Collaboration. These data allow to directly infer the transverse momentum dependence of the Collins function for pions and, for the first time, attempt extractions of the kaon Collins function. In this talk, I will discuss our recent results of the analysis of these and other available data sets, within a simple gaussian model.

Primary author: Dr GONZALEZ HERNANDEZ, J. Osvaldo (Old Dominion University)

Presenter: Dr GONZALEZ HERNANDEZ, J. Osvaldo (Old Dominion University)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **307** Type: **not specified**

Complete nonrelativistic-QCD prediction for prompt double J/ψ hadroproduction

Thursday, April 14, 2016 11:00 AM (20 minutes)

We perform a complete study of prompt double J/ψ hadroproduction at leading order in the nonrelativistic-QCD factorization framework by including all possible pairings of the $c\bar{c}$ Fock states ${}^1S_0^{[8]}$, ${}^3S_1^{[1,8]}$, and ${}^3P_J^{[1,8]}$ with $J = 0, 1, 2$.
We find that the ${}^1S_0^{[8]}$ and ${}^3P_J^{[8]}$ channels of J/ψ and ψ' production and the ${}^3P_J^{[1]}$ and ${}^3S_1^{[8]}$ channels of χ_{cJ} production, which have been overlooked so far, greatly dominate at large invariant masses and rapidity separations of the prompt J/ψ pair, and that their inclusion nearly fills the large gap between previous incomplete predictions within the color-singlet model and the recent measurement by the CMS Collaboration at the CERN LHC, leaving room for next-to-leading-order corrections of typical size.

Primary author: Dr HE, Zhiguo (Hamburg University)

Co-author: Prof. KNIEHL, Bernd (Hamburg University)

Presenter: Dr HE, Zhiguo (Hamburg University)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **308** Type: **not specified**

The EW Sudakov approximation in SHERPA

Wednesday, April 13, 2016 5:50 PM (15 minutes)

Monte Carlo event generators are currently very important tools for the comparison between theory and experiment at particle colliders. Today, these tools typically reach NLO precision in QCD for the fixed-order matrix element. In order to improve this precision, Monte Carlo event generators must compute to NLO in EW as well as to NNLO in QCD. The inclusion of a full NLO EW calculation is computationally expensive and is also non-trivial to include on top of a NLO QCD calculation. It is, however, possible to include the most dominant terms of the NLO EW calculation in the high-energy limit without the overhead of performing the complete calculation. These dominant terms are the large logarithms, called 'EW Sudakov logarithms', which result from the soft-collinear limit of weak boson exchange. Unlike in QCD and QED, the mass of the weak bosons introduces a natural cut-off, which leaves these logarithms large and finite in the high-energy regime. This talk presents the implementation of these logarithms as a K-factor to the underlying Born process within the SHERPA Monte Carlo event generator.

Summary

A talk to outline the implementation of the EW Sudakov high-energy approximation to NLO EW calculations in the SHERPA Monte Carlo event generator.

Primary author: Dr THOMPSON, Jennifer (II. Physikalisches Institut, Georg-August-Universitaet Goettingen)

Presenter: Dr THOMPSON, Jennifer (II. Physikalisches Institut, Georg-August-Universitaet Goettingen)

Session Classification: WG3 Electroweak Physics and Beyond the Standard Model

Track Classification: Electroweak Physics and Beyond the Standard Model

Contribution ID: **309** Type: **not specified**

Disentangling the EMC effect

Thursday, April 14, 2016 11:46 AM (20 minutes)

The deep inelastic scattering (DIS) cross section for scattering from bound nucleons differs from that of free nucleons. This experimental phenomena, known as the EMC effect, was first discovered 30 years ago and still lack an accepted theoretical explanation. In recent years it became accepted that any explanation to the EMC must include modification of the bound nucleon structure function due to the nuclear medium. Understanding the physical mechanism driving this modification is the focus of a large ongoing experimental and theoretical effort.

There are two main approaches to explain this mechanism. On one hand it was proposed that the strong mean field in the nucleus modify all the bound nucleons. On the other hand the strength of the EMC effect was found to be linearly correlated with the relative amount of Two-Nucleon Short Range Correlated pairs (2N-SRC) in nuclei. The observed correlation indicates that the EMC effect, like 2N-SRC pairs, is related predominantly to the high momentum (large virtuality) nucleons in the nucleus.

In the last few years several experiments were proposed to the updated 12 GeV JLab and the future Electron Ion Collider (EIC) that will test which one of the proposed theories is correct. We will review the EMC and SRC studies, their implication to asymmetric nuclear system, and present the planned experiments aimed at studying the origin of the EMC effect.

Primary author: HEN, Or (MIT)

Presenter: HEN, Or (MIT)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **310** Type: **not specified**

Top quark mass calibration for Monte-Carlo event generators

Wednesday, April 13, 2016 12:40 PM (15 minutes)

The lack of knowledge how the top quark mass parameter in Monte-Carlo event generators (MCs) is related to field theoretically defined mass schemes limits the theoretical interpretation of the top quark mass measurements based on templates obtained from direct reconstruction analyses at hadron colliders. In the first part of the talk I review the conceptual aspects of the problem and argue which classes of field theoretic heavy quark mass definitions have a close relation to the quark mass parameter in MCs. In the second part I describe a method to calibrate the top quark MC mass parameter by fits of MC hadron level predictions for observables with very strong mass sensitivity to corresponding hadron level QCD predictions. I demonstrate the approach for thrust in electron positron collisions using factorization based QCD calculations at NNLL / NLO that account for hadronization and the complete top mass dependence, and I present concrete numerical results.

Primary author: Prof. HOANG, Andre (University of Vienna)

Presenter: Prof. HOANG, Andre (University of Vienna)

Session Classification: WG4 Heavy Flavours

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **311** Type: **not specified**

Exclusive Hard Processes with CLAS and Generalized Parton Distributions

Wednesday, April 13, 2016 5:00 PM (15 minutes)

An extensive experimental program with the CEBAF Large Acceptance Spectrometer (CLAS) at Jefferson Lab has been under way to study the 3-dimensional structure of the nucleon through investigating Generalized Parton Distributions (GPDs) by measuring hard exclusive processes such as deeply virtual Compton scattering (DVCS) and deeply virtual meson production (DVMP). The GPDs provide a route to spatial tomography of the nucleon and have revolutionized how we characterize nucleon structure, by allowing a unified description of quark densities in spatial coordinates in relation to their momenta. Studies of the GPDs will be the focus of a sizable part of the program of the 12 GeV CEBAF upgrade and a driving force behind the construction of the Electron Ion Collider (EIC). In this contribution, we present
recent results of the target spin and double spin asymmetries from deeply virtual Compton scattering (DVCS) and deeply virtual neutral pion production. Data were taken at Jefferson Lab using the CLAS detector and a longitudinally polarized 14 NH 3 target with a 6 GeV polarized electron beam. These results could provide new insights into the 3-dimensional nucleon structure.

Primary author: JOO, Kyungseon (University of Connecticut, Storrs, CT 06269, USA)

Presenter: JOO, Kyungseon (University of Connecticut, Storrs, CT 06269, USA)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **313** Type: **not specified**

Production of a forward J/Psi and a backward jet at the LHC

Wednesday, April 13, 2016 5:10 PM (15 minutes)

J/Psi mesons are copiously produced at the LHC. Inspired by the Mueller Navelet jet studies, we propose to consider the production of a forward J/Psi accompanied by a backward jet. We make a feasibility study for this process and we compute the leading order differential cross section for such events in the BFKL framework.

Primary author: BOUSSARIE, Renaud (CNRS, Univ. Paris-Sud, 91405 Orsay, France)

Presenter: BOUSSARIE, Renaud (CNRS, Univ. Paris-Sud, 91405 Orsay, France)

Session Classification: WG4/WG5 joint session (HF+diffraction)

Track Classification: Heavy Flavours (Charm, Beauty and Top)

Contribution ID: **314** Type: **not specified**

Probing transversity GPDs through the photoproduction of a rho meson and a photon

Thursday, April 14, 2016 11:50 AM (15 minutes)

Transversity GPDs have yet to be experimentally unraveled. We propose to probe them by studying photoproduction of a rho meson and a photon and we give a feasibility study for this process to be measured at JLAB or by COMPASS.

Primary author: BOUSSARIE, Renaud (CNRS, Univ. Paris-Sud, 91405 Orsay, France)

Presenter: BOUSSARIE, Renaud (CNRS, Univ. Paris-Sud, 91405 Orsay, France)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **315** Type: **not specified**

Experimental overview of DVCS and Generalized Parton Distributions at Jefferson Lab

Wednesday, April 13, 2016 4:30 PM (25 minutes)

Generalized Parton Distributions (GPDs) are nowadays the object of an intense effort of research, in the perspective of understanding nucleon structure. They describe the correlations between the longitudinal momentum and the transverse spatial position of the partons inside the nucleon and they can give access to the contribution of the orbital momentum of the quarks to the nucleon spin. Deeply Virtual Compton scattering (DVCS), the electroproduction on the nucleon, at the quark level, of a real photon, is the process more directly interpretable in terms of GPDs of the nucleon. Depending on the target nucleon (proton or neutron) and on the DVCS observable extracted (cross sections, target- or beam-spin asymmetries,…), different sensitivity to the various GPDs for each quark flavor can be exploited. This talk will be focused on recent promising results, obtained at Jefferson Lab, on cross sections and asymmetries for DVCS, and their link to the Generalized Parton Distributions. These data have opened the
way to a "tomographic" representation of the structure of the nucleon, allowing the extraction of transverse-space densities of the quarks at fixed longitudinal momentum. The extensive experimental program to measure GPDs at Jefferson Lab with the 12-GeV-upgraded electron accelerator and the complementary detectors that will be housed in three experimental Halls (A, B, C), will also be presented.

Primary author: NICCOLAI, Silvia (IPN Orsay)

Presenter: NICCOLAI, Silvia (IPN Orsay)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **316** Type: **not specified**

Impact of Light-cone models for intrinsic charm on production of γ+c- jet differential cross section at LHC and Tevatron

Thursday, April 14, 2016 12:20 PM (15 minutes)

Charm quark distribution function play an important role in study of many presses. In the standard global analysis of parton distribution functions, charm quark distribution arises perturbatively by gluon splitting. Nonetheless, existence of a non-perturbative intrinsic charm quark component in the nucleon is predicted by QCD. We present some phenomenological light cone models for non-perturbative intrinsic charm quark component. We investigate the impact of the charm quark distribution on production of γ + c-jet differential cross section in pp and pp(bar) collisions at LHC and Tevatron.

Primary author: ROSTAMI, Saeedeh (Semnan University, Iran)

Presenter: ROSTAMI, Saeedeh (Semnan University, Iran)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **317** Type: **not specified**

NLO impact factor for diffractive dijet production in the shockwave formalism

Tuesday, April 12, 2016 10:00 AM (15 minutes)

We present the computation for the impact factor for the production of dijets in diffractive DIS at Next-to-Leading Order using Balitsky's shockwave formalism.

Primary author: BOUSSARIE, Renaud (CNRS, Univ. Paris-Sud, 91405 Orsay, France)

Presenter: BOUSSARIE, Renaud (CNRS, Univ. Paris-Sud, 91405 Orsay, France)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **318** Type: **not specified**

Some news about hard exclusive processes

Thursday, April 14, 2016 11:00 AM (25 minutes)

A mini review on the phenomenology of exclusive measurements in the deeply virtual region is presented, where some emphasis is given to deeply virtual Compton scattering measurements from JLAB and the first access of the 2π generalized distribution amplitude from Belle measurements. Furthermore, new perturbative next-to-leading order results are reported.

Primary author: MUELLER, Dieter (Ruder Boskovic Institute, Zagreb, Croatia)

Presenter: MUELLER, Dieter (Ruder Boskovic Institute, Zagreb, Croatia)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **319** Type: **not specified**

Measurements of dijet azimuthal decorrelation at 8 TeV from CMS

Wednesday, April 13, 2016 5:25 PM (20 minutes)

A measurement of the decorrelation of azimuthal angles between the two jets with the largest transverse momenta is presented for seven regions of leading jet transverse momentum up to 2.2 TeV. The results are compared to fixed-order predictions of perturbative quantum chromodynamics (QCD), and to simulations using Monte Carlo event generators that include parton showers, hadronization, and multiparton interactions. We discuss also experimental effects like jet-energy-corrections.

Primary authors: KOKKAS, Panos (University of Ioannina in Ioannina, Greece); Prof. GOERLACH, Ulrich (IPHC UNISTRA)

Presenter: KOKKAS, Panos (University of Ioannina in Ioannina, Greece)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **322** Type: **not specified**

Disussion

Tuesday, April 12, 2016 10:20 AM (10 minutes)

Session Classification: WG1 Structure Functions and Parton Densities

Contribution ID: **323** Type: **not specified**

Discussion

Tuesday, April 12, 2016 12:40 PM (20 minutes)

Session Classification: WG1 Structure Functions and Parton Densities

Contribution ID: **325** Type: **not specified**

Discussion

Wednesday, April 13, 2016 10:20 AM (10 minutes)

Session Classification: WG1 Structure Functions and Parton Densities

Contribution ID: **326** Type: **not specified**

A Lattice Calculation of Parton Distributions

Thursday, April 14, 2016 11:40 AM (15 minutes)

Although Parton Distribution Functions are the fundamental objects describing the inner structure of hadrons, there exists so far no computation of them from first principles. The most promising candidate for such calculation, lattice QCD, performed successful computations for the masses, charges and form factors but not of the distributions themselves. The reason for this is that quark distributions are given by light-cone correlations and simulations of them are difficult to be done on an Euclidian lattice. However, a recent proposal allows the light-cone distributions to be extracted from purely spatial correlations, being thus accessible by lattice methods. We present here the latest results of our effort to perform an ab-initio lattice calculation of the nonsinglet combinations for $u(x)$–$d(x)$, $\Delta u(x) - \Delta d(x)$, and $\delta u(x) - \delta d(x)$, on a $32^3 \times 64$ lattice. We also discuss the challenges of the present calculations, possible extensions and the status of the renormalization program for these objects.

Primary authors: Mr WIESE, Christian (NIC, DESY Zeuthen); Prof. ALEXANDROU, Constantina (University of Cyprus); Dr STEFFENS, Fernanda (DESY - Zeuthen); JANSEN, Karl; CICHY, Krzysztof; HADJIYIANNAKOU, Kyriakos; DRACH, Vincent

Presenter: Dr STEFFENS, Fernanda (DESY - Zeuthen)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **327** Type: **not specified**

Exclusive J/ψ and Y photoproduction and the low x gluon

Thursday, April 14, 2016 12:00 PM (15 minutes)

We discuss the potential to constrain the small-x PDFs using the exclusive production of heavy vector mesons. The calculation of J/psi and Upsilon photoproduction at NLO in collinear factorisation is described. The different behaviour of the NLO corrections for J/psi and Upsilon is highlighted and we outline what might be expected from the inclusion of these processes in a PDF fit.

Presenter: Dr JONES, Stephen (MPI, Munich)

Session Classification: WG1 Structure Functions and Parton Densities

Track Classification: Structure Functions and Parton Densities

Contribution ID: **329** Type: **not specified**

Coherent J/psi photoproduction in ultra-peripheral PbPb collisions at 2.76 TeV and prospects at CMS for Run 2

Wednesday, April 13, 2016 2:50 PM (15 minutes)

The coherent J/psi photoproduction cross section is measured in ultra-peripheral PbPb collisions at 2.76 TeV at the CMS experiment at the LHC. The J/psi mesons are reconstructed via their decay into muon pairs. In this talk, the measurement of the coherent J/psi photoproduction cross section as well as the neutron dependence break-up mode ratios for this process will be presented. These measurements extend the recent ALICE results on coherent J/psi photoproduction to a new rapidity range, confirming the experimental evidence of nuclear gluon effects in gamma+Pb interactions at unprecedentedly low Bjorken-x values in the Pb nucleus. The prospects of photon-induced measurements with heavy ions using the run 2 data at the LHC will be also described.

Primary author: TAKAKI, Daniel Tapia (The University of Kansas in Lawrence, KS, United States)

Presenter: TAKAKI, Daniel Tapia (The University of Kansas in Lawrence, KS, United States)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **330** Type: **not specified**

Measurements of total elastic, inelastic and diffractive cross sections with the ATLAS detector

Thursday, April 14, 2016 11:00 AM (15 minutes)

The total pp cross section is a fundamental property of the strong interaction which can not be calculated in perturbative QCD but only described based on phenomenological models. The ATLAS collaboration has explored the total proton-proton cross section, using measurements of the total inelastic proton-proton cross sections and of the diffractive part of the inelastic cross section in special data sets taken with low beam currents. The measurements have been performed at center of mass energies of 7TeV and 13TeV, using special forward scintillators or the calorimeters. Studies of the production of di-jets accompanied by a large rapidity gap are presented, which is also used to estimate the "gap survival probability" in hadron-hadron collisions. Finally, a measurement of exclusive production of dileptons in 7 TeV pp collisions is presented. The results show significant deviations from the pure QED prediction, which can be explained by photon coherence and proton rescattering effects.

The total cross section can be also extracted from a measurement of the differential elastic cross section using the optical theorem. The ATLAS Collaboration has collected 0.5 /nb of elastic data in a dedicated run with high beta* optics at 8 TeV centre-of-mass energy with the ALFA Roman Pot detector in order to perform this measurement.

Primary author: SHABALINA, Elizaveta (University of Gottingen)

Presenter: TRZEBINSKI, Maciej Marek (Polish Academy of Sciences)

Session Classification: WG5 Small-x and Diffraction

Track Classification: Small-x, Diffraction and Vector Mesons

Contribution ID: **331** Type: **not specified**

Overview of High Energy Jets

Wednesday, April 13, 2016 2:50 PM (20 minutes)

High Energy Jets (HEJ) is a novel method for organising the resummation of high energy logs in QCD to Leading Logarithmic accuracy (LL) in multi-jet production at hadronic colliders. In this talk, I will introduce the main concepts behind the approach and show how we build our exclusive predictions. I will show important results from recent LHC jet analyses. I will then discuss how the formalism can be extended to include Next-to-Leading Log (NLL) before focussing on recent work on including full finite quark mass effects in Higgs production in association with dijets.

Primary author: COCKBURN, James (University of Edinburgh)

Presenter: COCKBURN, James (University of Edinburgh)

Session Classification: WG2 QCD and Hadronic Final States

Track Classification: QCD and Hadronic Final States

Contribution ID: **333** Type: **not specified**

The CLIC physics potential

Wednesday, April 13, 2016 10:09 AM (20 minutes)

The Compact Linear Collider (CLIC) is a multi-TeV electron-positron collider under development. It offers the potential for a rich precision physics programme, combined with sensitivity to a wide range of new phenomena. To optimise its physics output CLIC is foreseen to be built and operated in several energy stages, ranging from ~350 GeV to 3 TeV centre-of mass energy.
The CLIC physics potential has been studied using full detector simulations for several centre-of-mass energies. These include Higgs production through Higgsstahlung at a few hundred GeV, allowing for the couplings and width of the Higgs boson to be determined in a model-independent way through the recoil mass technique. While originally considering only leptonic Z decays in the recoil mass measurement, it was shown recently that significantly higher precisions on the couplings can be achieved by including the hadronic decay of the Z. Operation at higher centre-of-mass energies provides large statistics for the study of the Higgs boson through the WW-fusion production process. It also offers the potential to directly measure the top Yukawa coupling. At the highest centre-of-mass energy of 3 TeV, the Higgs self-coupling can be determined with 10% precision. The complete physics program for all measurements of accessible Higgs couplings is included in combined fits.
Precision measurements of top quark production in e+e- collisions will significantly enhance our knowledge of top quark properties and will give new insight in physics beyond the Standard Model. The top mass can be measured at a 50 MeV accuracy level in a well-defined mass scheme by performing a scan of the top pair production threshold. For the study of the top quark couplings to electroweak gauge bosons, form factors can be determined to 1% precision, an order of magnitude better than the full LHC programme. Recent results extend the prospects to different centre-of-mass energies and to CP violating form factors. New studies of Flavour Changing Neutral Current decays of the top quark, such as the decay t -> cH, to a branching ratio BR(t->cH) ~ 10^-5, are also presented.
The search for phenomena beyond the Standard Model through direct observation of new particles and precision measurements is a main motivation for the high-energy stages of CLIC. An overview of physics benchmark studies assuming different New Physics scenarios is given. New particles can be discovered in a model-independent way almost up to the kinematic limit of sqrt(s)/2. The low background conditions at CLIC provide extended discovery potential compared to hadron colliders, for example in the case of non-coloured TeV-scale SUSY particles. In addition to studying new particles directly, BSM models can be probed up to scales of tens of TeV through precision measurements. Examples, including recent results on the reaction e+ e- -> gamma gamma, are presented. Beam polarisation allows to constrain the underlying theory further in many cases. The talk will also include a discussion of LHC results relevant for the CLIC physics case.

Summary

The CLIC physics potential will be summarised.

Primary author: LINSSEN, Lucie (CERN)

Presenter: ROBSON, Aidan (Glasgow)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments

Contribution ID: **334** Type: **not specified**

Recent results for the proton spin decomposition from lattice QCD

Thursday, April 14, 2016 12:10 PM (15 minutes)

The exact decomposition of the proton spin has been a much debated topic, on the experimental as well as the theoretical side. In this talk we would like to report on recent non-perturbative results and ongoing efforts to explore the proton spin from lattice QCD. We present results for several form factors from gauge field ensembles that feature a physical value of the pion mass. These form factors can be
used to determine the quark total angular momentum as well as the spin carried by
quarks. In addition we present first results for our ongoing effort to compute the angular momentum of the gluons in the proton.

Primary author: Mr WIESE, Christian (John von Neumann Institute for Computing (NIC), DESY, Platanenallee 6, 15738 Zeuthen, Germany)

Presenter: Mr WIESE, Christian (John von Neumann Institute for Computing (NIC), DESY, Platanenallee 6, 15738 Zeuthen, Germany)

Session Classification: WG6 Spin Physics

Track Classification: Spin Physics

Contribution ID: **335** Type: **not specified**

Altarelli prize Talk (b)

Friday, April 15, 2016 10:05 AM (15 minutes)

Presenter: Dr CAOLA, Fabrizio (Johns Hopkins University)

Session Classification: Plenary

Contribution ID: **336** Type: **not specified**

DESY director's Welcome

Monday, April 11, 2016 10:30 AM (5 minutes)

Presenter: Prof. DOSCH, Helmut (DESY)

Session Classification: Plenary

Contribution ID: **337** Type: **not specified**

The Compressed Baryonic Matter experiment at FAIR

Thursday, April 14, 2016 12:31 PM (20 minutes)

The CBM experiment will investigate highly compressed baryonic matter created in A+A collisions at the new FAIR accelerator. With a beam energy range up to 11 AGeV for the heaviest nuclei at the SIS 100 accelerator, CBM will investigate the QCD phase diagram in the intermediate range, i.e. at moderate temperatures but high net-baryon densities. This research program is thus complementary to the studies performed at the high-energy accelerators LHC and RHIC which focus on strongly interacting matter at high temperatures and essentially zero net-baryon density. The intermediate range of the QCD phase diagram is of particular interest because, compared to the high energy case, the strongly interacting matter created here is expected to have very different characteristics due to the high net-baryon densities. Different to the crossover between partonic and hadronic matter seen at low net-baryon densities, a first order phase transition ending in a critical point and possibly new high-density phases of strongly interacting matter are expected.

In this range of the QCD phase diagram only exploratory measurements have been performed so far. CBM, as a second generation, high-luminosity experiment, will substantially improve our knowledge of matter created in this region of the QCD phase diagram and characterize its properties by measuring rare probes such as multi-strange hyperons, dileptons or charm, but also with event-by-event fluctuations of conserved quantities, and collective flow of identified particles. Due to the unprecedented reaction rates CBM has a high discovery potential. The experimental preparations in terms of detector development, feasibility studies and fast track reconstruction are progressing well such that CBM will be ready with the FAIR start.

Presenter: Dr HOEHNE, Claudia (University of Giessen)

Session Classification: WG7 Future Experiments