DPG rehearsal

Report of Contributions

https://indico.desy.de/e/48252

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

Results Of Longevity Measurements Of A Prototype Plasma Lens For Positron Matching

Tuesday 25 March 2025 15:30 (25 minutes)

Presenter: HAMANN, Niclas (FTX (Technol. zukuenft. Teilchenph. Experim.))

Session Classification: Block 5

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

Considerations for high repetition rate plasma accelerator sources

Tuesday 25 March 2025 13:25 (25 minutes)

Electron-bunch-driven plasma-wakefield accelerators promise to revolutionize particle acceleration by
providing compact and cost-effective energy boosters for electron linacs which could, for example, significantly enhance the photon energies produced by free-electron lasers. The FLASHForward facility at
DESY has made substantial progress, demonstrating that accelerated electron bunches can maintain
their charge, energy spread, and emittance during plasma acceleration. A major challenge remains in
achieving high-repetition-rate operation, as is common in conventional radiofrequency accelerators.
To match the bunch patterns of superconducting RF linacs, identical plasma acceleration events must
take place at MHz frequencies. This presents two challenges: how to maintain the same plasma density
over these timescales, and how to deal with the high heat load in the plasma and its containment device.
In this contribution we will first outline plans and recent results to measure the density evolution of
discharge-initiated plasmas with high temporal and spatial resolution. Secondly, we will report on the
long-term heating of the plasma cell from repeated plasma creation events with a view towards implementing mitigation strategies.

Presenter: DIAZ PACHECO, Juan Pablo Jose (FTX (FTX Fachgruppe AST))

Session Classification: Block 3

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

A virtual spectral diagnostic for plasma accelerated bunches at FLASHForward

Tuesday 25 March 2025 15:05 (25 minutes)

Plasma-wakefield acceleration (PWFA) promises to reduce the size of future machines significantly by providing multi-GeV/m acceleration gradients, orders of magnitude higher than conventional RF accelerators. However, PWFA is a process with many non-linear dependencies, making it difficult to understand the influence of input parameters. Moreover, measurements of e.g. energy spectra are destructive, preventing the output beam from being used for applications whilst only allowing for the diagnosis of one bunch in a bunch train simultaneously. Neural networks trained on non-destructive measurements can be used to predict the properties of accelerated bunches, which would provide more insight into sources of variability and potential shot-to-shot, non-destructive measurements for whole bunch trains. Using experimental data collected at FLASHForward - a beam-driven plasma acceleration experiment at DESY, Hamburg - a neural network-based virtual diagnostic predicting the spectral properties of plasma accelerated bunches is being investigated. In this contribution, we present first results from this project.

Presenter: BURGHART, Philipp (FTX (FTX Fachgruppe AST))

Session Classification: Block 5

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

Higgs self-coupling measurement at the ILC

Tuesday 25 March 2025 14:05 (25 minutes)

Measuring the Higgs self-coupling represents a cornerstone of the physics program of future colliders because it gives important insights into the shape of the Higgs potential. This contribution summarizes the updated projections for the determination of the Higgs self-coupling from di-Higgs production at future □+□– colliders. In particular, we will present an update of the analysis of di-Higgs production at 500 GeV using full simulation of the ILD detector concept, incorporating advancements through state-of-the-art particle ID and flavor tagging as well as covering the □□ ⟶ □⁻□□⁻□ and □ ⟶ □ ⁻□/□+□–/□+□–/⁻□□ channels. Based on the experience of previous analyzes, we extrapolate these to cover some of the remaining decay modes, e.g. □□ ⟶ ⁻□□□ □ or □ ⟶ □ +□ –, as well as the contribution from the W W fusion production mode. We study the dependency of the results on the center-of-mass energy as well as on the value of the trilinear coupling realized in nature.

Presenter: BLIEWERT, Bryan (FTX (FTX Fachgruppe SLB))

Session Classification: Block 4

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

Strong-field QED measurement tests at FACET-II using new electron detector concept

Tuesday 25 March 2025 11:35 (25 minutes)

Strong-Field Quantum Electrodynamics (SFQED) is an emergent field of physics, where conventional quantum electrodynamics calculations become non-perturbative due to a strong electromagnetic background field. This gives rise to non-linear Compton scattering and non-linear Breit-Wheeler pair production. Advances in laser technology have made it possible to explore this field, by colliding photons from a high-intensity laser with a high-energy electron beam. One of the experiments that will measure SFQED phenomena is LUXE, an experiment planned at the DESY. Part of LUXE is its electron detection system (EDS), which will measure high rates of electrons coming from electron-laser interactions. It consists of a segmented straw Cherenkov detector, and a scintillator screen and camera set-up. A prototype of the EDS has recently made measurements with E320, an SFQED experiment at the FACET-II facility at SLAC, where it measured non-linear Compton scattering. This talk will discuss the prototype of the EDS and the first results obtained from the measurements at E320.

Presenter: HENDRIKS, Luke (FTX (FTX Fachgruppe SLB))

Session Classification: Block 2

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

Background Studies for the ILD Detector Concept at the FCC-ee

Tuesday 25 March 2025 10:25 (25 minutes)

The ILD detector concept has originally been developed for the International Linear Collider (ILC). Detailed simulations gauged against the performance of prototype components have shown that ILD in its ILC incarnation is ideally suited to pursue the physics program of a linear Higgs factory as well as of a higher energy ⊠+⊠– collider. Recently, the ILD collaboration has started to investigate how the detector concept would need to be modified in order to operate successfully in the experimental environment of a circular Higgs factory like for instance FCC-ee. In particular, the interaction region, or machine-detector interface (MDI), requires substantial changes to make room for accelerator elements and to withstand backgrounds. This contribution presents the assessment of the occupancy caused by machine backgrounds in the modified detector design, especially in the tracking subdetector systems.

Presenter: SCHWAN, Victor Laurenz (FTX (FTX Fachgruppe SLB))

Session Classification: Block 1

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

Quality Control of the Tileboards for the High Granularity Calorimeter upgrade of the CMS experiment

Tuesday 25 March 2025 11:10 (25 minutes)

The CMS experiment will be upgrading its detectors in lieu of higher luminosities and collision rates during the High-Luminosity era of the LHC (HL-LHC). One key upgrade of the CMS detector will be its end-cap calorimeters, which will be fitted with the new High Granularity Calorimeter (HGCAL). Since the HL-LHC will have 10 times more luminosity, the HGCAL will have improved radiation hardness and better background rejection that is caused due to much higher pile-up. It will consist of both the Electromagnetic and Hadronic calorimeters. Furthermore, the Hadronic calorimeter is split into two different technologies owing to the amount of radiation damage. The SiPM-on-Tile technology consists of scintillators that are linked to SiPMs (Silicon Photomultiplier) on the PCB. The size of the scintillators are also much smaller in the HGCAL than in the current CMS HCAL. The PCB without any scintillators on it is known as a tileboard. A tileboard will house 1 or 2 readout ASICs (called HGCROCs), and each HGCROC can read out 72 channels. The production tileboards have already started to be made. To test and certify the boards and the functionality of the HGCROCs, a robust quality control procedure is needed. The QC procedure, as well as some of the results, will be discussed in this presentation.

Presenter: SRITHARAN, Anurag (FTX (FTX Fachgruppe DTA))

Session Classification: Block 2

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

Contribution submission to the conference Göttingen 2025 Multi-Tilemodule test system using cosmic rays for the CMS HGCAL upgrade

Tuesday 25 March 2025 10:00 (25 minutes)

The CMS experiment plans to upgrade its calorimeter endcap for the high luminosity phase of the LHC with the High Granularity Calorimeter (HGCAL). The Tilemodule is one of the basic elements in the hadronic calorimeter part of the HGCAL. It uses small scintillator tiles directly coupled to SiPMs (SiPM-on-tile technology) and it is the first step in the production sequence providing an object capable of detecting particles. The Tilemodule is equipped with one or two HGCROC ASICs for data readout. To test and calibrate the Tilemodules, a cosmic ray setup capable of testing up to 9 Tilemodules simultaneously is developed for quality control and a better understanding of the property of the Tilemodules. The presentation will discuss the idea and current status of the cosmic test setup at DESY.

Presenter: LI, Jia-Hao (DESY)

Session Classification: Block 1

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

TelePix2: A HV-CMOS pixel sensor for Fast Timing and Region of Interest Triggering

Tuesday 25 March 2025 13:00 (25 minutes)

The DESY II Test Beam Facility offers electrons with a user selectable momentum from 1-6 GeV primarily for detector characterisation. TelePix2, a HV-CMOS sensor, is the latest new user infrastructure at the test beam facility used as an arbitrary Region of Interest (ROI) trigger and a timing plane, for efficient small prototype testing and ambiguity suppression.
This contribution will highlight the importance of TelePix2 in the context of user operation at the test beam facility whilst providing an insight into test beam user infrastructure. The latest performance metrics of TelePix2 including an efficiency above 99 %, a timestamp resolution below 4 ns, and a ROI trigger time resolution below 2.5 ns will be presented.

Presenter: WINTLE, Arianna (FTX (FTX Fachgruppe TBT))

Session Classification: Block 3

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

Study of effects of detector mis-calibration on energy resolution for the SiPM-on-tile section of the High Granularity Calorimeter for CMS.

Tuesday 25 March 2025 14:30 (25 minutes)

High Luminosity era of the LHC is fast approaching and the upgrades of the detector systems are now in various stages of production. The CMS experiment will receive a High Granularity Calorimeter (HGCAL) to replace the existing endcaps. Active layers of the upcoming sampling calorimeter are being constructed, and, I bring into focus work performed in the Tile Assembly Center in DESY on Scintillator tile modules of the hadronic section. The modules are constructed using the SiPM-on-tile technology, named after it's two main components: scintillating tiles coupled to Silicon Photo-Multipliers. One such pair makes a single channel of the hadronic endcap and the complete detector will feature more than 280 000 of them. Due to detector's geometry and the difference in production technics, tiles are trapezoidal in shape, range in area from 5.3 to 30.4 cm2 and have varying light yield depending on the size. These factors necessitate establishing the optimal strategy for monitoring of tile characteristics to assure longevity of good detector performance. Quality control (QC) procedures for tiles have been established following the successful pre-series campaign and are now being utilised. The acquired data are also used to add detail to the simulation of the detector to study the effects the precision of QC results has on energy resolution.

Presenter: SELIVANOVA, Daria (FTX (FTX Fachgruppe DTA))

Session Classification: Block 4