3. Annual MT Meeting

Abstracts book

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Abstract ID : 18

Evaluation of GPUs as a level-1 track trigger for the High-Luminosity LHC

Poster Title :
Investigation of GPUs for usage as a low-latency, high-throughput track trigger with CMS as showcase

Topic (ARD or DTS) :
DTS

Primary authors : DRITSCHLER, Timo (Karlsruhe Institue of Technology)

Co-authors :

Presenter : DRITSCHLER, Timo (Karlsruhe Institue of Technology)

Track classification :

Contribution type : --not specified--

Submitted by : DRITSCHLER, Timo

Submitted on Tuesday 29 November 2016

Last modified on : Tuesday 29 November 2016

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 21

μTCA.4 LLRF Control System Integration at ELBE - From Concept to Realisation

Poster Title :

Integration of digital LLRF into ELBE control System and future feedback scheme.

Topic (ARD or DTS) :

ARD

Primary authors : STEINBRüCK, Reinhard (HZDR)

Co-authors : Dr. KILLENBERG, Martin (DESY) ; Dr. HIERHOLZER, Martin (DESY) ; IATROU, Chris (TU Dresden) ; RAHM, Julian (TU Dresden) ; MARSCHING, Sebastian (aquenos GmbH)

Presenter : STEINBRüCK, Reinhard (HZDR)

Track classification :

Contribution type : --not specified--

Submitted by : STEINBRüCK, Reinhard

Submitted on Friday 02 December 2016

Last modified on : Friday 02 December 2016

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 22

R at DESY CMS

Poster Title :
prototyping, thermal and structural bonds, plasma cleaning, ultrasonic testing,infrared thermography

Primary authors : Mr. REICHELT, Oskar (DESY-CMS)

Co-authors :

Presenter : Mr. REICHELT, Oskar (DESY-CMS)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. REICHELT, Oskar

Submitted on Monday 05 December 2016

Last modified on : Monday 05 December 2016

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 23

Measurement of the Lorentz angle in CMS pixel detector modules

Poster Title :
A measurement of the Lorentz angle in CMS pixel detector modules of the 2016/17 CMS upgrade.

Topic (ARD or DTS) :
DTS

Primary authors : Mr. SCHUETZE, Paul (DESY - CMS)

Co-authors : Dr. PITZL, Daniel (DESY - CMS)

Presenter : Mr. SCHUETZE, Paul (DESY - CMS)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. SCHUETZE, Paul

Submitted on Monday 05 December 2016

Last modified on : Tuesday 20 December 2016

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 24

R status of the new superconducting CW heavy Ion LINAC@GSI

Poster Title :

R status of the new superconducting CW heavy Ion LINAC@GSI

Topic (ARD or DTS) :

ARD

Primary authors : Mr. BASTEN, Markus (IAP University Frankfurt am Main)

Co-authors : Dr. BARTH, Winfried (GSI Helmholtz Centre Darmstadt) ; Dr. BUSCH, Marco (IAP University Frankfurt am Main) ; Dr. DZIUBA, Florian (GSI Helmholtz Centre Darmstadt) ; Mr. GETTMANN, Viktor (GSI Helmholtz Centre Darmstadt) ; Dr. HEILMANN, Manuel (GSI Helmholtz Centre Darmstadt) ; Mr. MICKAT, Sascha (GSI Helmholtz Centre Darmstadt) ; Dr. MISKI-OGLU, Maksym (GSI Helmholtz Centre Darmstadt) ; Prof. PODLECH, Holger (IAP University Frankfurt am Main) ; Mr. SCHWARZ, Malte (IAP University Frankfurt am Main) ; Dr. YARAMYSHEC, Stepan (GSI Helmholtz Centre Darmstadt)

Presenter : Mr. BASTEN, Markus (IAP University Frankfurt am Main)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. BASTEN, Markus

Submitted on Friday 09 December 2016

Last modified on : Wednesday 04 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 25

Parameterization-based tracking for the P2 experiment.

Poster Title :
Introduction of the P2 experiment. HV/MAPS-based tracker. Parameterization-based tracking for P2.

Topic (ARD or DTS) :
DTS

Primary authors : Dr. SOROKIN, Iurii (JGU Mainz)

Co-authors :

Presenter : Dr. SOROKIN, Iurii (JGU Mainz)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. SOROKIN, Iurii

Submitted on Friday 09 December 2016

Last modified on : Friday 09 December 2016

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 27

Flip-Chip Bonding at DESY: Experiences & Outlook

Poster Title :

-Solder Jetting
-Flip-Chip Bonding
-Limits & Flexibilities
-CMS BPix & DTS SiPM

Topic (ARD or DTS) :

DTS

Primary authors : Mrs. KOUSAR, Sumera (FEC DESY)

Co-authors : Dr. HANSEN, Karsten (DESY) ; Mrs. DIEHL, Inge (DESY)

Presenter : Mrs. KOUSAR, Sumera (FEC DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Mrs. KOUSAR, Sumera

Submitted on Tuesday 13 December 2016

Last modified on : Tuesday 13 December 2016

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 28

The DESY II Testbeam Facility

Poster Title :

The DESY II electron testbeam facility will be presented including the available infrastructure.

Topic (ARD or DTS) :

DTS

Primary authors : DIENER, Ralf (DESY)

Co-authors : STANIZKI, Marcel (DESY) ; MEYNERS, Norbert (DESY)

Presenter : DIENER, Ralf (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : DIENER, Ralf

Submitted on Tuesday 20 December 2016

Last modified on : Tuesday 20 December 2016

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 29

Structural Mechanical Design Optimizations for a Newly Revised 4-Rod CW RFQ for the HLI

Poster Title :

Structural Mechanical Design Optimizations for a Newly Revised 4-Rod CW RFQ for the HLI

Topic (ARD or DTS) :

LINAC Development

Primary authors : Mr. KOSER, Daniel (IAP Goethe University Frankfurt)

Co-authors : Prof. PODLECH, Holger (IAP University of Frankfurt) ; Dr. GERHARD, Peter (GSI Helmholtz Centre) ; Dr. GROENING, Lars (GSI Helmholtz Centre) ; Prof. KESTER, Oliver (TRIUMF)

Presenter : Mr. KOSER, Daniel (IAP Goethe University Frankfurt)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. KOSER, Daniel

Submitted on Tuesday 03 January 2017

Last modified on : Wednesday 11 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 39

DAQ Test System for CMS Tracker Upgrade Phase 2

Poster Title :

The upcoming high-luminosity phase of the LHC requires an upgrade of the tracking detector of the CMS experiment. Two types of detector modules are foreseen to be used for the outer tracker regions: so called 2S and PS modules. The current design of the modules implies the presence of two semiconductor sensors with corresponding front-end electronics for the readout.
For the future module production at DESY, testing infrastructure is being developed, based on the FC7 test board. The FC7 is a ATCAcompatible Advanced Mezzanine Card for generic data acquisition and control applications. Developed by Imperial College London and built around the Xilinx Kintex 7 FPGA, the FC7 provides a large array of configurable I/O ports, primarily delivered by on-board FPGA Mezzanine Card (FMC) headers, which give the opportunity to establish an optical or electrical interface between the FC7 and the front-end electronics of the CMS tracker's modules.
The poster will present the concept of the test bench and the development status of the FC7 firmware.

Topic (ARD or DTS) :

DTS

Primary authors : Mr. HARANKO, Mykyta (DESY, CMS Group)

Co-authors : Dr. EICHHORN, Thomas (DESY) ; Dr. MUSSGILLER, Andreas (DESY)

Presenter : Mr. HARANKO, Mykyta (DESY, CMS Group)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. HARANKO, Mykyta

Submitted on Monday 09 January 2017

Last modified on : Monday 09 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 55

Development of superconducting undulators

Poster Title :

Since several years, KIT IBPT and the industrial partner Babcock Noell GmbH (BNG) are collaborating to develop superconducting undulators for ANKA and low emittance light sources.
The first full length device with 15 mm period length has been successfully tested in the ANKA storage ring for one year. The next superconducting undulator has a period length of 20 mm(SCU20) and is planned to be the source of the NANO beamline at ANKA. The cryostat has been manufactured, the beam vacuum chamber and the superconducting coils have been successfully tested.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. CASALBUONI, Sara (IBPT-KIT)

Co-authors : GLAMANN, Nicole (IBPT-KIT) ; Dr. GRAU, Andreas (IBPT-KIT) ; Dr. HOULBEK, Tomas (IBPT-KIT) ; MUETER, Christina (IBPT-KIT) ; Dr. SAEZ DE JAUREGUI, David (IBPT-KIT) ; BOFFO, Cristian (Babckock Noell GmbH) ; GERHARD, Thomas (Babckock Noell GmbH) ; TURENNE, Melanie (Babckock Noell GmbH) ; Dr. WOLFGANG, Walter (Babckock Noell GmbH)

Presenter : Dr. CASALBUONI, Sara (IBPT-KIT)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. CASALBUONI, Sara

Submitted on Wednesday 11 January 2017

Last modified on : Wednesday 11 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 56

Enhanced lateral drift sensors: simulation and production.

Poster Title :

One of the main goals in the R of tracker sensors technology is to improve the position resolution of the particle detector. There are two ways to achieve this. The most common way is to decrease the size of the read-out cell, i.e. to decrease the pixel or strip pitch. But in this case, the number of channels increases, which requires an increased bandwidth for the read-out. The other possibility to improve the position resolution of sensors is to increase the lateral size of the charge distribution already during the drift in the sensor material. In this case, it is necessary to carefully engineer the electric field in the bulk of this so-called enhanced lateral drift (ELAD) sensor. This new design is using implants deep inside the bulk. Implants constitute volumes with different values of doping concentration in comparison to the concentration in the bulk. This allows for modification of the drift path of the charge carriers in the sensor. The development of such a detector requires a good understanding of the entire production process. In order to find an optimal geometry and design of the detector, it is necessary to make reliable simulations, which are conducted using SYNOPSYS TCAD. The parameters that need to be defined are the geometry of the implants, their doping concentration and the position inside the sensor. For a realistic modeling of such implants, process simulations are used to provide input of their production-determined shapes. The production of these sensors will be based on the simulations results. In this talk, the concept of ELAD is described. TCAD simulations and a description of the production process are presented.

Topic (ARD or DTS) :

DTS

Primary authors : Ms. VELYKA, Anastasiia (CMS) ; Dr. JANSEN, Hendrik (CMS)

Co-authors :

Presenter : Ms. VELYKA, Anastasiia (CMS)

Track classification :

Contribution type : --not specified--

Submitted by : Ms. VELYKA, Anastasiia

Submitted on Wednesday 11 January 2017

Last modified on : Tuesday 17 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 68

Commissioning and Characterization of a Compact Super-conducting LINAC Module for CW Electron Acceleration

Poster Title :

An integral part of the electron LINAC ELBE is a compact 20 MeV superconducting LINAC module for 1 mA CW operation. It has been designed and built in collaboration with Stanford University more than 15 years ago. Very recently, an upgraded version was taken into operation and thus we will report on improvements and all relevant module parameters that have been measured.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. ARNOLD, André (HZDR)

Co-authors :

Presenter : Dr. ARNOLD, André (HZDR)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. ARNOLD, André

Submitted on Friday 13 January 2017

Last modified on : Friday 13 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 69

A Spatial Light Modulator (SLM) to Improve the Trans-verse Intensity Distribution of a Photocathode Laser

Poster Title :

An integral part of the superconducting high-frequency photoelectron source (SRF-Gun) at the Helmholtz-Center Dresden-Rossendorf is the photocathode laser developed by Max Born Institute in Berlin. Typically this laser has a three-dimensional Gaussian light distribution (Fig. 1), which is superimposed by further disturbances. Since the intensity distribution of the laser decisively determines the quality of the later electron beam, a transversal flat top profile is desired to achieve a homogeneous charge density. One way to manipulate the intensity profile in the desired manner is a so called spatial light modulator (SLM) combined with polarized beam splitter and a λ/4 wave plate.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. ARNOLD, André (HZDR)

Co-authors :

Presenter : Dr. ARNOLD, André (HZDR)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. ARNOLD, André

Submitted on Friday 13 January 2017

Last modified on : Friday 13 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 75

Development of an Integrated GEM Gas Amplification Structure

Poster Title :

A gas amplification stage for a Time Projection Chamber (TPC) has been developed employing Gas Electron Multipliers (GEMs) which are mounted on thin ceramic frames. This allows for an integrated, stable amplification structure with minimal dead area. Here, studies will be presented that focus on optimizing this GEM mounting scheme. The goal is a high flatness of the GEM foils and stability of the system. This ensures an even gain over the hole area and minimal field distortions. Tools and procedures have been developed that establish a reproducible high quality in the production processes. A set of prototype modules was build and tested in the DESY II Testbeam facility.

Topic (ARD or DTS) :

DTS

Primary authors : Mr. MALEK, Paul (DESY)

Co-authors :

Presenter : Mr. MALEK, Paul (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. MALEK, Paul

Submitted on Monday 16 January 2017

Last modified on : Monday 16 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 76

A pulsed gas stripper for the GSI UNILAC

Poster Title :

The GSI UNILAC will serve as part of an injector system
for the future FAIR facility, currently under construction in
Darmstadt, Germany. For this, it has to deliver short-pulsed,
high-current, heavy-ion beams with highest beam quality.
An upgrade for the 1.4 MeV/u gas stripper is ongoing to
increase the yield of uranium ions in the desired charge state.
For this a pulsed gas stripper was developed featuring a pulsed gas injection
synchronized with the beam pulse transit to increase the effective density of the
stripper target while keeping the gas load for the differential pumping system low.
Systematic measurements of charge state distributions and energy-loss were conducted
with various different stripper gases, including
H2 and He. By using H2 as a stripper gas, the yield into
the most populated charge state was increased by over 50 %,
compared to the current stripper. Additionally, the high gas
density, enabled by the pulsed injection, results in increased
mean charge states.

Topic (ARD or DTS) :

ARD

Primary authors : SCHARRER, Paul (HIM, GSI, JGU)

Co-authors : DüLLMANN, Christoph (HIM, GSI, JGU) ; BARTH, Winfried (HIM, GSI) ; KHUYAGBAATAR, Jadambaa (HIM, GSI) ; YAKUSHEV, Alexander (HIM, GSI) ; BEVCIC, Mario (GSI) ; GERHARD, Peter (GSI) ; GROENING, Lars (GSI) ; HORN, Klaus-peter (GSI) ; JäGER, Egon (GSI) ; KRIER, Jörg (GSI) ; VORMANN, Hartmut (GSI)

Presenter : SCHARRER, Paul (HIM, GSI, JGU)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. SCHARRER, Paul

Submitted on Tuesday 17 January 2017

Last modified on : Tuesday 17 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 77

Femtosecond Level Laser Synchronization at REGAE

Poster Title :

Relativistic Electron Gun for Atomic Exploration (REGAE) is a unique accelerator, capable of producing ~ 10 fs long electron bunches. These bunches are used for Ultrafast Electron Difraction (UED) experiments in a pump-probe configuration. In order to conduct precise pump-probe experiments one has to ensure femtosecond level laser synchronization. This poster presents advanced Mach-Zehnder Modulator based laser-to-RF synchronization setup realized for Titanium Sapphire laser system and corresponding measurement results.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. TITBERIDZE, Mikheil (DESY)

Co-authors :

Presenter : Mr. TITBERIDZE, Mikheil (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. TITBERIDZE, Mikheil

Submitted on Wednesday 18 January 2017

Last modified on : Wednesday 18 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 78

Hit reconstruction in the CBM Silicon Tracking System

Poster Title :

The Silicon Tracking System (STS) is the main tracking appliance of the future Compressed Baryonic Matter (CBM) experiment @FAIR. The STS employs double-sided silicon micro-strip sensors with double metal layers.
Here, we describe the hit reconstruction in the STS. The unbiased cluster position finding algorithm simplifies the hit error estimation and yields a spatial resolution close to that obtained with the Centre-Of-Gravity algorithm.
We have developed a method to estimate the hit position error, which includes the non-uniformity of an incident particle energy loss, the detector noise, the signal discretisation, and the error introduced by the cluster position finding algorithm. A reliable estimate of the hit position error is required to obtain a valid χ^2 of the track, which is further used to discard ghost track candidates. This improves the signal-to-background ratio of the reconstructed physical signals.
Both the hit pull (residual/error) and the track χ^2 distributions verify the viability of the method: the pull width is about 1, its shape reproduce the shape of the residual distribution, mean of the χ^2 distribution is unity.

Topic (ARD or DTS) :

DTS

Primary authors : Mrs. MALYGINA, Hanna (GSI; Goethe University Frankfurt)

Co-authors :

Presenter : Mrs. MALYGINA, Hanna (GSI; Goethe University Frankfurt)

Track classification :

Contribution type : --not specified--

Submitted by : Mrs. MALYGINA, Hanna

Submitted on Wednesday 18 January 2017

Last modified on : Wednesday 18 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 79

Charge collection measurements of microstrip sensors for the CBM Silicon Tracking System.

Poster Title :

The Silicon Tracking System (STS), the main tracking detector of CBM experiment located in the dipole magnet, is devoted to reconstruct tracks and determine momentum of charged particles originating from beam-target interactions. The STS employs 300 μm thick double sided silicon microstrip sensors. To read out the signal from particles, sensor strips has to be connected to read out electronic strips via microcable. To reduce number of r/o electronics and increase signal in outer part of STS stations, different configurations of connections schemes was implemented and tested with beam of 1.6 GeV/c protons at COSY, Jülich. Results on charge collection studies with the latest radiation tolerant silicon sensor prototypes will be presented.

Topic (ARD or DTS) :

DTS

Primary authors : Ms. MOMOT, Ievgeniia (Goethe Uni Frankfurt)

Co-authors : Dr. TEKLISHYN, Maksym (FAIR, Darmstadt) ; Dr. LYMANETS, Anton (GSI, Darmstadt) ; Mrs. MALYGINA, Hanna (Goethe Uni Frankfurt) ; Dr. BERTINI, Olga (GSI, Darmstadt) ; Dr. HEUSER, Johann (GSI, Darmstadt)

Presenter : Ms. MOMOT, Ievgeniia (Goethe Uni Frankfurt)

Track classification :

Contribution type : --not specified--

Submitted by : Ms. MOMOT, Ievgeniia

Submitted on Wednesday 18 January 2017

Last modified on : Wednesday 18 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 80

AGIPD - The Adaptive Gain Integrating Pixel Detector

Poster Title :

AGIPD is a hybrid pixel detector developed by DESY, PSI, and the Universities of Bonn and Hamburg. It is targeted for use at the European XFEL, a source with unique properties: a train of up to 2700 pulses is repeated at 10Hz rate. The pulses inside a train are ≤100fs long and separated by 220ns, containing 10^12 photons of 12keV each.
The readout ASICs with 64x64 pixels each have to cope with these properties: Single photon sensitivity and a dynamic range up to >10^4 photons/pixel in the same image as well as storage for as many as possible images of a pulse train for delayed readout, prior to the next train. The high impinging photon flux also requires a very radiation hard design of sensor and ASIC, which uses 130nm CMOS technology and radiation tolerant techniques.
The signal path inside a pixel of the ASIC consists of a charge sensitive preamplifier with 3 individual gains, adaptively selected by a subsequent discriminator. The preamp also feeds to a correlated double sampling stage, which writes to an analogue memory to record 352 frames. It is random-access, so it can be used most efficiently by overwriting bad or empty images. Encoded gain information is stored to a similar memory. Readout of these memories is by a common charge sensitive amplifier in each pixel, and multiplexers on four differential ports. Operation of the ASIC is controlled via a command interface, using 3 LVDS lines. It also serves to configure the chip's operational parameters and timings.
We will present the AGIPD detector with special focus on the design of the readout ASIC and will show various experimental results obtained with either a single chip, a single module, or a multi-module system.

Topic (ARD or DTS) :

DTS

Primary authors : Dr. TRUNK, Ulrich (DESY)

Co-authors :

Presenter : Dr. TRUNK, Ulrich (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. TRUNK, Ulrich

Submitted on Wednesday 18 January 2017

Last modified on : Wednesday 18 January 2017

Comments :

Co-Authors: the AGIPD Consortium

Status : ACCEPTED

Track judgments :

Abstract ID : 81

Measurement of ultrashort electron bunch durations from laser-wakefield accelerators using a broadband, single-shot spectrometer.

Poster Title :

Laser-wakefield accelerators (LWFA) feature electron bunch durations ranging from several fs to tens of fs. Precise knowledge of the longitudinal profile of such ultra-short electron bunches is essential for the design of future table-top Xray light-sources and remains a big challenge due to the resolution limit of existing diagnostic techniques.
Measurement of broadband coherent and incoherent transition radiation produced as LWFA electron bunches passing through a metal foil is a promising way to deduce longitudinal characteristics of these bunches.
Here we present development of a broadband spectrometer which covers a spectral range from UV (200nm) to mid-IR (12μm). Absolute and relative calibration show that the spectrometer is capable of measuring electron bunches as low as 1pC with resolving time-scale from 0.7 to 40 fs. Importantly the spectrometer has single-shot capability which is strongly required due to the limited reproducibility of the electron source.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. ZARINI, Omid (Helmholtz-Zentrum Dresden - Rossendorf)

Co-authors : Dr. DEBUS, Alexander (HZDR) ; Mr. COUPERUS, Jurjen Peter (HZDR) ; Mr. KöHLER, Alexander (HZDR) ; Mr. KRäMER, Jakob (HZDR) ; Mr. KURZ, Thomas (HZDR) ; Prof. SCHRAMM, Ulrich (HZDR) ; Dr. IRMAN, Arie (HZDR)

Presenter : Mr. ZARINI, Omid (Helmholtz-Zentrum Dresden - Rossendorf)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. ZARINI, Omid

Submitted on Wednesday 18 January 2017

Last modified on : Wednesday 18 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 82

Laser proton acceleration from liquid crystal films of different thicknesses with ultra-high laser contrast

Poster Title :

We present an experimental study which shows a possible pathway towards the robust and reliable generation of applicable, energetic, high-quality laser-driven proton beams at high repetition rates. This is enabled through the combination of ultra-high contrast laser pulses and liquid crystal film targets, which can be generated and characterized in situ within a thickness range from 10 µm to 10 nm at low cost. Pulses from our in-house Ti:Sa laser (~3 J, 30 fs, I~10^20 W/cm^2) incident obliquely on target in order to distinguish between ion acceleration mechanisms. Increasing target normal proton energy cut-offs are observed for decreasing thicknesses, with > 25 MeV protons recorded for ultra-thin (< 50 nm) targets. The results are in agreement with the dominance of target normal sheath acceleration (TNSA) down to ultra-thin target thicknesses, in line with the observed robustness of the acceleration performance.

Topic (ARD or DTS) :

ARD

Primary authors : Mrs. OBST, Lieselotte (Helmholtz-Zentrum Dresden-Rossendorf)

Co-authors : POOLE, Patrick (Lawrence Livermore National Laboratory) ; METZKES, Josefine (Helmholtz-Zentrum Dresden-Rossendorf) ; ZEIL, Karl (Helmholtz-Zentrum Dresden-Rossendorf) ; KLUGE, Thomas (Helmholtz-Zentrum Dresden-Rossendorf) ; COCHRAN, Ginevra (Ohio State University) ; SCHLENVOIGT, Hans-peter (Helmholtz-Zentrum Dresden-Rossendorf) ; KRAFT, Stephan (Helmholtz-Zentrum Dresden-Rossendorf) ; PRENCIPE, Irene (Helmholtz-Zentrum Dresden-Rossendorf) ; REHWALD, Martin (Helmholtz-Zentrum Dresden-Rossendorf) ; SCHUMACHER, Douglass (Ohio State University) ; SCHRAMM, Ulrich (Helmholtz-Zentrum Dresden-Rossendorf)

Presenter : Mrs. OBST, Lieselotte (Helmholtz-Zentrum Dresden-Rossendorf)

Track classification :

Contribution type : --not specified--

Submitted by : Mrs. OBST, Lieselotte

Submitted on Thursday 19 January 2017

Last modified on : Thursday 19 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 83

Novel laser sources based on coherently combined fiber laser channels

Poster Title :

Femtosecond fiber laser systems distinguish themselves by their high average power capabilities, high beam quality and efficient amplification. Spatial and temporal pulse multiplexing offers a path to make this technology viable for applications in the context of ARD. We will present recent results from our 8 channel laser system as well as showing the progress we have made in integrating the amplifier channels for scaling up the number of parallel channels.

Topic (ARD or DTS) :
ARD

Primary authors : Dr. KLENKE, Arno (Helmholtz-Institute Jena)

Co-authors : Dr. ROTHHARDT, Jan (Helmholtz-Institute Jena) ; Mr. KIENEL, Marco (Helmholtz-Institute Jena) ; Mr. MüLLER, Michael (FSU Jena) ; Mr. STARK, Henning (FSU Jena) ; Prof. LIMPERT, Jens (FSU Jena) ; Prof. TüNNERMANN, Andreas (Fraunhofer IOF)

Presenter : Dr. KLENKE, Arno (Helmholtz-Institute Jena)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. KLENKE, Arno

Submitted on Thursday 19 January 2017

Last modified on : Thursday 19 January 2017

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 84

The 4MPix Adaptive Gain Integrating Pixel Detector for the SPB/SFX instrument at the European XFEL

Poster Title :

For the SPB/SFX instrument at the European X-Ray Free-Electron Laser (XFEL) a 4MPix Adaptive Gain Integrating Pixel Detector (AGIPD) is under development. Its interface electronics is significantly different from the 1MPix AGIPD systems, which will be commissioned at the beam lines SPB and MID at the European XFEL. Digitization will take place in-vacuum directly behind the Front-End-Modules. To keep the electronic components at ambient temperatures in-vacuum, a powerful cooling system is necessary. In addition, it will employ control and DAQ completely based on optical data transmission. The 4MPix AGIPD key concepts will be presented.

Topic (ARD or DTS) :

DTS

Primary authors : Mr. LAURUS, Torsten (Desy)

Co-authors :

Presenter : Mr. LAURUS, Torsten (Desy)

Track classification :

Contribution type : --not specified--

Submitted by : LAURUS, Torsten

Submitted on Thursday 19 January 2017

Last modified on : Thursday 19 January 2017

Comments :

Co-Author: on behalf of the AGIPD consortium

Not interested in presenting the poster in a short oral prese

Status : ACCEPTED

Track judgments :

Abstract ID : 85

ASIC Development for Photon Science

Poster Title :

The poster presents an overview of our sensor readout circuits designed by the ASIC Detector Laboratory (ADL) group at KIT. We developed the PhotonV1 pixel readout ASIC for an engineering run in UMC 180 nm MMRF process. The chip size is 5 x 5 mm2 containing a 32 x 32 pixel matrix with a pixel size of 150 x 150 µm2. Simultaneous counting of photon signals and integration of total charge are two main features of the pixel electronics. For image quality improvement (e.g. medical imaging) we use the overlap region for counting and integrating to determine the average photon energy. For FEL application, the high dynamic integrator allows detection of the number of photons in an x-ray pulse. Every pixel contains a low-noise charge sensitive amplifier (CSA), a 13-bit counter counting photon pulses. A novel feedback circuit bypasses the charge pulses and is received by the integrator. This integrating stage consists of a charge pump, switchable integrator capacitance and a counter. When the integrator signal exceeds a certain threshold a reference charge packet is subtracted from the input. The time difference between the first and last subtraction is measured and the number of subtractions is counted. Such a two dimensional quantization allows a high dynamic range. To keep the crosstalk as small as possible we implemented the pixel logic as differential current mode logic. Continuous readout is necessary for integration and counting. According to simulations one readout frame in is possible within 20 µs.

Another sensor that we developed is a single photon avalanche diode (SPAD) readout sensor. This readout sensor comprises of single photon counting, active quenching and readout. The SPAD readout sensor was developed in a commercial AMS 0.35 µm HV-CMOS process. It contains a pixel matrix of 15 x 20 Geiger-mode avalanche photodiodes (GAPD). The size of the chip is 2.8 x 2.6 mm2. The GAPDs pixels have an imaging area of 1.3 mm2 with squared pixels of 100 x 45 µm2 with a ~ 32 % fill factor. Every corner of the pixels is round to avoid high electrical fields. A full configurable bias block, analog buffers and a hit-OR bus is implemented. For reading every row of the pixel matrix, vertical control logic was designed. To operate the SPAD in Geiger-mode we chose to put the high-voltage on the cathode thus, the signal will be DC coupled to the analog electronics. A preamplifier in unnecessary because of a strong DC signal. A fast comparator generates the hit information. Each pixel include a comparator, active quenching circuit, edge detection, monostable circuit, hit buffer, current adder, hit-OR bus, data bus. This sensor can be used for medical and particle physics applications.

Primary authors : Mr. BLANCO, Roberto (KIT - IPE)

Co-authors : Prof. PERIC, Ivan (KIT - IPE)

Presenter : Mr. BLANCO, Roberto (KIT - IPE)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. BLANCO, Roberto

Submitted on Friday 20 January 2017

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 86

ChimeraTK: A tool kit for modular control applications

Poster Title :

ChimeraTK (formerly called MTCA4U) is a collection of C++ libraries
which facilitate the development of control applications. Special
importance has been placed on abstraction from communication layers
to simplify writing applications in heterogeneous environments or reusing
applications in different facilities.
In close collaboration between DESY, HZDR, TU Dresden and Aquenos GmbH a
control system adapter has been developed. It allows to operate the same
application with different SCADA systems and in different control system
environments, without changing a single line of code in the application proper.
As a first project a Low Level RF controller server has been ported to the
adapter. SCADA plugins for DOOCS, OPC-UA and EPICS 3 have been implemented,
which will be used for FLASH and the European XFEL at DESY, ELBE at HZDR,
and FLUTE at KIT, respectively.
In addition to the control system adapter, ChimeraTK features the DeviceAccess
library with an extensible register-based interface and the VirtualLab
library for code testing and simulation.
Written in modern C++ and published under the open GPL and LGPL licenses,
ChimeraTK is designed to foster the collaboration between different facilities,
especially in the accelerator and research community.

Topic (ARD or DTS) :

ARD

Primary authors : KILLENBERG, Martin (DESY) ; HIERHOLZER, Martin (DESY)

Co-authors :

Presenter : KILLENBERG, Martin (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : KILLENBERG, Martin

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Track judgments :

Abstract ID : 87

Computing strategy to cope with the upcoming massive HEP and HI data collection

Poster Title :

The LHC scientific program has led to numerous important physics results. This would not have been possible without an efficient processing of PetaBytes of data using the Worldwide LHC Computing Grid (WLCG). In the periods following the accelerator and detector upgrades, a huge increase in the data rate is expected. In addition, other big experiments like BELLE-2 and the FAIR collaborations will also take large amounts of data during the next years. So far the LHC computing strategy, based on Grid computing as a distribution of data and CPUs over a few hundred of dedicated sites, has met the challenges. However, to cope with substantially increased data volumes and correspondingly higher CPU requirements, new techniques like cloud computing and the usage of opportunistic resources are necessary. In parallel a reorganisation of the interplay of the computing sites is presently addressed by the evolving computing models of the affected experiments. Recently the Technical Advisory Board of the WLCG German Tier-1 site GridKa in Karlsruhe organised a meeting aimed to identify the guidelines for keeping German HEP and Heavy Ion computing excellent for future requirements. In a follow-up meeting working groups were launched in order to effectively organise the work on the above topics. The presentation will address the challenges, the German strategy, and the current status of the work packages.

Topic (ARD or DTS) :

DTS

Primary authors : Dr. SCHWARZ, Kilian (GSI) ; Dr. KRESS, Thomas (RWTH Aachen University)

Co-authors :

Presenter : Dr. SCHWARZ, Kilian (GSI)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. SCHWARZ, Kilian

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Comments :

Poster presentation.

Status : ACCEPTED

Track judgments :

Abstract ID : 88

ROPPERI - A TPC readout with Timepix and pads

Poster Title :

For the International Large Detector (ILD) at the planned International Linear Collider (ILC) a Time Projection
Chamber (TPC) is foreseen as central tracker. The electrons produced in the TPC gas volume are amplified by
Micro Pattern Gaseous Detectors (MPGDs). One possibility is the usage of Gaseous Electron Multiplier (GEM)
foils that amplify the electrons and project the charge cloud onto a segmented anode plane. This work
investigates a novel anode readout structure with small pads on a separate PCB (for flexibility) and a pixel chip
as on-board digitization electronics (for high integration). The small pads allow for the identification of the initial
electron clusters which leads to an improvement of particle identification capabilities via dE/dx.

Topic (ARD or DTS) :

DTS

Primary authors : EINHAUS, Ulrich (FLC)

Co-authors :

Presenter : EINHAUS, Ulrich (FLC)

Track classification :

Contribution type : --not specified--

Submitted by : EINHAUS, Ulrich

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 89

Design of a longitudinal electron diagnostics using THz fields excited in split ring resonator at FLUTE

Poster Title :

Longitudinal electron diagnostics with high temporal resolution is increasingly demanded, especially for free-electron lasers. Strong THz fields, excited in a split ring resonator (SRR), have been recently proposed to streak electron bunches for their temporal characterisation. Thanks to the high amplitude and frequency of the THz field, longitudinal resolution down to the sub-femtosecond range can be expected. A proof-of-principle experiment of the SRR longitudinal diagnostics is planned at the accelerator test facility FLUTE (Ferninfrarot Linac und Test Experiment) at the Karlsruhe Institute of Technology. The design of the experimental chamber has been finished and integrated into the FLUTE accelerator beam line. Beam dynamics simulations have been conducted to investigate and optimise the performance of the SRR diagnostics. In this contribution, we present the design layout of the experimental setup and discuss the simulation results for different parameters of the accelerator and the SRR structure.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. YAN, Minjie (KIT)

Co-authors : Dr. BRüNDERMANN, Erik (KIT) ; Dr. FUNKNER, Stefan (KIT) ; Dr. NASSE, Michael (KIT) ; Dr. RUPRECHT, Robert (KIT) ; Dr. SCHEDLER, Manuel (KIT) ; SCHMELZER, Thiemo (KIT) ; Dr. SCHUH, Marcel (KIT) ; Dr. SCHWARZ, Markus (KIT) ; Dr. SMIT, Bennie (KIT) ; Prof. MüLLER, Anke-susanne (KIT) ; Dr. DEHLER, Micha (PSI) ; Dr. HILLER, Nicole (PSI) ; Dr. ISCHEBECK, Rasmus (PSI) ; Dr. SCHLOTT, Volker (PSI) ; HAYATI, Mozhgan (University Bern) ; Prof. FEURER, Thomas (University Bern)

Presenter : Dr. YAN, Minjie (KIT)

Track classification :

Contribution type : --not specified--

Submitted by : YAN, Minjie

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 90

Model development for the automated adjustment of the 2 MeV electron cooler’s beam line at COSY

Poster Title :

The 2 MeV electron cooler has been installed in the COSY ring to provide e-cooling of proton and deuteron beams in the entire energy range of the machine and to study the cooling process in the magnetized regime at high energy. Within the cooling section a velocity-matched electron beam is placed coaxially over the beam circulating in the ring. Coulomb interaction between the beams allows heat transfer analogue to heat exchange of gases. The electron beam is guided by a strong longitudinal magnetic field. This however gives rise to higher order dynamics such as larmor rotation and the so called galloping motion. Setting up the cooler and delivering a high quality e-beam by adjusting all required parameters manually is a time consuming task and requires a high level of expertise. The presented model under development shall ease and speed up the adjustment and offer more opportunities for beam control to achieve best possible e-cooling performance.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. HALAMA, Arthur (Forschungszentrum Jülich GmbH)

Co-authors :

Presenter : Mr. HALAMA, Arthur (Forschungszentrum Jülich GmbH)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. HALAMA, Arthur

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 91

Optical Synchronization at the European XFEL

Poster Title :

As an essential system of the European XFEL which is currently in the commissioning state an optical synchronization system was developed and installed. An optical reference is distributed via actively length-stabilized optical fibers serving end-stations such as Bunch Arrival Time Monitors (BAM), RF-Resynchronization systems (RefmOpt) and Laser systems for reliable fs-scale synchronization. Here, we show the installation and commissioning status of the optical synchronization system at the European XFEL and first performance results.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. MUELLER, Jost (DESY)

Co-authors :

Presenter : Mr. MUELLER, Jost (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. MUELLER, Jost

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 92

Design of a silicon strip telescope for the PCMAG at the DESY II testbeam

Poster Title :

The DESYII testbeam facility includes an infrastructure with a 1T PCMAG solenoid. A large area silicon telescope has been proposed as part of the AIDA2020 project. Simulation studies in order to determine the characteristics of the system such as spatial resolution, size and number of layers are shown using the prototype Time Projection Chamber (TPC) for the International Large Detector (ILD) as a use case. In addition the hardware layout for the telescope is presented.

Topic (ARD or DTS) :

DTS

Primary authors : Mr. KRäMER, Uwe (DESY)

Co-authors :

Presenter : Mr. KRäMER, Uwe (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. KRäMER, Uwe

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 93

Laser-proton acceleration from a condensed hydrogen jet

Poster Title :

Applications like radiation therapy of cancer have pushed the development of laser plasma accelerators and defined levels of control and necessary particle beam stability in laser plasma experiments. The poster will give an overview of a recent experiment for laser driven particle acceleration with high contrast at the high power laser Draco at HZDR, delivering pulses of 30fs and 5J. We present results of an experimental campaign employing a cryogenic hydrogen jet as a renewable target. The jet's nominal plasma density is approximately 30 times the critical density and its diameter can be varied to be 2µm, 5µm or 10µm and thus allowing to study the regime of relativistic transparency. In addition a planar aperture was commissioned, providing a different geometry of the hydrogen jet. Different ion diagnostics reveal mono-species proton acceleration in the laser incidence plane around the wire-like target. Radiochromic film stacks in laser forward direction display filament-like structures, stemming from a Weibel-like instability generated at the rear side of the target. Furthermore the micro-jet target could be monitored on-shot with a temporally synchronized optical probe beam perpendicular and almost parallel to the pump laser axis. Recorded probe images taken on a timescale of several 10’s of picoseconds indicating plasma density modulations from pinching effects along the jet axis.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. REHWALD, Martin (Helmholtz-Zentrum Dresden-Rossendorf, Germany)

Co-authors : Dr. ZEIL, Karl (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Mrs. OBST, Lieselotte (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Mr. SCHLENVOIGT, Hans-peter (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Mr. BRACK, Florian (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Mrs. METZKES, Josefine (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Dr. KLUGE, Thomas (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Dr. KRAFT, Stephan (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Mr. SOMMER, Philipp (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Mr. LOESER, Markus (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Prof. SCHRAMM, Ulrich (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Prof. COWAN, Thomas (Helmholtz-Zentrum Dresden-Rossendorf, Germany) ; Dr. GOEDE, Sebastian (European XFEL, Germany) ; Mr. KAZAK, Lev (Universität Rostock, Germany) ; Mr. WOLTER, Steffen (Universität Rostock, Germany) ; Dr. GAUTHIER, Maxcence (SLAC National Acceleration Laboratory, United States) ; Mrs. CURRY, Chandra (SLAC National Acceleration Laboratory, United States) ; Mr. MACDONALD, Michael (SLAC National Acceleration Laboratory, United States) ; Mr. SCHUMAKER, William (SLAC National Acceleration Laboratory, United States) ; Dr. ROEDEL, Christian (SLAC National Acceleration Laboratory, United States) ; Dr. GLENZER, Siegfried (SLAC National Acceleration Laboratory, United States)

Presenter : Mr. REHWALD, Martin (Helmholtz-Zentrum Dresden-Rossendorf, Germany)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. REHWALD, Martin

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 94

Automated Measurement of Beam Parameters at COSY Injection

Poster Title :

The energy of the H- /D- beam injected from the cyclotron into the COSY ring is measured by means of two capacitive phase probes utilizing the time of flight method. Two probes are installed in the long straight section of the injection beam line. In addition to the energy, other beam parameters such as bunch length, shape parameter and frequency can be obtained from the signals. Also the uncalibrated beam intensity can be extracted from the signals by integration. The signals from these probes are recorded and analyzed by means of an oscilloscope. The signal processing and analysis software running on the oscilloscope is written in Java. Since the software calculates the beam parameters automatically, it can be used for continuous monitoring and logging.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. NAUSCHüTT, Benny (Forschungszentrum Jülich GmbH)

Co-authors :

Presenter : Mr. NAUSCHüTT, Benny (Forschungszentrum Jülich GmbH)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. NAUSCHüTT, Benny

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 95

Preparation of worldwide first animal irradiation experiments with laser-accelerated protons and pulsed high-field magnets

Poster Title :

Laser-driven ion acceleration has been considered a potential alternative for conventional accelerators like cyclotrons or synchrotrons and thus could provide a more compact and cost-efficient particle therapy solution in the future. The beam properties of laser accelerated beams strongly differ from the quasi-continuous beams generated by conventional accelerators. Laser accelerated beams exhibit fs to ps bunch length, carry up to 1013 particles with broad energy spectrum and are highly divergent. Furthermore, fluctuations of the said beam parameters on a shot-to-shot basis are inherent to the acceleration mechanism. Thus, special measures are required to make use of the novel particle source, especially considering the goal of a future medical application.
Pulsed high-field magnets are a versatile and efficient way of shaping laser-accelerated beams both spatially and spectrally for application. As the ion bunches remain short and therefore intense, high dose rates occur when stopped in matter. These dose rates make special demands for dosimetry and are a core aspect for radiobiological studies. We present a pulsed solenoid for effective collection and focusing of laser-accelerated protons. The solenoid magnet is powered by a capacitor-based pulse generator and can reach a maximum magnetic field of 20 T at currents exceeding 20 kA.
We performed experiments with the PW beam of the Dresden laser acceleration source Draco to investigate the feasibility of worldwide first controlled volumetric tumour irradiations with laser-accelerated protons. Therefore, a setup of up to two solenoid magnets was used to efficiently capture and shape the beam, which was then analysed by means of a Thomson parabola spectrometer, scintillator and radiochromic film.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. BRACK, Florian-emanuel (Helmholtz-Zentrum Dresden-Rossendorf) ; Mr. KROLL, Florian (Helmholtz-Zentrum Dresden-Rossendorf)

Co-authors : Dr. ZEIL, Karl (Helmholtz-Zentrum Dresden-Rossendorf) ; Dr. SCHLENVOIGT, Hans-peter (Helmholtz-Zentrum Dresden-Rossendorf) ; Dr. KRAFT, Stephan (Helmholtz-Zentrum Dresden-Rossendorf) ; Mr. GAUS, Lennart (Helmholtz-Zentrum Dresden-Rossendorf) ; Dr. KARSCH, Leonhard (OncoRay - TU Dresden) ; Dr. PAWELKE, Jörg (OncoRay - TU Dresden) ; Prof. SCHRAMM, Ulrich (Helmholtz-Zentrum Dresden-Rossendorf)

Presenter : Mr. BRACK, Florian-emanuel (Helmholtz-Zentrum Dresden-Rossendorf) ; Mr. KROLL, Florian (Helmholtz-Zentrum Dresden-Rossendorf)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. BRACK, Florian-emanuel

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 96

Optical Free-electron lasers and High-Yield Optical Undulators in the Traveling-Wave Thomson-Scattering geometry

Poster Title :

Traveling-Wave Thomson-Scattering (TWTS) provides optical undulators with hundreds to thousands of undulator periods from high-power, pulse-front tilted lasers pulses. These allow to realize optical free-electron lasers (OFELs) with state-of-the-art technology in electron accelerators and laser systems. In this poster we present optical designs to experimentally synthesize TWTS laser pulses for ultraviolet and hard X-ray TWTS-OFELs.

TWTS employs a side-scattering geometry where laser and electron propagation direction of motion enclose the interaction angle. Tilting the laser pulse front with respect to the
wave front by half the interaction angle ensures continuous overlap over the whole laser pulse width while the electrons cross the laser beam path.

We show how to provide laser dispersion compensation within the interaction region originating from the pulse-front tilt. In addition, we discuss how optimized focusing reduces the laser beam propagation distances to achieve compact OFEL setups, while laser intensities are kept below damage thresholds on all optics. We point out qualitative and quantitative differences in realization between OFELs and high-yield, incoherent optical undulators.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. DEBUS, Alexander (HZDR)

Co-authors : STEINIGER, Klaus (HZDR / TU Dresden) ; PAUSCH, Richard (HZDR / TU Dresden) ; Dr. ALBACH, Daniel (HZDR) ; LOESER, Markus (HZDR / TU Dresden) ; Prof. SCHRAMM, Ulrich (HZDR / TU Dresden) ; Dr. SIEBOLD, Mathias (HZDR) ; Dr. BUSSMANN, Michael (HZDR)

Presenter : Dr. DEBUS, Alexander (HZDR)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. DEBUS, Alexander

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 97

Simulating laser wakefield acceleration with PIConGPU - from modeling the laser plasma dynamic to in-situ radiation calculation

Poster Title :

We recent simulations of laser wakefield acceleration on recent experiments performed at HZDR. We focus on how to best approximate the experimental setup using newly developed laser-models, as well as particle creation- and ionization-methods. Furthermore, we elaborate on predicting experimentally observable radiation signatures from the simulation.

We discuss in detail the influence of various ionization mechanisms, including BSI, ADK and Keldysh, and how to model the initial gas or plasma distribution. Furthermore, we present recent improvements in the laser implementation, that added Laguerre-Gauss modes, which drastically reduces discrepancies between previous simulations and experiments. On top of simulating plasma dynamics, we present how to predict experimental observables using PIConGPU's in-situ synthetic diagnostics, especially the classical Liénard-Wiechert potential- and QED-based radiation. It allows predicting both coherent and incoherent radiation spectrally from infrared to x-rays and provides the capability to resolve the radiation polarization as well as determine its temporal and spatial origin.

On the examples of a large-scale LWFA simulation, we illustrate how we reduce the gap between simulated plasma dynamics and radiation observed in experiments and discuss valuable spectral signatures which allow conclusions on the micrometer femtosecond electron dynamics during acceleration.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. PAUSCH, Richard (HZDR)

Co-authors : Dr. DEBUS, Alexander (HZDR) ; Mr. GARTEN, Marco (HZDR) ; Mr. HUEBL, Axel (HZDR) ; Mr. STEINIGER, Klaus (HZDR) ; Mr. WIDERA, René (HZDR) ; Mr. BURAU, Heiko (HZDR) ; Dr. BUSSMANN, Michael (HZDR) ; Prof. SCHRAMM, Ulrich (HZDR)

Presenter : Mr. PAUSCH, Richard (HZDR)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. PAUSCH, Richard

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 99

Advanced superconducting insertion device concepts and technologies for future accelerators and light sources

Poster Title :

Superconducting insertion devices have the potential to meet specific demands of future accelerators and light sources ranging from large scale colliders like the Compact Linear Collider (CLIC) to possible laboratory scale free electron lasers driven by laser wakefield accelerators (LWFA).

We present our recent work on two specialized superconducting insertion devices at both limits of this range, including the
related concepts and technologies: A prototype of a superconducting damping wiggler designed for the CLIC damping rings and tested at ANKA, and a superconducting short-period transverse-gradient undulator (TGU) for a LWFA-driven light source.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. BERNHARD, Axel (Karlsruhe Institute of Technology (KIT))

Co-authors : GETHMANN, Julian (KIT) ; KEILMANN, Alexander (KIT) ; Dr. WIDMANN, Christina (KIT) ; WILL, Andreas (KIT)

Presenter : Dr. BERNHARD, Axel (Karlsruhe Institute of Technology (KIT))

Track classification :

Contribution type : --not specified--

Submitted by : Dr. BERNHARD, Axel

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 100

Systematic Studies of Bursting Thresholds at ANKA

Poster Title :

The short bunch operation mode (using so called low-alpha optics) allows the reduction of the bunch length in a storage ring down to a few picoseconds. The micro-bunching instabilities resulting from the high degree of longitudinal compression lead to fluctuations in the emitted intensity in the THz regime, referred to as bursting. The threshold above which the instability arises is an important parameter. The snapshot measurement method allows the determination of this threshold within one second. In this way the value of the bursting threshold can be studied systematically for different machine setting including the short bunch-length bursting, a second region of instability, which occurs for extremely compressed bunches (small shielding factor) below the commonly studied main bursting threshold.

Topic (ARD or DTS) :

ARD

Primary authors : BROSI, Miriam (KIT)

Co-authors : BLOMELY, Edmund (KIT) ; BRüNDERMANN, Erik (KIT) ; CASELLE, Michele (KIT) ; KEHRER, Benjamin (KIT) ; SCHEDLER, Manuel (KIT) ; SCHöNFELDT, Patrik (KIT) ; SCHUH, Marcel (KIT) ; STEINMANN, Johannes (KIT) ; MüLLER, Anke-susanne (KIT)

Presenter : STEINMANN, Johannes (KIT)

Track classification :

Contribution type : --not specified--

Submitted by : BROSI, Miriam

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 101

Inovesa

Poster Title :

Inovesa (Inovesa Numerical Optimized Vlasov Equation Solver Application) is a tool developed to simulate the dynamics of an electron bunch in a storage ring, including the self-interaction with its own wake field. To do so, it uses the well established method to numerically solve the Vlasov-Fokker-Planck equation. Inovesa is modularly extensible and uses OpenCL to massively parallelize the computation. It was designed with standard desktop PCs and usability in mind. Here, we present benchmarks of computational performance and example simulations of beam dynamics.

Topic (ARD or DTS) :

ARD

Primary authors : SCHöNFELDT, Patrik (KIT)

Co-authors : BROSI, Miriam (KIT) ; SCHWARZ, Markus (KIT) ; STEINMANN, Johannes (KIT) ; MüLLER, Anke-susanne (KIT)

Presenter : STEINMANN, Johannes (KIT)

Track classification :

Contribution type : --not specified--

Submitted by : SCHöNFELDT, Patrik

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 102

Simultaneous Detection of Longitudinal and Transverse Bunch Signals at ANKA

Poster Title :

Time-resolved measurements of the horizontal and longitudinal bunch profile together with studies of the emitted radiation allow investigations of the beam dynamics of synchrotron light sources. The simultaneous turn-by-turn measurement of these quantities requires a precise synchronization of the individual detector systems and set-ups. At the ANKA storage ring a common measurement trigger is applied to determine synchronously the energy spread, the longitudinal bunch profile, and as the emitted intensity of coherent synchrotron radiation on a single-turn base. Here we present the different setups, the synchronization and calibration procedures

Topic (ARD or DTS) :

ARD

Primary authors : Mr. KEHRER, Benjamin (Karlsruhe Institute of Technology)

Co-authors : Mr. BLOMLEY, Edmund (Karlsruhe Institute of Technology) ; Ms. BROSI, Miriam (Karlsruhe Institute of Technology) ; Dr. BRüNDERMANN, Erik (Karlsruhe Institute of Technology) ; Prof. MüLLER, Anke-susanne (Karlsruhe Institute of Technology) ; Ms. NASSE, Michael (Karlsruhe Institute of Technology) ; Mr. SCHEDLER, Manuel (Karlsruhe Institute of Technology) ; Mr. SCHöNFELDT, Patrik (Karlsruhe Institute of Technology) ; Mr. SCHUH, Marcel (Karlsruhe Institute of Technology) ; Mr. SCHüTZE, Paul (DESY Hamburg) ; Mr. SMALE, Nigel (Karlsruhe Institute of Technology) ; Mr. STEINMANN, Johannes (Karlsruhe Institute of Technology)

Presenter : Mr. KEHRER, Benjamin (Karlsruhe Institute of Technology)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. KEHRER, Benjamin

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 103

Studying laser ion acceleration with overdense hydrogen ribbon targets by PIC Code simulation

Poster Title :

We present simulation results on laser ion acceleration using hydrogen ribbon targets irradiated by ultra-intense, ultra-short laser pulses. These targets promise to produce pure proton beams that could be used for radiation cancer therapy at high repetition rates. We address critical issues concerning the acceleration process that potentially hinders the application of these beams in a clinical scenario.

For achieving proton energies suitable for the treatment of deep seated tumors it is important to increase the laser intensity. At high laser intensities, plasma instabilities both at the target surfaces and target bulk can create electron filaments that in turn result in non-uniform proton beams, detrimental for delivering spatially uniform dose distributions.

By varying the laser contrast it becomes possible to change the preplasma scale length to influence the formation of instabilities. Other means of controlling proton beam properties are variations in target geometry, e.g. going from planar ribbon targets to spherical droplet targets, and changing the laser polarization. We present results of 2D3V particle-in-cell simulations at realistic density conditions that study the influence of these effects on the plasma dynamics and final beam properties and discuss their relevance regarding future applications of solid hydrogen targets for laser-driven proton tumor therapy.

Primary authors : Mr. BRANCO, João (HZDR)

Co-authors :

Presenter : Mr. BRANCO, João (HZDR)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. BRANCO, João

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 104

Frequency-Comb Spectrum of Periodic-Patterned Signals

Poster Title :

Frequency combs are an excellent tool used in atomic clocks, frequency metrology, high-resolution spectroscopy and other applications. A frequency comb is generated by the repeated emission of identical pulses most often created by lasers. Modern accelerator-based sources, however, are intrinsic sources of repeated emission that can provide high power and stability with a broad spectrum at once.

Using heterodyne spectroscopy we observed the frequency comb of synchrotron radiation in the THz-regime. Our measurements of the emitted coherent synchrotron radiation at 270 GHz revealed the discrete frequency harmonics around the 100’000 revolution harmonic of the storage ring ANKA. We present the effects of the filling pattern structure in multi-bunch mode on the beam spectrum and measurements of the synchrotron frequency.

While interferometers or grating spectrometers in the terahertz regime are typically limited to a frequency resolution of a few hundred megahertz, heterodyne measurements can provide resolutions of better than 1 Hz. Adjusting the electron’s revolution frequency, a gapless spectrum can be recorded, improving the resolution by up to 7 and 5 orders of magnitude compared to FTIR and recent heterodyne measurements, respectively.

Topic (ARD or DTS) :
ARD

Primary authors : STEINMANN, Johannes (KIT)

Co-authors : BLOMLEY, Edmund (KIT) ; BROSI, Miriam (KIT) ; BRüNDERMANN, Erik (KIT) ; CASELLE, Michele (KIT) ; HILLER, Nicole (PSI) ; KEHRER, Benjamin (KIT) ; MATHIS, Yves-laurent (KIT) ; NASSE, Michael (KIT) ; RAASCH, Juliane (KIT) ; SCHEDLER, Manuel (KIT) ; SCHöNFELDT, Patrik (KIT) ; SCHUH, Marcel (KIT) ; SCHWARZ, Markus (KIT) ; SIEGEL, Michael (KIT) ; SMALE, Nigel (KIT) ; MARC, Weber (KIT) ; MüLLER, Anke-susanne (KIT)

Presenter : STEINMANN, Johannes (KIT)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. STEINMANN, Johannes

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 105

KALYPSO, a linear array detector for real-time beam diagnostics

Poster Title :
Presentation of KALYPSO II, detector architecture, results at ANKA, design of new ASIC for KALYPSO III.

Topic (ARD or DTS) :
DTS

Primary authors : ROTA, Lorenzo (KIT-IPE)

Co-authors :

Presenter : ROTA, Lorenzo (KIT-IPE)

Track classification :

Contribution type : --not specified--

Submitted by : ROTA, Lorenzo

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Comments :

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Track judgments :

Abstract ID : 106

Electron Beam Characterizations for Generating THz Radiation with PITZ

Poster Title :

The Photo Injector Test facility at DESY, Zeuthen site (PITZ), develops high brightness electron sources for modern linac-based Free Electron Lasers (FELs). The PITZ accelerator can also be considered as a suitable machine for the development of an IR/THz source prototype for pump-probe experiments at the European XFEL. Interesting options for the IR/THz generation with PITZ are to generate the radiation by means of a SASE FEL and a Coherent Transition Radiation (CTR). A long-bunch electron beam (few 10 ps FWHM) with a peak current of ~200 A and an electron beam with a comb-like longitudinal profile are used for the studies of the SASE FEL and CTR, respectively. In this contribution, results of the characterizations and the optimizations of both types of electron beams from the PITZ accelerator are presented and discussed. Progress on the design and installation of a CTR station is also reported.

Topic (ARD or DTS) :

ARD-ST3

Primary authors : Mr. BOONPORNPRASERT, Prach (DESY)

Co-authors : Dr. KRASILNIKOV, Mikhail (DESY)

Presenter : Dr. KRASILNIKOV, Mikhail (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. KRASILNIKOV, Mikhail

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 107

Ultimate Heavy Ion Intensities

Poster Title :

To generate ultimate heavy ion beam intensities in synchrotrons, low charge states have to be used. This avoids stripping losses and the space charge limit is shifted to higher number of particles.
But at the same time, the probability for charge exchange in collision with residual gas molecules of such ions is much higher, than for highly charged heavy ions. Ionized ions are deflected different, than the reference ion and will get lost. At the position of impact on the beam pipe vacuum chamber, they induce a desorption process, which significantly increases the residual gas density in this area. This in turn increases the probability for further charge exchange processes, whereby a self-amplification up to complete beam loss can evolve. This mechanism limits the maximum possible heavy ion intensity.
To shift this limit to higher number of particles, several measures are possible. One is, to reduce the residual gas pressure, another is to reduce the number of desorbed gas particles by heavy ion impact. Both measures are subject of accelerator research within ST2.
A cryogenic environemt provides high pumping speed for all heavy residual gas particles. According to the vapour pressure courves, their partial pressure is reduced to ultimate low pressures. At 5K-15K, the typical operation temperature of cryogenic vacuum chambers cooled by liquid helium, hydrogen does not get condensated to acceptable low pressures. Hydrogen only gets adsorbed by the cold walls. This adsorption process also leads to sufficiently low pressures, although the capacity is limited. The investigation of capacity and pumping speed as a function of the temperature has been investigated.
The understanding of the desorption process on cryogenic and room temperature surfaces is the other subject of investigations. The temperature and energy dependence of the desorption yield by heavy ion bombardement has been investigated for different materials, as well as the energy dependence of several room temperature materials.
The result of all research subjects is condensed into the StrahlSim simulation code, which simulates the interaction bebween residual gas and heavy ion beam. The time dependent temperature change of cryogenic magnet chamber walls has newly been implemented. First results of dynamic vacuum simulations using dynamic chamber temperatures will be shown.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. BOZYK, Lars (GSI)

Co-authors :

Presenter : Dr. BOZYK, Lars (GSI)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. BOZYK, Lars

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 108

(Quasi-)Ellipsoidal bunch generation progress at PITZ

Poster Title :

The optimization of photoinjectors is crucial for the successful operation of linac-based free electron lasers, and beam dynamics simulations have shown that ellipsoidal photocathode laser pulses result in significantly lower electron beam emittance than that of conventional cylindrical pulses. Therefore, in collaboration with the Institute of Applied Physics (Nizhny Novgorod, Russia) and the Joint Institute of Nuclear Research (Dubna, Russia), a Laser system capable of generating quasi ellipsoidal laser pulses has been developed and installed at the Photo Injector Test facility at DESY, Zeuthen (PITZ).
Progress and the current status of the system are shown together with a number of on-table measurements, and an overview of further on-going developments including volume Bragg grating experiemnts at IAP and the new solid-state based design.

Topic (ARD or DTS) :

ARD-ST3

Primary authors : Mr. GOOD, James David (DESY)

Co-authors : Dr. KRASILNIKOV, Mikhail (DESY)

Presenter : Dr. KRASILNIKOV, Mikhail (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. KRASILNIKOV, Mikhail

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Comments :

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Track judgments :

Abstract ID : 110

High flux & high coherence femtosecond electron diffraction based on PITZ accelerator

Poster Title :

PITZ is a photoinjector test facility for FLASH & E-XFEL, and it has been proposed to be a prototype machine to develop accelerator based THz sources for E-XFEL pump-probe experiment. Meanwhile, the machine can also support femtosecond electron diffraction at the same beam repetition rate as XFEL, which brings XFEL users more flexibility for different experiments. In this paper, a femtosecond electron diffraction scheme based on PITZ accelerator setup is investigated.

Topic (ARD or DTS) :

ARD-ST3

Primary authors : Dr. QIAN, Houjun (DESY)

Co-authors : Dr. STEPHAN, Frank (DESY)

Presenter : Dr. QIAN, Houjun (DESY)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. KRASILNIKOV, Mikhail

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 112

Novel Designs of a Septum Magnet and a Large Aperture High Field Superconducting Magnet with a Nuclotorn cable

Poster Title :

Septum magnets for an accelerator or a beamline are designed as an iron-dominated magnet. However, due to saturation of the iron yoke, the magnetic field strength is limited around 2 Tesla. Novel concept of a septum magnet with a cosine-theta type magnet, which can induce a magnetic field beyond 2 T, was invented and the technical studies are ongoing at GSI. High field superconducting magnets for accelerators are designed with a coil would with a Rutherford cable. For a large aperture high field magnet, a coil with a Nuclotron type cable can be a competitive alternative for such magnets by utilizing its technical advantages.

We present design studies on both key technologies for the future accelerator development.

Topic (ARD or DTS) :

ARD

Primary authors : Dr. SUGITA, Kei (GSI)

Co-authors : Dr. FISCHER, Egbert (GSI)

Presenter : Dr. SUGITA, Kei (GSI)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. SUGITA, Kei

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Comments :

By request of Dr. Peter Spiller (GSI), we apply for a poster.

Status : ACCEPTED

Track judgments :

Abstract ID : 113

The frontend electronics of the CBM Silicon Tracking System

Poster Title :

The Silicon Tracking System (STS) is the essential component for tracking up to 1000 tracks per event at event rates up to 10MHz in A+A collisions. With the resulting 1.8 million channels, it poses the most demanding requirements in terms of bandwidth and density of all CBM detectors. The STS-XYTER ASIC is one of the major component of the STS readout chain; it is dedicated for reading out the double-sided silicon sensors. After tests of previous prototype, the chip design was revised. The current ASIC version implements various improvements to achieve the desired noise levels, and to ensure fail-safe operation. Several tests are carried out to check chip functionalities, performance and system integration aspects. An overview of the experimental setup, device tests and results is presented.

Topic (ARD or DTS) :

DTS

Primary authors : Mr. RODRIGUEZ RODRIGUEZ, Adrian (Goethe Universitaet Frankfurt am Main)

Co-authors :

Presenter : Mr. RODRIGUEZ RODRIGUEZ, Adrian (Goethe Universitaet Frankfurt am Main)

Track classification :

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Submitted by : Mr. RODRIGUEZ RODRIGUEZ, Adrian

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Track judgments :

Abstract ID : 114

Beam Dynamics Simulations for the new superconducting CW heavy Ion LINAC@GSI

Poster Title :

For future experiments with heavy ions at the coulomb barrier within the SHE research project a multi-stage R program of GSI, HIM and IAP is currently under progress. It aims at developing
a superconducting (sc) continuous wave (cw) LINAC with multiple CH-type DTL cavities as key components. Presently, beam dynamics design studies are performed for the construction of an intermediate stage towards the whole LINAC. The beam dynamics concept is based on EQUUS (Equidistant Multigap Structure) constant-beta cavities.
The corresponding simulations - done with LORASR and TraceWin - will be presented.

Topic (ARD or DTS) :

ARD

Primary authors : Mr. SCHWARZ, Malte (IAP, Goethe University Frankfurt)

Co-authors : Dr. BARTH, Winfried (GSI Helmholtz Centre Darmstadt) ; Dr. BUSCH, Marco (IAP, Goethe University Frankfurt) ; Dr. DZIUBA, Florian (GSI Helmholtz Centre Darmstadt) ; Mr. GETTMANN, Viktor (GSI Helmholtz Centre Darmstadt) ; Dr. HEILMANN, Manuel (GSI Helmholtz Centre Darmstadt) ; Dr. MICKAT, Sascha (GSI Helmholtz Centre Darmstadt) ; Dr. MISKI-OGLU, Maksym (HIM Helmholtz Institute Mainz) ; Prof. PODLECH, Holger (IAP, Goethe University Frankfurt) ; Dr. YARAMYSHEV, Stepan (GSI Helmholtz Centre Darmstadt) ; BASTEN, Markus (IAP, Goethe University Frankfurt) ; Dr. TIEDE, Rudolf (IAP, Goethe University Frankfurt)

Presenter : Mr. SCHWARZ, Malte (IAP, Goethe University Frankfurt)

Track classification :

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