2. Annual MT Meeting

Report of Contributions

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

Welcome and Introduction

Tuesday, 8 March 2016 13:00 (15 minutes)

Presenters: Prof. WEBER, Marc (KIT); Dr BEHNKE, Ties (DESY)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

Introduction to the meeting and to MT

Presenter: Dr BEHNKE, Ties (DESY)

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

Status of ARD

Tuesday, 8 March 2016 13:15 (30 minutes)

Presenter: Prof. JANKOWIAK, Andreas (HZB)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

Status of DTS

Tuesday, 8 March 2016 13:45 (30 minutes)

Presenter: Prof. WEBER, Marc (KIT)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

TIARA: A European Initiative to promote Sustainable Accelerator R&D

Tuesday, 8 March 2016 14:15 (40 minutes)

Presenter: Dr ROY, Aleksan (CEA)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

CMOS Image Sensors and Electronics at IMS Duisburg

Tuesday, 8 March 2016 15:35 (40 minutes)

Presenter: BROCKHERDE, Werner (IMS Duisburg)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

New detectors for KATRIN

Tuesday, 8 March 2016 16:45 (40 minutes)

Presenter: MERTENS, Susanne (KIT)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

Accelerator for Hadron Therapy: the Industry Perspective

Tuesday, 8 March 2016 14:55 (40 minutes)

Presenter: Dr ROHDJESS, Heiko (Siemens)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

The ImPACT (Impulse Paradigm Change through Disruptive Technology) program in Japan

Presenter: Dr SANO, Yuji

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

Detector Challenges at the LHC upgrade

Thursday, 10 March 2016 09:55 (50 minutes)

Presenter: FELD, Lutz (RWTH Aachen)

Session Classification: Plenary Session 2 - Please klick on detailed view for further information

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

Common Projects ARD and DTS: Status and Outloook

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

Report from the second MT student retreat

Thursday, 10 March 2016 12:00 (20 minutes)

Presenter: KARNICK, Djorn (KIT)

Session Classification: Plenary Session 2 - Please klick on detailed view for further information

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

Accelerator Physics and Technology in China

Tuesday, 8 March 2016 17:25 (40 minutes)

Presenter: Prof. QIN, Qing (IHEP Beijing)

Session Classification: Plenary Session 1 - Please klick on detailed view for further information

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

Status and Future of Low-Mass Pixel Detectors

Thursday, 10 March 2016 11:15 (45 minutes)

Presenter: Dr WINTER, Marc

Session Classification: Plenary Session 2 - Please klick on detailed view for further information

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

ARD parallel: Session 4

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

DTS parallel: Session 4

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

Poster Session

Tuesday, 8 March 2016 18:20 (1 hour)

Session Classification: MT Poster Session

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

Summary and Conclusions

Thursday, 10 March 2016 12:20 (25 minutes)

Presenter: Dr BEHNKE, Ties (DESY)

Session Classification: Plenary Session 2 - Please klick on detailed view for further information

Contribution ID: **21** Type: **not specified**

BESSY VSR - Upgrade for BESSY II

Summary

The major upgrade of the BESSY II synchrotron light source aims at developing a Variable pulse length Storage Ring - BESSY-VSR, by introducing strongly focusing superconducting cavities in order to manipulate the longitudinal phase space. This will bring up a voltage beating pattern and allows to store simultaneously long and short electron bunches. In the regular user optics rms bunch lengths of ≈ 15 ps and down to 1.7 ps are expected for high current operation. Bunches as short as 300 fs can be provided by using a low-α optics.

This poster will give a short overview of the concept and realization of BESSY VSR.

Primary author: Dr GOSLAWSKI, Paul (Helmholtz-Zentrum Berlin, HZB)

Presenter: Dr GOSLAWSKI, Paul (Helmholtz-Zentrum Berlin, HZB)

Contribution ID: **22** Type: **not specified**

Resonance Island Experiments at BESSY II and MLS for User Applications

Summary

Beam storage close to a tune resonance (Qx= 1/3, 1/4) could generate resonance island buckets in the x,x' phase space providing a second
stable "island orbit" winding around the standard orbit. Experiments with such an operation mode have been conducted at the Metrology Light
Source (MLS) and at BESSY II. These two orbits are well separated and with good life time and stability. This operation mode will offer
additional operation flexibility. It has the potential to fulfil simultaneously conflicting user demands, e.g., high vs. low beam current and single,few vs. multi bunch filling. We present successful measurements taken at photon beam lines and discuss the required beam optics set up.

Primary author: Dr GOSLAWSKI, Paul (Helmholtz-Zentrum Berlin, HZB)

Co-authors: Dr WÜSTEFELD, Godehard (Helmholtz-Zentrum Berlin, HZB); Dr RIES, Markus (Helmholtz-Zentrum Berlin, HZB)

Presenter: Dr GOSLAWSKI, Paul (Helmholtz-Zentrum Berlin, HZB)

Contribution ID: **23** Type: **not specified**

Thermionic injector vs. SRF-Gun: Femtosecond-level characterization of beam arrival-time jitter at the CW SRF accelerator ELBE

Summary

The poster will discuss the characterization of the two electron injectors installed at the superconducting CW linear accelerator ELBE at Helmholtz-Zentrum Dresden-Rossendorf (HZDR). Data from a high resolution bunch arrival-time monitor (BAM), a bunch compression monitor (BCM) and a energy dependent position measurement (eBPM) have been carried out. A comprehensive set of measurements have been performed in order to investigate the changes of arrival-time and energy jitter of the electron beam for different bunch compression states for each individual injector.

Primary author: Dr KUNTZSCH, Michael (HZDR)

Co-authors: Dr TEICHERT, Jochen (HZDR); Dr MICHEL, Peter (HZDR); Mr SCHURIG, Rico (HZDR); Dr LEHNERT, Ulf (HZDR)

Presenter: Dr MICHEL, Peter (HZDR)

Contribution ID: **24** Type: **not specified**

TELBE - High Field THz user facility and ARD test facility for diagnostics on quasi-cw electron beams

Summary

TELBE, the THz facility at ELBE is a prototype multiple THz source user facility for photon science and a test facility for (THz)-based diagnostics on quasi-cw electron beams. In this contribution the current Status of the facility is presented based on different example experiments performed at TELBE during the past year.

Primary author: Dr GENSCH, Michael (HZDR)

Presenter: Dr GENSCH, Michael (HZDR)

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

High-Q cavity operation: Study on the thermoelectrically induced contribution to the surface resistance

Summary

Study on the thermoelectrically induced contribution to the surface resistance

Primary author: Prof. KNOBLOCH, Jens (Helmholtz-Zentrum Berlin)

Presenter: Prof. KNOBLOCH, Jens (Helmholtz-Zentrum Berlin)

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

High Precision Synchronization of a Laser-Microwave Network over Stabilized Fiber Links

Summary

We demonstrate a high precision laser-microwave hybrid network and a microwave-microwave network over stabilized multi-kilometer fiber links. Relative timing jitter between a remote microwave source and a remote laser is 950-attosecond for 18-hour operation. Relative phase jitter (>1Hz) and drift (<1Hz) between two remotely synchronized 10.83 GHz microwave sources are 77.9 and 119.6 μrad, respectively, over 2.5-hour operation.

Primary author: Mr WANG, wenting (Deutsches Elektronen-Synchrotron)

Co-authors: Mr KALAYDZHYAN, Aram (Deutsches Elektronen-Synchrotron); Prof. KÄRTNER, Franz X. (Deutsches Elektronen-Synchrotron); Mr ŞAFAK, Kemal (Deutsches Elektronen-Synchrotron); Dr PENG, Michael Y. (Massachusetts Institute of Technology); Dr XIN, Ming (Deutsches Elektronen-Synchrotron)

Presenter: Mr WANG, wenting (Deutsches Elektronen-Synchrotron)

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

Metallic Photocathodes as an Alternative to Semiconductor Cathodes for SRF Photoinjectors

Wednesday, 9 March 2016 09:00 (18 minutes)

Presenter: Mrs XIANG, Rong (HZDR)

Session Classification: ARD parallel

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

Cool Down Tests at the CW-Linac Demonstrator and First Beam Measurements Matching the CH-Cavity

Wednesday, 9 March 2016 09:18 (18 minutes)

Presenter: MISKI-OGLU, M. (HIM)

Session Classification: ARD parallel

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

CW and Pulsed Performance of LG & FG TESLA Type Cavities in the European XFEL Cryomodules

Wednesday, 9 March 2016 09:36 (18 minutes)

Presenter: Dr RESCHKE, Detlef (DESY)

Session Classification: ARD parallel

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

LLRF Developments for CW Control of SRF Cavities

Wednesday, 9 March 2016 09:54 (18 minutes)

Presenter: Mr RYBANIEC, Radosław (ISE)

Session Classification: ARD parallel

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

Characterizing SRF materials for CW accelerators

Wednesday, 9 March 2016 10:12 (18 minutes)

Presenter: KLEINDIENST, Raphael (HZB)

Session Classification: ARD parallel

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

Overview on Hadron Accelerator Developments at GSI

Wednesday, 9 March 2016 11:00 (25 minutes)

Presenter: OMET, C. (GSI)

Session Classification: ARD parallel

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

Laser Cooling of Heavy Ion Beams

Wednesday, 9 March 2016 11:25 (20 minutes)

Presenter: Dr WINTERS, Danyal (GSI)

Session Classification: ARD parallel

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

Progress and Plans on Hadron Accelerator Developments at FZJ

Wednesday, 9 March 2016 11:45 (25 minutes)

Presenter: Prof. LEHRACH, Andreas (RWTH Aachen & FZ Jülich)

Session Classification: ARD parallel

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

Ion Source Integration at the Extreme Low ENergy ring for Antiprotons ELENA at CERN for commissioning

Wednesday, 9 March 2016 12:10 (20 minutes)

Presenter: MEGIA-MACIAS, A. M.

Session Classification: ARD parallel

Contribution ID: **36** Type: **not specified**

Ultimate Pulse Diagnostics, Femtosecond Level Control, and Novel Photon Sources - Recent Advances in the Field of PS and FS Beams

Wednesday, 9 March 2016 13:30 (30 minutes)

Presenter: MÜLLER, A.-S. (KIT)

Session Classification: ARD parallel

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

Sensors and Electronics for Beam Diagnostic

Wednesday, 9 March 2016 14:00 (15 minutes)

Presenter: CASELLE, M. (KIT)

Session Classification: ARD parallel

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

Coupled Bunch Effects at BESSY-VSR

Wednesday, 9 March 2016 14:15 (15 minutes)

Presenter: Mr RUPRECHT, Martin (Helmholtz-Zentrum Berlin)

Session Classification: ARD parallel

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

Terahertz-Driven Linear Electron Acceleration

Wednesday, 9 March 2016 14:30 (15 minutes)

Presenter: FALLAHI, Arya (CFEL)

Session Classification: ARD parallel

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

Precision RF-Controls of Normal Conducting Accelerators

Wednesday, 9 March 2016 14:45 (15 minutes)

Presenter: Mr PFEIFFER, Sven (DESY)

Session Classification: ARD parallel

Contribution ID: **41** Type: **not specified**

Potential and Limitations of Modern Plasma Simulations

Wednesday, 9 March 2016 15:30 (18 minutes)

Presenter: Dr BUSSMANN, Michael (HZDR)

Session Classification: ARD parallel

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

Status LAOLA

Wednesday, 9 March 2016 15:48 (18 minutes)

Presenter: Dr MAIER, Andreas R. (University Hamburg)

Session Classification: ARD parallel

Contribution ID: **43** Type: **not specified**

Laser-Particle Accelerators –Source Development at HI-Jena

Wednesday, 9 March 2016 16:06 (18 minutes)

Presenter: KALUZA, M. (HIJ)

Session Classification: ARD parallel

Contribution ID: **44** Type: **not specified**

Recent Results from LIGHT

Wednesday, 9 March 2016 16:24 (18 minutes)

Presenter: SCHUMACHER, Dennis (GSI)

Session Classification: ARD parallel

Contribution ID: **45** Type: **not specified**

The DRACO Petawatt Upgrade Online and Recent Results

Wednesday, 9 March 2016 16:42 (18 minutes)

Presenter: SCHRAMM, U. (HZDR)

Session Classification: ARD parallel

Contribution ID: **46** Type: **not specified**

A TPC readout with GEMs, pads and Timepix

Summary

A new readout scheme for a TPC is proposed: a GEM-stack for amplification, pads as segmented anode and a pixel chip (the Timepix) for digitization and readout.
This way the anode pads can be much smaller than in current readout schemes, resolving electron clusters from the ionization process. This would allow for improved double hit and track resolution as well as improved particle identification by cluster counting compared to dE/dx.

Primary author: EINHAUS, Uli (DESY-FLC)

Presenter: EINHAUS, Uli (DESY-FLC)

Contribution ID: **47** Type: **not specified**

Development of an Integrated GEM Gas Amplification Structure

Summary

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 areas. 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. Further, tools and procedures are being developed to establish a reproducible high quality in the production processes.

Primary author: MALEK, Paul (DESY)

Presenter: MALEK, Paul (DESY)

Contribution ID: **48** Type: **not specified**

Investigations of the long-term stability of a GEM-TPC

Summary

As readout for a Time Projection Chamber (TPC), a readout module has been developed using Gas Electron Multipliers (GEMs) for the gas amplification. A crucial requirement is the long term high voltage stability and reliability of these readout modules. The discharge behavior of 23 x 17 square centimeter large GEM foils has been studied under different operating conditions. These studies include long term measurements to study systematic effects as well as detailed measurements and calculations of the dynamic behavior of a GEM shortly after a discharge.

Primary author: FEDORCHUK, Oleksiy (DESY)

Presenter: FEDORCHUK, Oleksiy (DESY)

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

Realization of a Stable Electron Beam by Laser Wakefield Acceleration and the ImPACT programm in Japan

Thursday, 10 March 2016 09:00 (45 minutes)

Presenter: HOSOKAI, Tomonoa (Osaka University)

Session Classification: Plenary Session 2 - Please klick on detailed view for further information

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

ASICs in HGF - Overview

Wednesday, 9 March 2016 09:40 (20 minutes)

Presenter: Dr TRUNK, Ulrich (DESY)

Session Classification: DTS parallel - Please klick on detailed view for further information

Contribution ID: **51** Type: **not specified**

Vulcan –Configurable Integrated Receiver Front-End

Wednesday, 9 March 2016 10:00 (20 minutes)

Presenter: Dr KRUTH, Andre (FZ Jülich)

Session Classification: DTS parallel - Please klick on detailed view for further information

Contribution ID: **52** Type: **not specified**

Materials for HEP detectors

Wednesday, 9 March 2016 10:20 (20 minutes)

Presenter: MUSSGILLER, Andreas (DESY)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

ASICs at CERN

Wednesday, 9 March 2016 09:00 (40 minutes)

Presenter: CAMPBELL, Michael (CERN)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

High speed optical data transmission for detector applications

Wednesday, 9 March 2016 11:10 (20 minutes)

Presenter: SKWIERAWSKI, Piotr (KIT)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

Helmholtz DAQ-Platform

Wednesday, 9 March 2016 11:30 (20 minutes)

Presenter: Dr KAEVER, Peter (HZDR)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

High intensity 100ps pulsed proton beam detection with diamond membrane detectors

Wednesday, 9 March 2016 11:50 (20 minutes)

Presenter: KIS, Mladen (GSI)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

Percival: a CMOS Imager for Photon Science

Wednesday, 9 March 2016 12:10 (20 minutes)

Presenter: MARRAS, Alessandro (DESY)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

Helmholtz Cube Integration and Application and Large Area High-Z-sensors

Wednesday, 9 March 2016 13:30 (30 minutes)

Presenters: Mr PENNICARD, David (DESY); FIEDERLE, Michael (KIT)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

Bump-bonding

Wednesday, 9 March 2016 14:00 (20 minutes)

Presenter: Dr PITZL, Daniel (DESY)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

A novel detection system for Single-Shot Electro-Optical bunch measurements

Wednesday, 9 March 2016 14:20 (20 minutes)

Presenter: ROTA, Lorenzo (KIT-IPE)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

A fast imaging detector based on SiPM technology

Wednesday, 9 March 2016 14:40 (20 minutes)

Presenter: DIEHL, Inge (DESY)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

Challenges and Opportunities in gaseous detectors

Wednesday, 9 March 2016 15:30 (40 minutes)

Presenters: VOSS, Bernd (GSI); Dr NAUMANN, Lothar (HZDR); Mr SCHÄFER, Oliver (DESY Hamburg)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

High precision TPC

Presenter: Mr SCHÄFER, Oliver (DESY Hamburg)

Contribution ID: **64** Type: **not specified**

Efficient GPU-enabled computing infrastructure for high-speed data acquisition

Wednesday, 9 March 2016 16:10 (20 minutes)

Presenter: CHILINGARYAN, Suren (KIT)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

Scalable tools for user-centric, interactive, live data analysis on HPC clusters

Wednesday, 9 March 2016 16:30 (20 minutes)

Presenter: Dr BUSSMANN, Michael (HZDR)

Session Classification: DTS parallel - Please klick on detailed view for further information

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

First experimental results towards demonstrating the self-modulation instability at PITZ

Summary

The self-modulation instability is a plasma-particle beam interaction, where a long (in respect to the plasma wavelength) particle beam is separated into bunchlets. The bunchlets, which are about a plasma wavelength long, are generated when a steplike disturbance (e.g. co-moving ionization front, or sharp rise of the particle beam density) excites a plasma wave. The self-modulation is a key element in the design of the plasma acceleration experiment by the AWAKE collaboration at CERN, which is due to start operation later this year.

To study this instability in detail an experiment was conceptualized at the Photo-Injector Test Facility at DESY, Zeuthen site (PITZ) to inject a 6 mm long electron beam into a lithium plasma with a density of 10E15 cm-3.

Here we report about first experiments with a novel cross-shaped plasma cell which was inserted into the PITZ beam line. The cell is prepared with lithium and argon buffer gas, then heated up to 700C to achieve a lithium atmosphere with the necessary density. The lithium is ionized with an ArF laser (193 nm wavelength) via sideports, creating a plasma channel with a length of up to 10 cm. The 22 MeV electron beam available at PITZ is focused tightly into the plasma, then guided from there to the diagnostics elements.

Primary authors: Dr GROSS, Matthias (DESY); Mr LISHILIN, Osip (DESY)

Co-authors: Dr SCHROEDER, Carl (LBNL); Dr RICHTER, Dieter (HZB); Prof. GRUENER, Florian (U Hamburg / CFEL); Dr STEPHAN, Frank (DESY); Mr PATHAK, Gaurav (DESY); Mr KOSS, Gerald (DESY); Dr KRASILNIKOV, Mikhail (DESY); Dr BRINKMANN, Reinhard (DESY); Mr SCHUETZE, Rico (DESY); Mr PHILIPP, Sebastian (DESY)

Presenter: Dr STEPHAN, Frank (DESY)

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

MT Executive Committee closed session

Wednesday, 9 March 2016 18:00 (1 hour)

Session Classification: MT Executive board (closed session)

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

Tours of KIT

Wednesday, 9 March 2016 18:00 (2 hours)

Session Classification: Tours of KIT

Contribution ID: **69** Type: **not specified**

First Experimental Characterization of Electron Beams for THz Options at PITZ

Summary

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 the ideal machine for the development of a tunable IR/THz source prototype for pump and probe experiments at the European XFEL. The IR/THz radiation generated by means of a SASE FEL and Coherent Transition Radiation (CTR) has been considered and studied. A long-bunch electron beam with 4 nC bunch charge and a short-bunch electron beam (compressed by velocity bunching) are used for the studies of the SASE FEL and CTR, respectively. In this contribution, generation and characterization of both types of electron beams from the PITZ accelerator are demonstrated.

Primary author: Mr BOONPORNPRASERT, Prach (DESY, Zeuthen)

Co-authors: Dr HERNANDEZ-GARCIA, Carlos (Jlab, Newport News, USA); Mr MELKUMYAN, David (DESY, Zeuthen); Dr MALYUTIN, Dmitriy (HZB, Berlin, Germany); Dr STEPHAN, Frank (DESY, Zeuthen); Dr ASOVA, Galina (INRNE, Sofia, Bulgaria); Mr PATHAK, Gaurav (DESY, Zeuthen); Mr LOISCH, Gregor (DESY, Zeuthen); Dr VASHCHENKO, Grygorii (DESY, Zeuthen); Dr HUCK, Holger (DESY, Zeuthen); Mr ISAEV, Igor (DESY, Zeuthen); Mr RYBAKOV, Ivan (INR of the RAS, Moscow, Russia); Mr GOOD, James (DESY, Zeuthen); Dr KALANTARYAN, Kalantaryan (DESY, Zeuthen); Dr BAKR, Mahmoud (Assiut University, Assiut, Egypt); Dr OTEVREL, Marek (DESY, Zeuthen); Dr GROSS, Matthias (DESY, Zeuthen); Dr KRASILNIKOV, Mikhail (DESY, Zeuthen); Mr LISHILIN, Osip (DESY, Zeuthen); Dr ZHAO, Quantang (DESY, Zeuthen); Dr RUBLACK, Tino (DESY, Zeuthen); Dr RENIER, Yves (DESY, Zeuthen)

Presenter: Dr STEPHAN, Frank (DESY, Zeuthen)

Contribution ID: **70** Type: **not specified**

Development of the electrostatic deflector for JEDI

Summary

The direct measurement of the proton or deuteron electric dipole moment has never been performed before. These experiments can be done at storage rings. As a starting point for a first measurement, the magnetic storage ring COSY at Forschungszentrum Jülich can be used. A dedicated stroage ring will require electrostatic elements. For testing the electrode material, shape, surface treatment and high voltage tests, a new laboratory was set up at Aachen University. The experimental setup and first laboratory tests will be presented.

Primary author: Dr GRIGORYEV, Kirill (III. Physikalisches Institut B, RWTH Aachen)

Presenter: Dr GRIGORYEV, Kirill (III. Physikalisches Institut B, RWTH Aachen)

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

RF Characterization of Superconducting Samples at HZB

Summary

Based on a design originally developed at CERN, HZB has built a quadrupole resonator that permits the extensive characterization of superconducting samples to help evaluate their performance for cavity applications.

Primary author: Mr KLEINDIENST, Raphael (Helmholtz-Zentrum Berlin)

Presenter: Mr KLEINDIENST, Raphael (Helmholtz-Zentrum Berlin)

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

Silicon Photonic High-Speed Data Transmission System for Detector Instrumentation

Summary

We present a new optical data transmission system for the data read-out of detector systems in particle physics, photon science or material research. It is based on wavelength division multiplexing (WDM), i.e. the modulation of numerous continuous wave (cw) optical carriers which are conveyed over a single optical fiber. A silicon photonic transmitter inside the detector volume consists of monolithically integrated Mach-Zehnder modulators and optical (de-)multiplexers.

Primary author: Mr KARNICK, Djorn (Karlsruher Institut für Technologie)

Co-authors: Mr EISENBLÄTTER, Lars (Karlsruher Institut für Technologie); Dr SCHNEIDER, Marc (Karlsruher Institut für Technologie); Prof. WEBER, Marc (lars.eisenblaetter@kit.edu); Mr SKWIERAWSKI, Piotr (Karlsruher Institut für Technologie)

Presenter: Mr KARNICK, Djorn (Karlsruher Institut für Technologie)

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

Simulating spectral detectors - synthetic radiation diagnostics with PIConGPU and ClaRa

Summary

We present both the in-situ far field radiation diagnostics in the particle-in-cell code PIConGPU and the offline radiation diagnostic code ClaRa. The first was developed to close the gap between simulated plasma dynamics and radiation observed in laser plasma experiments. The second is used to quantitatively simulate radiation observed in e.g. Thomson scattering experiment. Both methods are based on the far field approximation of the Liénard-Wiechert potential. Their predictive capabilities, both qualitative and quantitative, have been tested against analytical models.

We will discuss the advantages of the in-situ approach of PIConGPU over ClaRa that allows predicting both coherent and incoherent radiation spectrally from infrared to x-rays and provides the capability to resolve the radiation polarization and determine the temporal and spatial origin of the radiation. Furthermore, we explain why the direct integration into the highly-scalable GPU framework of PIConGPU allows computing radiation spectra for thousands of frequencies, hundreds of detector positions and billions of particles efficiently.

We will demonstrate these capabilities on resent simulations of laser wakefield acceleration (LWFA), high harmonics generation during target normal sheath acceleration (TNSA) and Thomson scattering during laser electron interactions.

Primary author: Mr PAUSCH, Richard (HZDR)

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

Presenter: Mr PAUSCH, Richard (HZDR)

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

Design Study for an Optical Free-Electron Laser realized by Traveling-Wave Thomson-Scattering

Summary

We present an experimental setup strategy for the realization of an optical free-electron laser (OFEL) in the Traveling-Wave Thomson-Scattering geometry (TWTS). In TWTS, the electric field of petawatt class, pulse-front tilted laser pulses is used to provide an optical undulator field. This is passed by a relativistic electron bunch so that electron direction of motion and laser propagation direction enclose an interaction angle. The combination of side scattering and pulse-front tilt provides continuous overlap of electrons and laser pulse over meter scale distances which are achieved with centimeter wide laser pulses. An experimental challenge lies in shaping of these wide laser pulses in terms of laser dispersion compensation along the electron trajectory and focusing. The poster shows how diffraction gratings in combination with mirrors are used to introduce and control dispersion of the laser in order to provide a plane wave laser field along the electron trajectory. Furthermore we give limits on alignment tolerances to operate the OFEL. Example setups illustrate functioning and demonstrate feasibility of the design.

Primary author: Mr STEINIGER, Klaus (Helmholtz-Zentrum Dresden-Rossendorf)

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

RECENT STATUS NEW SUPERCONDUCTING CW HEAVY ION LINAC@GSI

Summary

The demonstrator is a prototype of the first section of the proposed cw-LINAC@GSI, comprising a superconducting CH-cavity embedded by two superconducting solenoids. The sc CH-structure is the key component and offers a variety of research and development. The beam focusing solenoids provide maximum fields of 9.3 T at an overall length of 380 mm and a free beam aperture of 30 mm. The magnetic induction of the fringe is minimized to 50 mT at the inner NbTi-surface of the neighboring cavity. The fabrication of the key components is still in progress and is near to completion. The cold performance testing of the RF cavity is finished, the helium jacket will be welded on soon. The first cold test of the cryostat @GSI was successful. The test environment is completely prepared.
Integration of the cryostat into the beam line and commissioning of the RF elements will be performed as next steps towards a complete testing of the demonstrator.

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Presenter: Mr GETTMANN, Viktor (GSI Darmstadt, HIM Mainz)

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

Ultimate Heavy Ion Intensities

Summary

For the generation of ultimate heavy ion intensities in synchrotrons, low charge states have to be used. Such stripping losses are avoided and the space charge limit is shifted to higher number of particles.

But the probability, that such ions change their charge state in colission with residual gas molecules 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 at this location. 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 intesity.

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, hydrogend is not 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 is 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 is 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.

Primary author: Dr BOZYK, Lars (GSI)

Co-authors: Mr MAURER, Christoph (GSI); Mr CHILL, Frederic (GSI / Uni Frankfurt); Dr SPILLER, Peter (GSI)

Presenter: Dr BOZYK, Lars (GSI)

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

Challenging Methods in the Detection of fast Ultra-High Intensity of Heavy Ion Beams

Summary

Investigations of isotopes near the driplines, super heavy elements and analysis of other very rare isotopes keep require very high intensity ion beams.

Modern detection systems have to be developed and adapted to the high beam intensity and the highly radiative environment.
Challenges and solutions shall be presented and some of the on going research regarding high intensity beam monitors and time of flight detector systems.

Primary author: Mr SCHLEMME, Steffen (GSI / TUD)

Presenter: Mr SCHLEMME, Steffen (GSI / TUD)

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

A novel full-scale superconducting undulator tested at ANKA

Summary

The ANKA Synchrotron Radiation Facility at KIT and Babcock Noell GmbH (BNG) are pursuing a Research & Development program on superconducting undulators (SCUs). Since SCUs can reach higher magnetic peak fields than permanent magnet in-vacuum insertion devices, including cryogenic ones (for the same gap and period length), they have the potential to increase the spectral range, brilliance and flux of existing state-of-the-art devices.
A first milestone of the collaboration is the successful development and operation of SCU15, a full-scale (1.5 m long coils) superconducting undulator with 100.5 periods of 15 mm each. SCU15 was installed and tested in the ANKA storage ring during 2015. It has been running and quench-free (avoiding possible quench-induced electron beam losses) in regular 2.5 GeV machine operation reliably during the all testing period.

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Presenter: Dr CASALBUONI, Sara (IBPT-KIT)

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

Overview of Testfacilities and Activities in MT-ARD @ KIT

Summary

The poster presents the MT-ARD testfacilities and activities at KIT

Primary author: Dr SCHWARZ, Markus (KIT)

Presenter: Dr SCHWARZ, Markus (KIT)

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

Status of the Accelerator Physics Test Facility FLUTE

Summary

A new compact versatile linear accelerator named FLUTE (”Ferninfrarot Linac Und Test Experiment”) is currently under construction at the Karlsruhe Institute of Technology (KIT), in collaboration with the Paul Scherrer Institute (PSI) and the Deutsches Elektronen-Synchrotron (DESY). It will serve as an accelerator test facility and allow conducting a variety of accelerator physics studies. In addition, it will be used to
generate intense ultra-short THz pulses for photon science experiments. Special emphasis is put on studies of bunch compression
and beam stability as a function of bunch charge and of different
generation mechanisms of coherent radiation.

Primary author: Dr NASSE, Michael (Karlsruhe Institute of Technology)

Presenter: Dr NASSE, Michael (Karlsruhe Institute of Technology)

Track Classification: ARD

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

Computer Controlled Bunch Charge Stabilization for the ELBE SRF Gun

Summary

The superconducting RF gun of the linear electron accelerator ELBE at Helmholtz-Center Dresden-Rossendorf is operated with a pulsed high power UV laser. The laser power directly determines the bunch charge. Due to technical reasons the laser is subjected to long term thermal drifts that directly translate into changes of bunch charge. In order to make the SRF gun available for user operation it is necessary to compensate these drifts. For this purpose a feedback loop was realized consisting of an adjustable laser attenuator, a beam current sensor and a real time controller. The poster shows the feedback setup and first experimental results.

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Presenter: STEINBRÜCK, Reinhard (HZDR)

Track Classification: ARD

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

The EUSO Super Pressure Balloon Pathfinder Experiment

Summary

A discussion of the ongoing research with Silicon Photomultipliers for Cosmic Ray Research at KIT-IKP and KIT-IEKP. Particular focus on the work preceding the development of a silicon photomultiplier based camera for first flight on the EUSO Super Pressure Balloon Mission, Spring 2017.

Primary author: Mr PAINTER, William (KIT-IEKP)

Presenter: Mr PAINTER, William (KIT-IEKP)

Track Classification: DTS

Contribution ID: **83** Type: **not specified**

Silicon micro-strip detector response simulation for the CBM experiment

Summary

The Compressed Baryonic Matter experiment (CBM) at FAIR is designed to explore the QCD phase diagram in the region of high net-baryon densities. As the central detector component, the Silicon Tracking System (STS) is based on double-sided micro-strip sensors. To achieve realistic modelling, the response of the silicon strip sensors should be precisely included in the digitizer which simulates a complete chain of physical processes caused by charged particles traversing the detector, from charge creation in silicon to a digital output signal.

The current implementation of the STS digitizer comprises non-uniform energy loss distributions (according to the Urban theory), thermal diffusion, Lorentz shift in magnetic field, charge redistribution over the read-out channels due to interstrip capacitances as well as the read-out chip modelling: threshold, noise, etc.

Using the digitizer, one can test influence of each physical processes on cluster and hit parameters separately. We have developed a new cluster position finding algorithm and a hit error estimation method for it. The errors were verified by the width of pull distributions (expected to be about unity) and their shape.

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Presenter: Mrs HANNA, Malygina (GSI; Goethe University Frankfurt)

Track Classification: DTS

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

Parallel Algorithms for Online Trackfinding in PANDA

Summary

One of the challenges of the PANDA experiment is the triggerless readout of the complete detector and the online event selection to reduce the data rate by three orders of magnitude. One key component in the online processing of the data is the track finding and fitting of charged particles. Here PANDA studies the usage of GPUs to utilize their huge parallel computing power. The poster will present the concept and the developments of algorithms suitable to run on GPUs.

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Co-author: STOCKMANNS, Tobias (FZJ)

Presenter: STOCKMANNS, Tobias (FZJ)

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

The Silicon Tracking System of the CBM experiment at FAIR

Summary

The Silicon Tracking System (STS) is the central component of the Compressed Baryonic Matter (CBM) experiment at FAIR. The CBM physics program aims at exploring the properties of matter under extreme conditions, in particular at highest nuclear matter densities with possible signs for a phase transition from normal matter to quark-gluon plasma.

The purpose of STS is the measurement of the trajectories and momenta of the charged particles produced from the interaction of heavy-ion beams with nuclear targets. The STS is located in the superconducting dipole magnet and extends from 30 to 100 cm downstream of the target

The STS system must be able to operate at interaction rates up to 10 MHz, archieving 95% efficiency of track reconstruction and momentum resolution with a precision of about $\Delta p/p=1\%$. These requirements can be satisfied with a tracking system of 8 layers of 300 μm thick silicon microstrip sensors. The sensors are designed to be double-sided with a stereo angle of 7.5° and a strip pitch of 58 μm. The self-triggering read-out electronics will be located at the periphery of the tracking stations to achieve a low material budget in the physics aperture. The building block of the STS is therefore a detector module composed of a fine-pitch microstrip sensor, ultra-thin signal transmission cables up to half a meter long, and front-end electronics boards. About 1200 sensors are to be mounted onto 106 low-mass mechanical support structures.

The tracker system is operated in a thermal enclosure that allows operating the sensors at about -5℃, thus reducing dark currents due to radiation damage.

The status of the prototype development and tests is addressed in this poster, also system integration issues are considered. The STS detector is developed in cooperation of institutes from Germany, Poland, Russia and Ukraine. It is planned to be constructed and ready for installation into the CBM experiment by the year 2020.

Primary author: Dr TEKLISHYN, Maksym (FAIR)

Presenter: Dr TEKLISHYN, Maksym (FAIR)

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

The workflow of module assembly for the CBM Silicon Tracking System

Summary

The Compressed Baryonic Matter Experiment at FAIR is designed to explore the QCD phase diagram of strongly interacting matter. The Silicon Tracking system (STS) is the core detector that provides track reconstruction and momentum determination of charged particles from beam-target interactions. The STS will consist of eight planar tracking stations that are built from different types of basic functional modules consisting of a double-sided silicon microstrip sensor that is connected via microcables to two front-end-electronics boards.

All in all 32 polyimide microcables, each with 64 aluminum traces, have to be connected on one side to 16-STS-XYTER-chips and on the other side to the P- and N-side of the sensor in two staggered layers with TAB-bonding. Additionally, the chips have to be wire-bonded to the front-end-electronics-boards, and shielding layers have to be fixed. This contribution will show the workflow of the module-assembly.

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Presenter: Mrs SIMONS, Carmen (GSI)

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

Versatile MTCA.4 Compatible, FPGA Based Boards for High Throughput Systems

Summary

Presented are two FPGA based designs in µTCA standard with wide range of the applications in different Helmholtz research centers

Primary author: Mr KRIVAN, Frantisek (DESY FEA)

Presenter: Mr KRIVAN, Frantisek (DESY FEA)

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

ps-fs Beam Diagnostics and Beam Dynamics

Summary

An overview of methods and technologies to investigate short electron bunches and photon pulses at high MHz repetition rates will be given as part of subtopic three of ARD. A focus will be on collaborative ARD and DTS activities and applications at KIT using detection systems jointly developed within DTS for applications in ARD.

Primary author: Dr BRUENDERMANN, Erik (KIT)

Presenter: Dr BRUENDERMANN, Erik (KIT)

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

Ultra-fast YBCO detectors for single-shot THz spectroscopy of Coherent Synchrotron Radiation

Summary

Coherent Synchrotron Radiation (CSR) in the THz frequency range generated by short electron bunches is a promising instrument for many applications such as spectroscopy and non-destructive imaging techniques [1]. The variation of temporal and spectral THz pulse shapes that is due to the so-called bursting phenomenon however requires a bunch-by-bunch resolution of the THz signal [2]. Therefore the use of ultra-fast and broadband THz detectors is essential.
A state-of-the-art detection system based on superconducting YBa2Cu3O7-x (YBCO) thin-films offers picosecond response times [3]. Patterning to sub-µm dimensions moreover ensures suitable detector sensitivity for the detection of single THz pulses [4]. In addition of picosecond response times and broadband readout the YBCO detection system offers zero-bias detection and electrical-field sensitivity [5].
By combining the well-established technology for broadband YBCO detectors with narrow-band THz filtering we aim at the single-shot spectroscopy of CSR. The approach that is currently under development consists of an on-chip 4-pixel detector array with integrated narrow-band antennas and simultaneous broadband readout of all four detectors [6]. First testing of a prototype of the single-shot THz spectrometer allowed for the simultaneous bunch-by-bunch observation of the bursting CSR signal at two different wavelengths.

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Presenter: Dr ILIN, Konstantin (IMS-KIT)

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

Improvement of Ge(i)- and Si(Li)- Detector Systems for X-ray Polarimetry

Summary

Position sensitive and energy dispersive Ge(i)- and Si(Li)- detector systems are mandatory for the research program of the SPARC collaboration at GSI and the future FAIR facility.
We discuss different activities and recent results which aim for an improved physics performance as well as a flexible and more cost efficient DAQ system.

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Track Classification: DTS