HK 49: Instrumentation XIII

Time: Wednesday 16:00–17:00 Location: HK-H5

HK 49.1 Wed 16:00 HK-H5

Development of a method for the calibration of the backward end cap of the PANDA calorimiter — •Samet Katilmis[1], Alaa Dbeyssi[1], Alexander Greiner[1], David Rodriguez Pineiro[1], Dong Liu[1], Frank Maas[1,2,3], Julian Moik[1], Luigi Capozza[1], Oliver Noll[1,2], Peter-Bernd Otte[1], Sahra Wolff[1], and Cristoph Rosner[1] for the PANDA-Collaboration — [1]Helmoltz Institut Mainz, Germany — [2]Institute of Nuclear Physics, Johannes Gutenberg University, Mainz, Germany — [3]PRISMA Cluster of Excellence, Mainz, Germany

The PANDA-Experiment (Antiproton and Proton Annihilation at Darmstadt) is one of the main experimental pillars at the **F**acility for **A**ntiproton and **I**on **R**esearch at Darmstadt (FAIR), which currently is under construction.

The Backward Endcap Calorimiter (BWEC) is developed and built by the EMP group at the Helmholtz Institute Mainz. The BWEC consists of subunits called submodules. Each submodule houses electronic components, such as high voltage boards, ASICS, photodiodes, and others, whose characteristics must be determined for optimal operating settings. This includes determining the characteristics of avalanche photodiodes, high-voltage scans, and various other tests. This procedure is repeated several times for 48 submodules, so convenient, automatic and reconstructable calibration methods are developed.

HK 49.2 Wed 16:15 HK-H5

Recent developments regarding the final $\overline{\text{P}}$ANDA Barrel EMC — •Aniko Tim Falk, Markus Moritz, Hans-Georg Zaunick, Kai-Thomas Brinkmann, Valera Dormenev, Kim Tabea Giebenhain, Christopher Hahn, Marvin Peter, Matthias Sachs, and René Schubert for the PANDA-Collaboration — II. Physikalisches Institut, Justus-Liebig-Universität, Gießen

The future electromagnetic calorimeter of the $\overline{\text{P}}$ANDA experiment will provide an excellent energy resolution over a wide dynamic range from a few dozens of MeV up to 15 GeV. The barrel part will consist of 16 segments. Each segment, with the exception of the two for the target pipe, includes 710 individual detectors. The main parts of each detector are a PWO-II crystal, two individual large area avalanche photo diodes and a preamplifier ASIC named APFEL (ASIC for Panda Frontend Electronics). In order to reveal the full potential of the calorimeter, even beyond the design goals, such aspects as the calibration, the APFEL settings and APD gains of each detector must be optimized to provide the best possible energy resolution.

In this talk the most recent progress concerning the final Barrel EMC design shall be presented.

This project is supported by BMBF, GSI and HFHF.

HK 49.3 Wed 16:30 HK-H5

Development of BaO*2SiO2:Ce (DSB:Ce) glass and glass ceramic scintillation material for future detectors — •Valerii Dormenev[1], Andrey Borisevich[2], Kai-Thomas Brinkmann[1], Mikhail Korzhik[2,3], Dmitry Kozlov[2], Markus Moritz[1], Rainer Novotny[1], Pavel Orsich[1,2], and Hans-Georg Zaunick[1] — [1]2nd Physics Institute, Justus Liebig University, Giessen, Germany — [2]Institute for Nuclear Problems of Belarus State University, Minsk, Belarus — [3]NRC "Kurchatov Institute", Moscow, Russia

Utilization of fast and efficient scintillating materials for radiation detectors has played a crucial role in the discovery of the properties of matter in the last decades. However, the operation in a harsh radiation environment generated at high intensity machines such as the LHC and FAIR demonstrated their limitations and underlined the requirements for materials more tolerable to radiation damage in particular caused by high energy hadrons. Glass and glass ceramics can be considered as alternatives to crystal-based scintillators. Here we report on the performance of a low cost glass (BaO*2SiO2) and the glass ceramics DSB: Ce/Gd and in addition on aspects of industrial mass production. Admixing gadolinium oxide (Gd3+) even provides up to five times larger light yield. This work summarizes the present status of the overall performance of small and large samples.

The work was supported by funding of EU Horizon 2020 under Grant Agreement No 777222 (ATTRACT) and No 654002 (INTELUM), BMBF Project 05K2019 - UFaCal and in the spirit of the Crystal Clear Collaboration.

HK 49.4 Wed 16:45 HK-H5

Construction of the crystal Zero Degree Detector for BESIII — •Frederic Stieler[1], Achim Denig[1], Peter Drexler[1], Leonard Koch[2], Wolfgang Kühn[2], Werner Lauth[1], Jan Muskalla[1], Saskia Plura[1], Christoph Florian Redmer[1], and Yasemin Schelhaas[1] — [1]Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, Deutschland — [2]II. Physikalisches Institut, Justus-Liebig-Universität Gießen, Deutschland

The crystal Zero Degree Detector (cZDD) is a proposed addition to the BESIII experiment in China. In order to measure hadronic cross sections with the Initial State Radiation (ISR) method for a more precise calculation of the hadronic vacuum polarization contribution to the anomalous magnetic moment of the muon, ISR photons have to be detected. Since these photons are mostly emitted at small angles in relation to the colliding particles, the cZDD will measure these photons at angles of about 1.5 mrad to 10.4 mrad, that are not covered yet by the already existing detectors at BESIII.
In this presentation the design of the first prototype of the cZDD is discussed and further steps are motivated.