HK 63: Instrumentation XV

Time: Thursday 15:45–17:15 Location: HBR 19: C 1

HK 63.1 Thu 15:45 HBR 19: C 1

Properties of Fast-Lutetium-Gadolinium Oxyorthosilicate Scintillation Material — •Valerii Dormenev, Kai-Thomas Brinkmann, Dzmitry Kazlou, Rainer W. Novotny, and Hans-Georg Zaunick — 2nd Physics Institute Justus-Liebig-University Giessen, Germany

Many modern detector systems based on scintillation materials require high count rates. This involves the use of bright scintillators with fast rise and decay times in combination with modern ultra-fast photodetectors such as SiPMs. A possible solution for such kind of applications is a family of Lutetium-Gadolinium oxyorthosilicate ($Lu_{2(1-x)}Gd_{2x}SiO_5$, LGSO). Oxide Corporation (Japan) developed a version of fast-LGSO material with optimized timing characteristics. This work reports on the characterization of properties of fast-LGSO material doped by Ce and their comparison with standard Lutetium-Yttrium Oxyorthosilicates YSO/LYSO/LSO.

This work was carried out in the framework of BMBF Project 05K2019 * UFaCal, the High-D consortium and in line with the Crystal Clear Collaboration. EU regional funding via the EFRE scheme of the State of Hesse is gratefully acknowledged.

HK 63.2 Thu 16:00 HBR 19: C 1

Construction of the crystal Zero Degree Detector for BESIII — •Frederic Stieler, Achim Denig, Peter Drexler, Werner Lauth, Jan Muskalla, Saskia Plura, Christoph Florian Redmer, and Yasemin Schelhaas for the BESIII-Collaboration — Institute for Nuclear Physics, Johannes Gutenberg University Mainz, Germany

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 the development of an online feature extraction based on FPGAs is motivated.

HK 63.3 Thu 16:15 HBR 19: C 1

Simulation studies of the Forward Conversion Tracker for ALICE 3 — •Cas van Veen for the ALICE Germany-Collaboration — Physikalisches Institut, Heidelberg, Germany

During the Long Shutdown 4 of the Large Hadron Collider, ALICE will upgrade its complete detector to address new physics cases with unprecedented resolution and higher interaction rates, called ALICE 3. The Forward Conversion Tracker (FCT), located in the forward direction, will measure the photon spectrum predicted by Low's theorem in proton-proton collisions at $\sqrt{s} = 14$ TeV.

The focus of this talk will be on the status of the simulation studies of the FCT. The O2 framework of ALICE allows for detailed, full simulations of proton-proton collisions including transportation through the detector setup of ALICE 3. The background bremsstrahlung generated by charged particles passing through material in front of the FCT is a major challenge for this study and strategies to reduce this background will be presented. One of the major strategies is to provide electron particle identification in the region of the FCT, and the other major strategy is to construct a conical beam pipe which comes with its own challenges.

HK 63.4 Thu 16:30 HBR 19: C 1

Progress of the development of the PANDA FAIR Phase-0 electromagnetic calorimeter — Luigi Capozza[1], Jonas Geisbüsch[1], Ravi Gowdru Manjunata[1], Samet Katilmis[1], Frank Maas[1,2,3], Oliver Noll[1,2], David Rodriguez Piñeiro[1], Paul Schöner[1], •Christoph Rosner[1], and Sahra Wolff[1] — [1]Helmholtz-Institut Mainz, Mainz, Germany — [2]Institute of Nuclear Physics, Mainz, Germany — [3]PRISMA Cluster of Excellence, Mainz, Germany

The PANDA experiment will be one of the main pillars of the future FAIR facility in Darmstadt. In the scope of the PANDA FAIR Phase-0 project, the backward electromagnetic calorimeter (EMC) of Panda will be used at the Mainz Microtron (MAMI) accelerator to determine the neutral pion transition form factor, which is a crucial ingredient to reduce the uncertainty of the theoretical calculation of the muon anomalous magnetic moment. Together with an improved experimental uncertainty, this will allow to shed light on the muon g-2 puzzle.

This contribution focusses on the progress of the detector development for the FAIR Phase-0 version of the backward EMC. The calibration of the submodules which the detector comprises will be discussed, as well as a first test assembly of the detector modules in their final configuration. Finally, the plans to install the detector at MAMI will be presented.

HK 63.5 Thu 16:45 HBR 19: C 1

Development of a web based application for the slow control of the PANDA FAIR Phase-0 Calorimeter — Luigi Capozza[1], Jonas Geisbüsch[1], Ravi Gowdru Manjunata[1], •Samet Katilmis[1], Frank Maas[1,2,3], Oliver Noll[1,2], David Rodriguez Piñeiro[1], Paul Schöner[1], Christoph Rosner[1], and Sahra Wolff[1] for the PANDA-Collaboration — [1]Helmholtz-Institut Mainz, Mainz, Germany — [2]Institute of Nuclear Physics, Mainz, Germany — [3]PRISMA+ Cluster of Excellence, Mainz, Germany

The PANDA FAIR Phase-0 calorimeter consists of 48 submodules. Each submodule houses detector components, such as high voltage distribution boards, charge sensitive preamplifiers, temperature sensors and LEDs. The control values of these components can be set and read. The control of these components is summarised as slow control. The slow control is realised in a web interface to control various sections of the calorimeter. The talk points out the current development status of the web interface.

HK 63.6 Thu 17:00 HBR 19: C 1

Results from the latest Beam Time with the $\overline{\text{P}}$ANDA Cluster-Jet Target at COSY — •Philipp Brand, Daniel Bonaventura, Hanna Eick, Jost Froning, Christian Mannweiler, Sophia Vestrick, Michael Weide, and Alfons Khoukaz for the PANDA-Collaboration — Institut für Kernphysik, Universität Münster, 48149 Münster, Germany

The $\overline{\text{P}}$ANDA cluster-jet target will be the Day-1 target for the $\overline{\text{P}}$ANDA experiment within the High Energy Storage Ring (HESR) at FAIR. With this device, a target thickness of more than 10^{15} atoms/cm^2 is achieved at the interaction point more than 2 m below the jet nozzle.

This target was routinely in operation at the COoler SYnchrotron (COSY) over the last years. Special emphasis of the last beam time was on the operation of an MCP system for cluster beam visualization. Therefore, the cluster beam has to be ionized which can be done either by a dedicated electron gun or by the accelerator's ion beam. Using the ion beam has the advantage that then only the vertex region is visualized with the MCP so that this system can work as a vertex zone monitor. Currently, the MCP image intensity dependence on target density, ion beam intensity, and MCP voltages is analyzed which would allow for a rough luminosity monitoring. Furthermore, also studies on the beam target interaction using the HESR stochastic cooling devices were performed. Some results of this last COSY beam time are presented.

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