HK 39: Instrumentation VIII

Time: Wednesday 16:30–19:00 Location: J-HS D

Group Report HK 39.1 Wed 16:30 J-HS D

R^{3}B - a versatile setup at FAIR — •Kathrin Göbel for the R3B-Collaboration — Goethe-Universität Frankfurt, Germany

We study reactions with relativistic stable and radioactive beams at the R^{3}B experiment at the international accelerator facility FAIR in Darmstadt, Germany. The versatile setup allows kinematically complete measurements with high efficiency and resolution.

We present the new time-of-flight wall ToFD to identify fragments and the new scintillation fiber detectors to track fragments in combination with the superconducting magnet GLAD. We review the experiment on Coulomb dissociation of ^{16}O performed in 2019, and give an outlook on the quasi-free scattering and fission experiments scheduled for the experimental campaign in spring 2020.

The experiments are carried out within FAIR Phase 0 at GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt. The project is supported by the Bundesministerium für Bildung und Forschung (BMBF) (05P19RFFN1, 05P19WOFN1, 05P15RFFN1, 05P15RDFN1), HGS-HIRE, HIC for FAIR and the GSI-TU Darmstadt cooperation agreement.

Group Report HK 39.2 Wed 17:00 J-HS D

First results from commissioning of mCBM at GSI/FAIR — •Christian Sturm for the CBM-Collaboration — GSI, Darmstadt, Germany

To study extremely rare probes in nucleus-nucleus collisions with high precision, the Compressed Baryonic Matter experiment (CBM) at FAIR is designed to measure at unprecedented interaction rates up to 10 MHz. Hence, CBM will be equipped with fast and radiation hard detector systems, readout by a free-streaming data acquisition system, transporting data with up to 1 TB/s to a large scale computer farm, which provides first level event reconstruction and selection. To test and optimize all components and their complex interplay including firmware and software under realistic conditions the CBM full-system test-setup *mCBM* ("mini-CBM") comprising pre-series components and final prototypes of all CBM detector subsystems and their read-out chains has been set-up at the present SIS18 facility of GSI/FAIR. With runs in March, November and December 2019 performed within the FAIR Phase-0 program the commissioning of mCBM has started. First results of the mCBM beam campaigns will be presented.

Supported by BMBF and GSI/FAIR.

Group Report HK 39.3 Wed 17:30 J-HS D

The HADES detector upgrades: Current status and future perspectives — •Adrian Rost for the HADES-Collaboration — TU Darmstadt

The HADES spectrometer at GSI Helmholtzzentrum für Schwerionenforschung GmbH in Darmstadt was recently upgraded with new detector components. Besides a technical upgrade of the photon detector of the Ring-Imaging-Cherenkov (RICH) system a new electromagnetic calorimeter (ECAL) was installed in the spectrometer. In March 2019 a four week physics production beam time with an "Ag+Ag" beam at 1.58A GeV was carried out.

In this contribution the performance of the new detector systems under beam conditions will be presented. For future operations at the SIS18 accelerator HADES has a broad physics program which is mainly focused on pion/proton induced reactions. For these upcoming experiments T0 and new beam detectors utilizing Ultra Fast Silicon Detector (UFSD) technology will be used, front-end electronics of HADES tracking system will be upgraded and a new forward tracking system will be installed.

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Group Report HK 39.4 Wed 18:00 J-HS D

KOALA experiment commissioning at COSY — •Huagen Xu — Forschungszentrum Juelich, Juelich, DE

The prime motivation of the KOALA experiment is the study of antiproton-proton elastic scattering at small momentum transfers at HESR. Since the evaluation of the pure Coulomb differential cross section, which proportional to $1/t^2$, is unambiguous, a measurement in the region of Coulomb dominance would determine the $\overline{p}p$ luminosity in an independent way and allow parameters of the $\overline{p}p$ interaction to be extracted. The idea of KOALA is to measure the scattered beam antiprotons at forward angles by fast timing detector and the recoil target protons near 90° by energy detectors.

To verify the method of KOALA a recoil detector has been built and successfully commissioned at former ANKE hydrogen cluster target station at COSY. It was found that the high rate of background limits the measurement to be extended to the desired small momentum transfer t. In order to suppress the background a forward detector consisting of scintillator bars has been built for the KOALA commissioning at COSY by measuring the pp elastic scattering. So far, the full KOALA setup has been installed at COSY. The latest results of KOALA commissioning measurements at COSY will be presented.

Group Report HK 39.5 Wed 18:30 J-HS D

Dedicated Precision Polarimeter for Charged Particle EDM searches at COSY — •Irakli Kesherashvili — Forschungszentrum Jülich GmbH

The international JEDI (Jülich Electric Dipole moment Investigations) collaboration in Jülich, has developed a dedicated polarimeter for the storage ring electric dipole moment experiment at COSY. The polarimeter is equipped with a carbon block target for the effective asymmetry measurement. It is a modular set-up and based on novel LYSO inorganic scintillator crystals coupled to new large area silicon arrays. The detector readout system is assembled with the fast sampling, high-resolution ADC's. The high-speed data transfer allows us online selection of event/hit and asymmetry monitoring. During the last three years, we have performed five beam times at the extracted beam experimental area to optimize detector operation. Currently, the polarimeter is installed at the COSY internal beam. The recent commissioning beam time with vertically polarized deuterons was auspicious, and in January 2020, the first in-plane polarization vector precession will be monitored with the new polarimeter. During this talk, important development steps and recent results will be presented.