HK 64: Instrumentation XVII

Time: Thursday 15:45–16:45 Location: SCH/A.101

Group Report HK 64.1 Thu 15:45 SCH/A.101

Status and production of the CBM Transition Radiation Detector — •Philipp Kähler for the CBM-Collaboration — Institut für Kernphysik, WWU Münster

The upcoming Compressed Baryonic Matter (CBM) experiment at FAIR will investigate the QCD phase diagram at high net-baryon densities and moderate temperatures. In these measurements, the CBM Transition Radiation Detector (TRD) will contribute to the excellent electron identification, enabling to study the hot and dense medium via di-electron analyses at intermediate masses. Furthermore, the TRD will serve as an intermediate tracking station as well as provide the identification of light nuclei in the hypernuclei programme of CBM.

This talk summarises the status of the CBM-TRD project. A report on the detector module (MWPC) production will be given, which has been started. Design details of the new intrinsically gas-tight cathode pad-plane are included. Moreover, the current plans for the periphery are covered as well as the participation in the FAIR phase 0 programme mCBM at the SIS18 accelerator. This work is supported by BMBF grants 05P21RFFC1 and 05P21PMFC1.

HK 64.2 Thu 16:15 SCH/A.101

Commissioning of the First Gas System Line for the CBM-TRD — •Felix Fidorra for the CBM-Collaboration — Institut für Kernphysik WWU Münster, Münster, Germany

The Compressed Baryonic Matter (CBM) experiment is a fixed target heavy-ion experiment which is currently under construction at FAIR in Darmstadt. It will explore the QCD phase diagram at high net-baryon densities. The Transition Radiation Detector (TRD) of the CBM experiment will be based on Multi Wire Proportional Chambers (MWPCs) filled with Xe/CO_2 85:15 as detector gas. This talk reports on the commissioning of the first regulated line of the future gas system for the CBM-TRD. During operation, the gas flow through the chambers has to be regulated such that the relative pressure in the detector volume stays within -0/+1 mbar. To ensure the gas quality, also continuous monitoring of O_2, CO_2 and H_2O content will be included. A part of the gas system, as, e.g., the main regulation valves, the circulation pump and the PLC layer will be located in a service level above the experiment. The first gas line, including already the final tube lengths and the PLC controls, has been set up in the laboratories in Münster for characterisation of, e.g., the timing characteristics of the pressure control and for commissioning. This work is supported by BMBF grants 05P19PMFC1 and 05P21PMFC1.

HK 64.3 Thu 16:30 SCH/A.101

New planar GEM detectors for AMBER — •Jan Paschek[1], Karl Flöthner[1,3], Dimitri Schaab[1], Christian Honisch[1], Michael Lupberger[1,2], Igor Konorov[4], Christian Honisch[1], Michael Hösgen[1], and Bernhard Ketzer[1] — [1]Universität Bonn, Helmholtz-Institut für Strahlen- und Kernphysik, Bonn, Germany — [2]Universität Bonn, Physikalisches Institut, Bonn, Germany — [3]CERN, Geneva, Switzerland — [4]Technische Universität München, Physik-Department, Garching, Germany

As a follow-up experiment to COMPASS at the M2 beamline of the CERN SPS, AMBER (NA66) is expected to make important contributions to unresolved questions related to the structure and spectroscopy of light mesons. In addition, a precision measurement of the proton formfactor by elastic muon-proton scattering at very low 4-momentum transfer will be performed over the next two years.

New large-format triple GEM detectors have been designed and built for tracking charged particles in close proximity to the primary beam. They have shorter strips split in the middle to handle higher particle rates without having to disable the central region. We also eliminated the use of spacer grids to minimize dead zones. The first new detectors were installed and operated during the COMPASS beam period in 2022. For AMBER, the APV-based readout electronics will be replaced by a self-triggering front-end chip. In addition, a stabilized voltage divider will provide constant gain independent of particle rate.

The talk will give an overview of the construction and commissioning of the new detectors and show first results from their operation.