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Development of a RICH detector for electron identification in CBM

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The Compressed Baryonic Matter (CBM) experiment at the Facility for Antiproton and Ion Research (FAIR) at Darmstadt will be a dedicated heavy-ion experiment exploring the intermediate range of the QCD phase diagram with A+A collisions from 10-45 AGeV beam energy. A key observable of the physics program is a precise measurement of low-mass vector mesons and charmonium in their leptonic decay channel. In CBM, electrons will be identified using a gaseous RICH detector combined with several TRD detectors positioned after a system of silicon tracking stations which are located inside a magnetic dipole field.

The concept of the RICH detector, results on R & D as well as feasibility studies in terms of electron efficiency, pion suppression and the invariant mass distributions of low-mass vector mesons and charmonium will be presented. For the RICH detector CO₂ is foreseen as the radiator gas. Glass mirrors with a reflective Al+MgF₂ coating are being developed in cooperation with industry. Reflectivity and surface homogeneity results on first tested prototypes will be presented. For photodetection it is planned to use MAPMTs coupled to fast, self triggered readout electronics. This readout electronics development is based on the so-called n-XYTER chip developed for the readout of Si detectors. This chip offers 128 channels at a readout speed of 32 MHz, and will allow the handling of interaction rates up to the 10 MHz foreseen for CBM. As an intermediate working solution a charge attenuator board for the readout of the Hamamatsu H8500 MAPMT was adopted. Successful operation for single photon counting and Cherenkov light detection was demonstrated in a testbeam. The usage of wavelengthshifter films is reinvestigated in order to increase the photon conversion efficiency for wavelengths below 300 nm. Wavelength dependent quantum efficiency measurements will be presented. The preparation of RICH prototypes is ongoing.

Please indicate "poster" or "plenary" session. Final decision will be made by session coordinators.

plenary

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Classification de Session: Research and Development for future detectors

Classification de thématique: Research & Development for future experiments