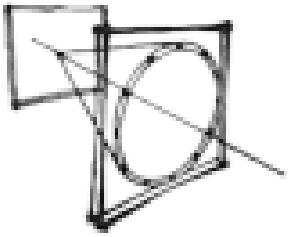

Contribution ID: **23** Type: **Poster**

Conception and design of a control and monitoring system for the mirror alignment of the CBM RICH detector

Monday, 5 September 2016 15:00 (30 minutes)

The Compressed Baryonic Matter (CBM) experiment at the future Facility for Antiproton and Ion Research (FAIR) complex will investigate the phase diagram of strongly interacting matter at high baryon density and moderate temperatures in nucleus-nucleus collisions. The beam energy will range from 2 up to 11 AGeV for the heaviest nuclei at the SIS 100 accelerator setup.
One of the key detector components foreseen to cope with the CBM physics program is the RICH detector, providing efficient and clean electron identification (for momenta up to 8 GeV). It will be made of a CO2 gaseous radiator, Multi-Anode Photo-Multipliers for photon detection and about 80 trapezoidal glass mirror tiles, equally distributed in two half-spheres and used as focusing elements with spectral reflectivity down to the UV range.
An important aspect to guarantee a stable operation of the RICH detector is the alignment of the mirrors. A qualitative alignment control procedure for the mirror system, CLAM (Continuous Line Alignment Monitoring method) originally developed by the COMPASS experiment, has been implemented in the CBM RICH prototype detector. It was tested under real conditions at the CERN PS/T9 beamline. Data and results of image processing will be reviewed and discussed.
In parallel a quantitative method using recorded data and originally developed and inspired by the HERA-B experiment has also been employed to compute mirror displacements of the RICH mirrors. Results based on simulated events and the limits of the method are discussed as well.
If mirror misalignment is detected, it can be subsequently included and rectified by correction routines. A correction routine is presented and three geometries are compared, namely the misaligned, corrected and ideal ones. The improvements offered by the correction are also highlighted, using reconstruction efficiencies.

Registered

Yes

Primary author: BENDAROUACH, Jordan, for the CBM Collaboration (Justus Liebig University (Giessen))

Presenter: BENDAROUACH, Jordan, for the CBM Collaboration (Justus Liebig University (Giessen))

Session Classification: Poster Session A

Track Classification: Technological aspects and applications of Cherenkov detectors