



Contribution ID: 63

Type: **not specified**

GEM based R&D for Muon Chambers for the CBM experiment at FAIR

Tuesday, 2 July 2013 12:55 (25 minutes)

A large area, high rate, high granularity gas detector system is being developed for detection of muons in the Compressed Baryonic Experiment (CBM) at the upcoming FAIR facility in Germany. Consisting of alternating layers of detector-triplets and thick hadron absorbers, the main task of these Muon Chambers (MUCH) is to detect dimuons arising out of the decay of the low mass vector mesons and charmonia produced in the heavy ion collisions in CBM. A high event rate of about 10 MHz and a harsh radiation environment impose severe challenging constraints on the choice of detector technology for MUCH. For the first few detector stations, where the particle rates reach 1 MHz/sq.cm, a triple GEM gas detector with pad readout has been envisaged. Owing to this high event rate, a self triggered readout scheme has been adopted for all the detectors of the CBM experiment, where the data would be collected in a free streaming mode. This is a unique feature for all CBM detectors. Events are then reconstructed offline by grouping the hits on the detector on the basis of their timestamps. Several triple GEM prototypes with an active area of 100 sq. cm. with high granularity pad readout have been built at VECC, Kolkata and were successfully tested with proton, pion and muon beams, also using nXYTER, a self triggered ASIC. A charged particle detection efficiency higher than 90 % has been achieved from these tests. High rate test of the detectors have also been performed and the response of the detector studied. Large size triple GEM chambers based on sector geometry has been envisaged for the MUCH. Details on fabrication, assembly and test results of prototypes as well as issues related to actual layout of the MUCH chambers will be presented and discussed. Results from a large size GEM chamber with realistic pad granularity will also be presented.

Presenter: DUBEY, Anand Kumar (Department of Atomic Energy (IN))

Session Classification: Tuesday (MPGD mid-morning session)