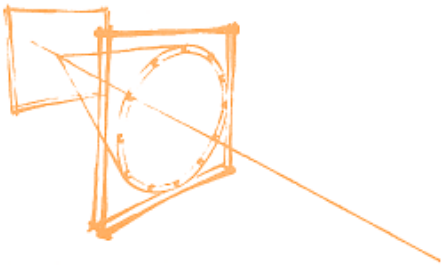

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Results from first beam tests for the development of a RICH detector for CBM

jeudi 6 mai 2010 10:00 (1 minute)

A key observable of the Compressed Baryonic Matter (CBM) physics program is a precise measurement of low-mass vector mesons and charmonium in their leptonic decay channel. In the CBM experiment at FAIR, electrons will be identified using a gaseous RICH detector combined with several TRD detectors positioned behind a system of silicon tracking stations. The concept of the RICH detector foresees an array of Multianode Photomultipliers (MAPMTs) as photodetector.
First beam test data for Cherenkov light detection with a 64 channel Hamamatsu H8500 MAPMT recorded at GSI, will be presented. A 2 GeV proton beam was used to produce Cherenkov photons in a 8 mm thick plexiglass radiator. The signals of the MAPMT were attenuated by a factor of 40 in order to be compatible with the self triggered readout electronics based on the n-XYTER ADC chip which originally has been developed for signals from Silicon sensors. It offers 128 channels at a readout speed of 32 MHz, which will allow to cope with interaction rates up to 10 MHz foreseen for CBM.
A very good separation of the ADC signals of uncorrelated, low amplitude noise events from signals of Cherenkov photons with higher amplitude can be achieved using a cut on the time difference between the beam counter coincidence and the hits in the MAPMT. The recorded number of MAPMT hits per beam event is compared with an estimate taking into account the number of produced Cherenkov photons, geometrical losses, transmission losses in the plexiglass and the quantum efficiency and collection efficiency of the MAPMT.
The results of this beam test demonstrate that the self triggered n-XYTER ADC chip readout electronics is suited for the readout of the Hamamatsu H8500 MAPMT even with the currently needed attenuation of the primary PMT signals. It could be demonstrated that this MAPMT is able to detect single Cherenkov photons which can be well separated from noise using available timing information on the event.

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

Poster

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