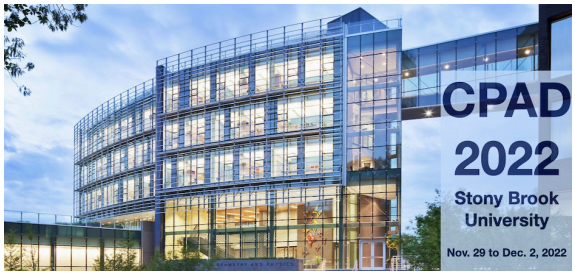

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Detector and electronics integration for the CGEM Inner Tracker

Wednesday, 30 November 2022 11:15 (20 minutes)

The CGEM inner tracker (CGEM-IT) consists of three coaxial layers of triple GEM and is designed to replace the current inner drift chamber of BESIII (BEijing Spectrometer,IHEP, CN), which is suffering from aging.
The tracker is expected to restore efficiency, improve z-determination and secondary vertex position reconstruction with a resolution of 130 μm in the xy-plane and better than 300 μm along the beam direction

A special readout system has been developed. Signals from the detector strips are processed by TIGER (Torino Integrated Gem Electronics for Readout), a custom 64-channel ASIC that provides an analog charge readout over a fully digital output up to about 50 fC and less than 3 ns jitter. TIGER continuously transmits data over thresholds in triggerless mode to an FPGA-based readout module, called GEM Read Out Card, which organizes the incoming data by creating the event packets when the trigger arrives. Since the readout system is versatile, it can be connected to other MPGDs.

Two of the three CGEM layers are in operation in Beijing since January 2020 remotely controlled. Due to the pandemic situation, the integration team has continued its work on triple GEM planar detectors and a test beam with the final electronics configuration has been conducted at CERN.
In this presentation, the general status of the CGEM-IT project is presented, with a particular focus on the preliminary results of the test beam, which show that performance is in line with expectations.

Presenter: BALOSSINO, Ilaria

Session Classification: WG5: MPGDs

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