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Construction of Triple-GEM Detector Using Commercially Manufactured Large GEM Foils

Thursday, 25 May 2017 09:00 (20 minutes)

Many experiments are currently using or proposing to use large area GEM foils in their detectors, which is creating a need for commercially available GEM foils. Currently CERN is the only main distributor of large GEM foils, however with the growing interest in GEM technology keeping up with the increasing demand for GEMs will be difficult.

We present here an update on the assembly and testing of triple-GEM tracking detectors utilizing single-masked 40×40 cm^2 commercial GEM foils produced by Tech-Etch. The triple-GEM detectors will allow us to characterize the overall quality of these Tech-Etch foils through gain, efficiency, and energy resolution measurements. This will be done by constructing four single-mask triple-GEM detectors, using foils manufactured by Tech-Etch, which follow the design used by the STAR Forward GEM Tracker (FGT). The stack is formed by gluing the foils to the frames and then gluing the frames together. The stack also includes a Tech-Etch produced high voltage foil and a 2D $r - \phi$ readout foil. While one of the four triple-GEM detectors will be built identically to the STAR FGT, the other three will investigate ways in which to further decrease the material budget and increase the efficiency of the detector by incorporating perforated Kapton spacer rings rather than G10 spacing grids to reduce the dead area of the detector.

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