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Cylindrical Micromegas, an innovative solution for central trackers.

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A Micro-mesh Gaseous Detector, or Micromegas, is a parallel plate detector used in tracking apparatus for its low material budget, good spatial and time resolutions, and high rate capabilities.

Recent development in the fabrication of the detector, the bulk technology, has made the detector monolithic by embedding the micro-mesh on the readout electrode. This allowed to curve the detector with a minimal mechanical support and opened the possibility to have very light, self supported, cylindrical Micromegas. With a spatial resolution around 100 μ m, a low material budget with 0.33% of X₀, and magnetic field compatible technology; cylindrical Micromegas offer a competitive alternative for central trackers with high-rate capabilities of the order 150kHz/strip.

This talk will report on the CLAS12 central tracking project and its innovative solution consisting in a 6 layers Micromegas barrel. The first chambers have been produced and their full characterization will be reported. The CLAS12 design has been adapted and successfully operated in the CERN anti-hydrogen experiment ASACUSA. The performances of the 10cm-radius 30cm-length two layers cylindrical Micromegas will be presented. Finally we will discuss future directions for this technology, focusing on an application for the central tracking at the Electron Ion Collider (EIC).

Collaboration

CLAS12 RD51 ASACUSA

Summary

Recent results around cylindrical Micromegas detectors from the CLAS12 and ASACUSA experiments.

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