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Characterizations of GEM detector prototype

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Gas Electron Multiplier (GEM) is one of the most important micro-pattern gaseous detectors used in the recent and being considered for future High-Energy Physics (HEP) experiments [1, 2]. For example ALICE at the Large Hadron Collider Facility is upgrading its multi-wire proportional chamber based Time Projection Chamber (TPC) with GEM units. In line with the worldwide efforts, we have also taken an initiative in our experimental high-energy physics detector laboratory build and test of GEM detector prototypes. The GEM foils and other components are obtained from CERN. The detector has been tested with Co60, Cs137 and Sr90 radioactive sources with Ar/CO₂ gas in 70/30 ratios. The temperature and atmospheric pressure has been measured and recorded continuously using a data logger developed in-house. Effect of Temperature and Pressure on count rate has also been measured. Variation of the count rate has also been measured with varying flow rate. The details test results will be presented. The results of long term stability test will also be presented.

Summary

Characterizations of GEM detector prototype

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[1] F. Sauli, Nucl. Instrum. Meth. A 386 (1997) 531.

[2] Technical Design Report for the Upgrade of the ALICE Time Projection Chamber, ALICE-TDR-016, CERN-LHCC- 2013-020, March 3 2014.

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