

Building of a 4-GEM prototype for ALICE-TPC upgrade

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. ALICE will upgrade its multi wire proportional chamber (MWPC) based time projection chamber (TPC) by GEM units. IOP is one of the major institutes to carry on the R&D program for ALICE TPC GEM.

At IOP we have already built the first 4-GEM prototype of India for ALICE. The raw materials are obtained from CERN. The GEM foils are all made by single-mask technology, developed by CERN. Some of the GEM foils are stretched at IOP and rests are stretched at CERN. The drift gap, 3 transfer gaps and the induction gap are made 3, 2, 2, 2, 2 mm respectively using ring shaped spacers. The voltage divider for the chamber is made at IOP. The 4-GEM prototype is tested initially with Ar/CO₂ gas in 70/30 ratio with cosmic muons. The chamber will be used for long-term test of quad GEM with high radiation. The result is urgently needed for ALICE experiment at its upgraded version.

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