

Contribution ID: 378

Type: Poster

Test of ATLAS Micromegas detectors with ternary gas mixture at the CERN GIF++ facility.

The ATLAS collaboration at LHC has chosen the resistive Micromegas technology, along with the small-strip Thin Gap Chambers (sTGC), for the high luminosity upgrade of the first muon station in the high-rapidity region, the New Small Wheel (NSW) project. Micromegas quadruplets have been constructed at the involved construction sites in France, Germany, Italy, Russia and Greece. At CERN, the final validation and the integration of the modules in Sectors and their commissioning are in progress. The achievement of the requirements for these detectors revealed to be even more challenging than expected. One of the main features being studied is the HV stability of the detectors. Several approaches have been tested in order to enhance the stability, among them the use of different gas mixtures are being studied. A ternary argon-CO2-isobutane mixture has shown to be effective in dumping discharges and dark currents. The presence of isobutane in the mixture required a set of ageing studies, ongoing at the GIF++ radiation facility at CERN, where the expected HL LHC background rate is reached by a 137Cs 14 TBq source of 667 keV photons. Preliminary ageing results and effectiveness of the ternary mixture will be shown.

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Collaboration / Activity

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Presenter: VOGEL, Fabian (Ludwig Maximilians Universitat (DE)) **Session Classification:** T12: Detector R&D and Data Handling

Track Classification: Detector R&D and Data Handling