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Studies of RPC operations with ecological gas mixture under irradiation at GIF++

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Resistive Plate Chambers working at the LHC experiments are operated with large fractions of Tetrafluoroethane ($C_2H_2F_4$) commonly known as R-134a that has a high Global Warming Power (GWP) and has been recently banned by the European community. Many studies are ongoing to find a good replacement for such component for RPCs working in avalanche mode at the LHC. One interesting alternative is the Tetrafluoropropane ($C_3H_2F_4$) called HFO1234ze that has a GWP of 6 and that has been shown to have reasonable performance with respect to the R134a. Past tests have been performed with cosmic rays and no data are available at present showing the long term impact of high background to the RPCs operated with this new component.

A joint collaboration between ALICE, ATLAS, CMS and CERN groups has been set-up at the GIF++ facility in order to study the performance under irradiation of RPCs operated with a HFO1234ze based gas mixture. Preliminary results of the detector operation stability and of the gas contamination due to the irradiation will be presented along with the future plans.

Primary authors: PICCOLO, Davide (INFN e Laboratori Nazionali di Frascati (IT)); PUGLIESE, Gabriella (Universita e INFN, Bari (IT)); ZAGANIDIS, Nikolaos (Ghent University (BE)); TYTGAT, Michael (Ghent University (BE)); RIGOLETTI, Gianluca (Universite Claude Bernard Lyon I (FR))

Presenter: RIGOLETTI, Gianluca (Universite Claude Bernard Lyon I (FR))

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