

10th Beam Telescopes and Test Beams Workshop



Contribution ID: 65

Type: **Talk**

Eco-friendly gas mixtures for future RPC detectors

Friday 24 June 2022 10:00 (20 minutes)

Resistive Plate Chambers are operated in several experiments typically with large fractions of Tetrafluoroethane ($C_2H_2F_4$) commonly known as R134a, a gas with a high Global Warming Potential (GWP) that has been recently banned by the European Union.

Within the HEP Community, many studies are ongoing to find a good replacement for such component for RPCs working in avalanche mode. One interesting alternative is the Tetrafluoropropene ($C_3H_2F_4$) called HFO1234ze with a GWP of 6 that has been shown to have reasonable performance with respect to the R134a. Since a few years a joint collaboration between ALICE, ATLAS, CMS, LHCb/SHiP and CERN groups is in place with the goal to study the performance of RPCs operated with eco-friendly gas mixtures under irradiation at GIF++.

The performance of several chambers with different layout and electronics has been studied during dedicated beam tests, with and without gamma irradiation at GIF++. The RPCs have been operated with different gas mixtures based on CO_2 and HFO1234ze gases.

Results of these tests together with the future plans for aging studies of the chambers will be presented.

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Session Classification: Experiments