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## Characterization of a RPC prototype with 1mm of gas gap thicknesses

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In the framework of the well-known improved rate capability and time resolution of Resistive Plate Chamber type detectors with thinner gap sizes, it has been carrying out the performance characterization of a new RPC prototype with 1mm gas gap thickness. The RPC prototype, with a single gap configuration, was tested in the GIF++ facility at CERN under a muon beam with a momentum range from 10 GeV/c up to the maximum SPS momentum of 450 GeV/c and high gamma radiation conditions produced by a Cs-137 source up to 12 TBq. Given the global warming potential of the standard gas mixture based on freon, it was also studied the detector response using gas mixtures based on HFO and CO<sub>2</sub>, with the aim to find a new eco-friendly gas mixture. During the test were obtained the maximum muon efficiencies for the standard\*, ECO2\*\*, and ECO3\*\*\* gas mixtures respectively. As well, were studied the muon and gamma cluster features and current density for each gas under study. Finally, it was measured the time resolution using the ToF method.

\* R134a-95.2%, iC4H10-4.5%, SF6-0.3%

\*\*HFO-35%, CO<sub>2</sub>-60%, iC4H10-4%, SF6-1%

\*\*\*HFO-25%, CO<sub>2</sub>-69%, iC4H10-5%, SF6-1%

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