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Eco-friendly Resistive Plate Chambers for HL-LHC and beyond

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Resistive Plate Chambers are widely used in present High Energy Physics experiments, and are foreseen to constitute an important part of the muon systems which will equip the experiments at the future colliders, like CEPC or FCC. However, they are operated filled with gases which, because of their large Global Warming Potential, are progressively being phased out, also according to regulations by the European Community. This has led to an important R&D program to find suitable replacements, which is being currently carried out in the framework of the RPC EcoGas@GIF++Collaboration, a joint effort across the ALICE, ATLAS, CMS, LHCb/SHiP and CERN EP-DT RPC communities. Here the latest results and prospective given by a series of tests performed with various detector layouts and electronics, operated with eco-friendly gas mixtures, and irradiated by an intense gamma background which simulates the conditions at HL-LHC and beyond, are presented and discussed in details.

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