

## **Development of new gas recirculation and recuperation systems for Resistive Plate Chamber operation with new environmental friendly gases**

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Resistive Plate Chamber (RPC) detectors are widely used thanks to their excellent time resolution and low production cost. The large RPC systems at the CERN-LHC experiments are operated in avalanche mode thanks to a Freon-based gas mixture containing C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> (R134a), SF<sub>6</sub> and iC<sub>4</sub>H<sub>10</sub>. The first two gas will be phased out from production in the near future due to their high global warming potential (GWP). Even if R134a and SF<sub>6</sub> will always be available for research purposes, their cost could increase as the interest of industry and market will decrease.

To reduce greenhouse gas (GHG) emission, several gas mixtures based on new environmental friendly gases have been tested in the past few years. R&D studies on this topic are still ongoing. Some additional results will be presented.

A parallel strategy for a reduction of GHG emission is focused on the development of new gas recirculation and recuperation systems. The present contribution describes preliminary results of a test performed in laboratory on RPC operated with new environmental friendly gas mixture and a new gas recirculation system.

The layout of a prototype recuperation system for R134a and other GHG gases will be also discussed.

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