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Development of Novel Designs of Resistive Plate Chambers

Wednesday, May 26, 2021 5:30 AM (18 minutes)

A novel design of Resistive Plate Chambers (RPCs), using only a single resistive plate, was developed and tested. Based on this design, prototype chambers of size ranging from 10 cm x 10 cm to 32 cm x 48 cm were constructed and tested with cosmic rays and particle beams. The tests confirmed the viability of this new approach for calorimetric applications where the particle rates do not exceed 1 kHz/cm2, such as CALICE digital calorimeters. The chambers also have improved single-particle response, such as a pad multiplicity close to unity.

In addition to this development, we probed a new technique to mitigate limitations associated with common RPC gases compatible with the environment. The technique is based on electron multiplication in a thin layer of high secondary electron yield material coating on the anode plane.

Here we report on the construction of various different glass RPC designs, and their performance measurements in laboratory tests and with particle beams.

TIPP2020 abstract resubmission?

No, this is an entirely new submission.

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