

Abstract Submitted
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Rate Capability in Bakelite Based Resistive Plate Chambers MAX

CANDOCIA, University of Illinois at Urbana-Champaign — Bakelite-based resistive plate chambers (RPCs) are particle detectors commonly used in muon trigger systems for high-energy physics experiments. Bakelite RPCs combine fast response, sufficient position resolution and low cost, and they can be operated at instantaneous background rates up to about 1.5 kHz/cm². Current and future collider experiments will demand operation of trigger RPCs under background rates higher than what is currently achieved. The rate capability is related to the bulk and surface conductivities of the Bakelite material used for the plates bordering the active gas volume in the RPCs. The inner surface of present Bakelite RPCs used at the LHC and RHIC is coated with linseed oil, lowering the surface resistivity of the raw Bakelite. Methods of increasing the surface conductivity of Bakelite sheets via dispersion of carbon blacks in linseed oil are being developed. Performance tests of prototype RPCs are carried out in a test stand that utilizes cosmic ray muons and radioactive ⁵⁵Fe sources. In this presentation different dispersion methods and the rate capability of the resulting prototype RPCs will be compared.

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