

Workshop on Advanced Radiation Detector and Instrumentation in Nuclear and Particle Physics (Online)



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Bakelite RPC with and without linseed oil coating

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Resistive Plate Chamber (RPC) detectors are currently used in High Energy Physics (HEP) experiments for triggering and tracking purposes for their low-cost of fabrication, high efficiency (> 90%) and good time resolution ($\sim 1\text{-}2$ ns). RPC is also a potential candidate for high-resolution medical imaging.

Keeping in mind, the requirements of detectors having high-rate handling capability, cost-effectiveness, and large area coverage, to be used in future HEP experiments, commercially available bakelite plates with moderate bulk resistivity are used to build RPC prototypes.

Initially, RPC prototype is fabricated without any oil coating and its characteristics study is done with cosmic ray using 100 % Tetrafluoroethane ($\text{C}_2\text{H}_2\text{F}_4$) gas. In this prototype, only an efficiency $\sim 70\%$ is achieved. To improve the performance as a remedial measurement, electrode plates are coated with linseed oil using a new technique. In conventional bakelite RPC, the linseed oil coating is done after making the gas gap. In this particular work, the linseed oil coating is done before making the gas gap. After the linseed oil coating, the plates are cured for several days. The advantage of this procedure is that after linseed oil coating it can be checked visually whether the curing is properly done, or any uncured droplet of linseed oil is present. Standard NIM electronics are used for this study. The detailed method of fabrication, measurement and the test results will be presented.

What is your experiment?

R&D

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