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Development of glass based RPC and performance study with cosmic ray muons

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The Resistive Plate Chamber (RPC) is an ionization (created due to the passage of charged particles) based gaseous detector made up of two highly resistive electrode plates like glass. The high bulk resistivity of glass helps in limiting the discharge to a limited area in the vicinity of primary avalanche site. RPCs are developed in 1981 by R Santonico and R Cardarelli. RPC detector has diverse applications in various fields requiring imaging, scanning and including particles detection due to excellent time and spatial resolutions, simplicity in fabrication & operation etc. In STAR experiment at RHIC and ALICE at LHC, RPCs are a part of time of flight (TOF) system. In Belle experiment, RPCs are used for muon identification and in CMS, ATLAS at LHC are used for triggering purpose. RPCs are also proposed to use in some future experiments like INO etc. In an RPC like detector, quality of electrode material plays a leading role in achieving consistent & good detector performance. In present studies, bulk resistivity measurements, elemental analysis studies are done for the selected electrodes (used for the RPC fabrication). The RPCs of dimensions 1 m X 1 m are developed using locally available Asahi glass plates as electrodes. Performance study of the fabricated RPCs i.e. leakage current measurements, efficiency and noise rate measurements is done with cosmic ray muons using standard gaseous mixtures.

Recent publications
1. Manisha et al. (2016) Nuclear Instruments and Methods in Physics Research 840:128-132.

Biography

Manisha is a graduate student at Department of Physics, Panjab University Chandigarh since July, 2014. She received her MSc (Hons. School) in Physics from Panjab University. Her thrust area of research is Experimental High Energy Physics (EHEP). She actively participated in implementation of glass based Resistive Plate Chambers (RPCs), which are used in various EHEP experiments for diverse applications. She is currently focusing on soft QCD studies via underlying event measurements using CMS detector. She will participate in development of Gas Electron Multiplier (GEM) detectors also, planned to install in the first endcap muon station during CMS Phase 2 upgrade.

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