

## Development of Glass Resistive Plate Chambers for INO

Satyanarayana Bheesette  
Tata Institute of Fundamental Research, INDIA  
For INO Collaboration

Resistive Plate Chamber (RPC) is a type of spark chamber with resistive electrodes. It has very good timing (<1 nsec) and spatial resolution and is well suited for particle tracking with directional information. India-based Neutrino Observatory Collaboration (INO) has proposed a 50 kton magnetized iron calorimeter (ICAL) with glass RPCs as active detector element. An aggressive R & D program to develop and characterize large area glass RPCs operating in avalanche mode was undertaken.

As a part of this RPC R & D, a prototype of 35 ton detector has been set up over ground to track cosmic ray muons. The structure of the prototype detector is built in the form of a multilayered sandwich of 50mm thick magnetized low carbon iron plates and glass RPCs of 1 sq. m. size. Experience with this prototype will be very useful in planning for the much bigger ICAL detector.

The signal readout chain essentially consists of a front-end preamp, low level threshold discriminator and digital front-end. The data acquisition is done using a CAMAC backend, employing many custom built modules. The trigger system based on distributed combinatorial circuits produces master trigger upon matching of programmable pulse patterns in the RPC pickup strips. Information on strip hits as well as their timing with reference to master trigger is recorded and used offline to reconstruct the muon tracks. Monitoring of strip noise rates is done as a cyclic background job. Record of ambient and important operating parameters of the RPCs is available on-line.

Design and current status of this prototype RPC setup and its performance will be presented.