

RPC2007

Abstract ID : 66

INO prototype detector and data acquisition system

India-based Neutrino Observatory (INO) collaboration is proposing to build a 50 kton magnetised iron calorimetric (ICAL) detector in an underground laboratory. Some of the primary goals of this experiment are to determine oscillation parameters of the atmospheric neutrinos, to study matter effects and to use it as a long baseline detector in future. Glass Resistive Plate Chambers (RPCs) of about 2m \times 2m in size will be used as active elements for the ICAL detector.

As a first step, a prototype 35 ton ICAL detector will be set up over ground to track cosmic muons. Experience with the prototype will be very useful in planning for the much bigger ICAL detector. This prototype will provide an active volume of about 1 m³. The structure of the prototype detector is built in the form of a multilayered sandwich of 50mm thick low carbon iron plates and glass RPCs of 1m \times 1m in area. The coils were made from electrolytic copper conductor tubing. RPC gas gaps are fabricated using 3mm thick Asahi Float glass sheets and operated in the avalanche mode. Plastic honeycomb based panels are used for signal pickup as well as for providing rigidity for the assembled chamber.

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. 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 on web.

Design and current status of the magnet, RPCs, electronics and data acquisition system of the prototype detector will be presented.

Primary authors : BEHERE, Anita (Bhabha Atomic Research Centre, Mumbai, INDIA) ; CHANDRATRE, V B (Bhabha Atomic Research Centre, Mumbai, INDIA) ; DATAR, V M (Bhabha Atomic Research Centre, Mumbai, INDIA) ; BHATIA, M S (Bhabha Atomic Research Centre, Mumbai, INDIA) ; JENA, Satyajit (Indian Institute of Technology Bombay, Mumbai, INDIA) ; VIYOGI, Y P (Institute of Physics, Bhubaneswar, INDIA) ; BHATTACHARYA, Sudeb (Saha Institute of Nuclear Physics, Kolkata, INDIA) ; SAHA, Satyajit (Saha Institute of Nuclear Physics, Kolkata, INDIA) ; BHIDE, Sarika (Tata Institute of Fundamental Research, Mumbai, INDIA) ; KALMANI, S D (Tata Institute of Fundamental Research, Mumbai, INDIA) ; MONDAL, N K (Tata Institute of Fundamental Research, Mumbai, INDIA) ; NAGESH, B K (Tata Institute of

Fundamental Research, Mumbai, INDIA) ; PANYAM, Nagaraj (Tata Institute of Fundamental Research, Mumbai, INDIA) ; RAO, Shobha K (Tata Institute of Fundamental Research, Mumbai, INDIA) ; REDDY, L V (Tata Institute of Fundamental Research, Mumbai, INDIA) ; SARAF, Mandar (Tata Institute of Fundamental Research, Mumbai, INDIA) ; SATYANARAYA, B (Tata Institute of Fundamental Research, Mumbai, INDIA) ; SHINDE, R R (Tata Institute of Fundamental Research, Mumbai, INDIA) ; UPADHYA, S S (Tata Institute of Fundamental Research, Mumbai, INDIA) ; VERMA, Piyush (Tata Institute of Fundamental Research, Mumbai, INDIA) ; BISWAS, Saikat (Variable Energy Cyclotron Centre, Kolkata, INDIA) ; CHATTOPADHYAY, Subhasish (Variable Energy Cyclotron Centre, Kolkata, INDIA) ; SARMA, P R (Variable Energy Cyclotron Centre, Kolkata, INDIA)

Co-authors :

Presenter : SATYANARAYA, B (Tata Institute of Fundamental Research, Mumbai, INDIA)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. PANYAM, Nagaraj

Submitted on Wednesday 06 February 2008

Last modified on : Wednesday 06 February 2008

Comments :

Status : ACCEPTED

Track judgments :