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Experimental study of properties of an Assembled single Straw Tube and other simulation studies with GARFIELD++

Monday 12 December 2022 14:00 (1 hour)

Straw tubes are drift chambers made of a gas filled conducting cylinder acting as cathode, and a wire stretched along the axis of the cylinder acting as an anode. The Straw Tube Trackers (STTs) are a low mass tracking system with excellent vertex, momentum, angular and time resolution, and particle identification. Straw Tube based tracking detector is proposed for one of the Near Detectors in the long baseline neutrino experiment, Deep Underground Neutrino Experiment (DUNE) at Fermilab. Our group at Panjab University has assembled a single straw tube and designed a prototype (1.8 m x 50 cm) for the SAND STT modules. Also, gas chambers have been fabricated. Gas leak tests and other properties of the assembled straw tube are studied and reported. Simulation studies using GARFIELD++, a C++ based simulation of tracking detectors, is done for the dimensions and properties of the assembled single straw tube using different gas mixtures. The dependences of the gas gain on high voltage are presented. The dependences of spatial resolution and efficiency on the high voltage and thresholds are also reported using the simulation.

Session

Future Experiments and Detector Development

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