**Introduction**

Straw tube detector is a gaseous drift detector in which each thin proportional tube (straw) acts as a single channel drift tube. This detector is proposed to be used as a part of one of the configurations of SAND (System for on-Axis Neutrino Detection) in the long baseline neutrino experiment, DUNE, at Fermilab.

**Future Plans**

- Study V-I characteristics of Single straw with pre-mix gas
- X-ray images for single spacer effects on the wire
- Design a prototype of 1.8m X 50 cm (~50 straws)
- To explore various tooling ways for assembly of single straw tube
- Study with different readout chips
- Test the prototype in Cosmic Ray stand

**Acknowledgements**

- We acknowledge the enduring support and funding provided by Department of Science and Technology, Government of India.
- We are thankful to Riya Gaba (post graduate student) for making a 3D modelled prototype diagram for future studies.

**References**

- ATLAS Technical Design Report
  [https://atlas.cern/glossary/tdr](https://atlas.cern/glossary/tdr)
- NA62 Technical Design Report
  [https://cds.cern.ch/record/1404985](https://cds.cern.ch/record/1404985)
- LBNE/DUNE Conceptual Design Report, Volume 4
  [. LBNE-ND: STT RD AT PU, Vipin Bhatnagar in Neutrino Workshop and Meeting on HEP Instrumentation Center.](https://lbne.org/)

**Test Chamber**

- Prototype we are testing is from JINR, Dubna
- Kapton Straw tubes with 9.3 mm diameter
- 48 Straws in a Single layer
- Signal recorded from all 48 straws
- Na-22 used as source
- Gas mixture: Ar/CO2 (80:20) supplied at 0.3 bar pressure

**ST Assembly and Prototyping**

- **Cathode**: Mylar tubes  
  Length: 121 cm  
  Diameter: 9.5mm
- **Anode**: Gold plated tungsten wire  
  Thickness: 20 μm  
  Density: 19.22 g/cc

**Dual Voltage supply was connected to the pre-amplifier. Input of pre-amplifier is connected to the channels (to be read out) through connectors and output is connected to the CRO. High Voltage supply (1.75 – 2.00 kV) is given to the anode. Whole apparatus was grounded and signal was taken from anode with respect to ground.**

**Stable V-I Characteristics**

- Black curve represents the experimental values and the red curve is exponentially fitted curve

**Cosmic Ray stand for testing**

**Straw tube after assembly**

- Inserted anode wire in the spacer
- Passed through the tube such that the spacer lies in the middle of the straw tube.
- End-caps were inserted at both ends. Anode wire was passed through the crimping pin.
- Pin was placed inside end-cap (at one end) and crimped. The end-cap was carefully sealed with the help of glue leaving space for the passage of gas.
- Tension of 46 gm was given at the other end and the pin was cramped
- Perspex chamber was also prepared

**End cap at ATLAS TRT**

**End cap with STT**

**Sign on CRO**

**Signal on CRO**

**Verification of Proportional behaviour of Straws**

- Black curve represents the experimental values and the red curve is exponentially fitted curve

**Cosmic ray stand for testing**

**Straw tube**

** Spacer**

**Crimping pin**

**End cap**

**Straw tube after assembly**

**Prototype with complete setup**