Contribution ID: **505** Type: **Poster**

Development of FPGA based 128-Channel TDC for Time Projection Chambers

Thursday, May 27, 2021 5:12 AM (18 minutes)

Time Projection Chamber (TPC) is a gaseous detector used for tracking charged particles. These detectors comprise of sensitive gas volumes applied with high electric field between the endplates. When a charged particle traverses the TPC volume, it ionizes the gas atoms along its trajectory. The free electrons produced move towards anode with a speed depending on the gas mixture and the applied field. Arrival times and hit channel information are used to track the particle. In order to measure accurately, the arrival times of these slow-moving electrons at the anode, an FPGA-based Start-Stop type TDC is designed. The TDC Starts on Trigger and Stops on the arrival of electrons at each anode channel. Dynamic range of 160us and least count of 2.5 ns are obtained, which cover the entire particle trajectory. Also, another useful feature of this TDC is its multi-hit capability up to 4 hits. Design features and preliminary test results of the TDC will be presented.

TIPP2020 abstract resubmission?

Funding information

Primary author: Mr JOHN, Jim (Tata Institute of Fundamental Research, INDIA & Homi Bhabha National Institute, INDIA)

Co-authors: ELANGOVAN, Yuvaraj (Tata Institute of Fundamental Research); Mr UPADHYA, S.S (Tata Institute of Fundamental Research, INDIA); SARAF, Mandar (Tata Institute of Fundamental Research); BHEESETTE, Satyanarayana; MAJUMDER, Gobinda (Tata Inst. of Fundamental Research (IN)); Ms ., Chithra (Indian Institute of Technology Madras)

Presenter: Mr JOHN, Jim (Tata Institute of Fundamental Research, INDIA & Homi Bhabha National Institute, INDIA)

Session Classification: Posters: Trigger and DAQ

Track Classification: Readout and Data Processing: Readout: Trigger and DAQ