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High Speed Readout of the Cathode Signal for the NIFFTE TPC

BRANDON COOMBES, Abilene Christian University — The goal of the Neutron Induced Fission Fragment Tracking Experiment (NIFFTE) is to use a Time Projection Chamber (TPC) to improve the precision of the measurements of the major actinides cross sections. To make these high precision cross section measurements, the start time of each fission event needs to be determined from the TPC cathode with less than 1ns resolution. High speed readout of the cathode signal allows the longitudinal postion of the fission fragment track to be more accurately reconstructed. The current readout TDCs give about 20ns timing resolution. To improve the timing resolution, a new scheme was developed where the cathode signal is split and allowed to propagate through delay lines of different lengths. Then all of the signals are analyzed to better determine the start time. This poster will concentrate on the design and testing done to improve the timing resolution and how this will improve the quality of track reconstruction of these fission events.

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