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Track Reconstruction in a Time Projection Chamber Designed to Make High Precision Fission Cross Section Measurements SARVAGYA SHARMA, Abilene Christian Unversity, NIFFTE COLLABORATION — The TPC (Time Projection Chamber), being constructed by the NIFFTE (Neutron Induced Fission Fragment Tracking Experiment) collaboration will be used for high-precision fission cross-section measurements. These measurements will aid in the design of future generations of nuclear power plants. The NIFFTE track reconstruction effort has developed two approaches consisting of a variety of statistical estimators. The first, consists of traditional cluster and hit finding algorithms that are performed on 2D planes. A least squares is performed on the hits to produce a track in the TPC. The alternate approach uses the Hough Transform, a brute force attempt at finding tracks that isolates features in the TPC volume through data binning. To determine fit parameters, a Kalman Filter has been implemented that accounts for multiple scattering and kinks in the track. Comparing simulated and reconstructed tracks have shown the validity of these methods. The software uses open source packages to ensure re-usability for future TPC projects. In my talk, I will describe these methods in detail.

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