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Precision Nuclear Data Measurements with the NIFFTE fissionTPC

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Nuclear data play a vital role in nuclear energy and defense applications. The community heavily relies on simulations and modelling, and therefore on available data and their uncertainties. The Neutron Induced Fission Fragment Tracking Experiment (NIFFTE) collaboration employs a fission Time Projection Chamber (fissionTPC) to measure fundamental nuclear data with unprecedented precision. The novel instrument enables precise tracking of charged particles and their energy deposition providing a direct measurement of systematic uncertainties in fundamental data such as fission cross sections, fragment angular distributions or branching ratios. The NIFFTE collaboration aims to understand and minimize uncertainties in those measurements, currently focusing on particle identification and target and beam uniformities. Preliminary experimental results illustrate the physics capabilities of the fissionTPC. The talk will include neutron-induced fission data taken recently with a 239Pu/235U target at Los Alamos Neutron Science Center (providing neutrons from 200 keV to hundreds of MeV), and spontaneous fission data taken with 244Cm and 252Cf at Lawrence Livermore National Laboratory.

Summary

The Neutron Induced Fission Fragment Tracking Experiment (NIFFTE) collaboration employs a fission Time Projection Chamber (fissionTPC) to measure fundamental nuclear data with unprecedented precision.

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