Abstract Submitted
for the DNP17 Meeting of
The American Physical Society

Modeling the Fission Fragment Detection Efficiency of the NIFFTE fissionTPC[1] NATHANIEL BOWDEN, Lawrence Livermore National Laboratory, NIFFTE COLLABORATION — The goal of the Neutron Induced Fission Fragment Tracking Experiment (NIFFTE) is to measure neutron-induced fission cross section ratios with unprecedented precision. The NIFFTE Collaboration has designed and built a Time Projection Chamber, the fissionTPC, for this purpose. The detector enables charged particle tracking with full three-dimensional charge cloud reconstruction, allowing for the characterization of fission fragments originating from a thin central target. Quantifying the fission fragment detection efficiency is a central element of these cross section ratio measurements. Here we describe how the wealth of data captured for every fission event allows us to build and validate a detailed Monte Carlo efficiency model. Effects such as anisotropy, fission fragment energy degradation, and target thickness, composition, and roughness must all be taken into account.

[1]LLNL-ABS-733618. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344

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Date submitted: 30 Jun 2017 Electronic form version 1.4