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Experimental Analysis of nT Kinematic Edge Data on OMEGA[1]

OWEN MANNION, DUC CAO, CHAD FORREST, VLADIMIR GLEBOV, VALERI GONCHAROV, VARCHAS GOPALASWAMY, JAMES KNAUER, ZAARAH MOHAMED, SEAN REGAN, THOMAS SANGSTER, CHRISTIAN STOECKL, Laboratory for Laser Energetics, University of Rochester, AIDAN CRILLY, BRIAN APPELBE, JEREMY CHITTENDEN, Center for Inertial Fusion Studies, Imperial College — Recent work [A. J. Crilly *et al.*, Phys. Plasmas **25**, 122703 (2018)] has identified the shape of the nT kinematic edge present in the scattered neutron energy spectrum of DT cryogenic experiments as a useful diagnostic feature. The neutrons that populate the nT kinematic edge spectral feature have originated from scattering events with tritons of various velocities and temperatures, and therefore contain information on the triton velocity distributions. The mean energy of the nT edge is related to the mean of the scatter-weighted triton velocity distribution, while the slope of the edge is related to the variance of the scatter-weighted triton velocity distribution. An experimental analysis of the nT kinematic edge measured in cryogenic implosions on OMEGA will be presented and the mean and variance of the scatter-weighted triton velocity distribution inferred. A comparison to 1-D and 2-D radiation-hydrodynamic simulation results will be presented and provide insights into the interpretation of these values.

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