Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Evaluating the Residual Kinetic Energy in Direct-Drive Cryogenic Implosions on OMEGA CHAD FORREST, VLADIMIR GLEBOV, VALERI GONCHAROV, JAMES KNAUER, OWEN MANNION, ZAARAH MOHAMED, RADHA BAHUKUTUMBI, SEAN REGAN, RAHUL SHAH, CHRISTIAN STOECKL, University of Rochester — Efficient conversion of the shell kinetic energy to the hot-spot thermal energy is an essential requirement in inertial confinement fusion implosions. The hydrodynamic profile of the fusing deuterium–tritium (DT) plasma will result in a measureable difference in the DT and DD average temperatures. Additionally, a deviation from the DT and DD plasma temperature inferred from the second moment has been suggested as one method used to infer the residual kinetic energy (RKE) in the fusion plasma. An advanced forward-fit technique is used to interpret the spectral moments of the neutron energy distribution emitted from a fusing plasma along two lines of sight. Presented here are measurements of the DT and DD temperature from DT cryogenic drive-drive implosions. The contribution of RKE in these implosions is extracted with the consideration of the role of temperature gradient present in a 1-D model. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

Chad Forrest
Lab for Laser Energetics

Date submitted: 29 Jun 2020 Electronic form version 1.4