Abstract Submitted
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Fuel areal density distributions derived from nuclear scattering signatures[1] R. M. BIONTA, D. T. CASEY, C. J. CERJAN, C. B. YEAMANS, LLNL, M. G. GATU JOHNSON, MIT — The spatial variation of activities measured in the array of 20 Nuclear Activation Detectors mounted on the flanges around the NIF target chamber (FNADs) are correlated with asymmetries in the underlying fuel areal density of compressed ICF targets. The asymmetric areal density distributions cause variations in the neutron spectra with direction which are seen in the dsr (down scattered ratio) metric, the ratio of the number of 10-12 MeV neutrons to the number of 13-15 MeV neutrons. We show, using a simple physics based simulation of neutron scattering through an idealized non-uniform DT shell with a realistic neutron source, that for most shots an areal distribution can be found which reproduces both the FNAD activity and the dsr measurements. Furthermore, by linking the simulation to a Marquardt minimizer, we fit the areal distribution to a truncated set of spherical harmonics.

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