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Diagnosing mode 1 drive asymmetries in ICF implosions with scattered neutron spectra AIDAN CRILLY, BRIAN APPELBE, JEREMY CHITTENDEN, Imperial College London, OWEN MANNION, CHAD FORREST, ZAARAH MOHAMED, IGOR IGUMENSHCHEV, Laboratory of Laser Energetics — The effects of mode 1 drive asymmetries on the moments of the primary DT and DD fusion neutron spectra have been well studied both theoretically and experimentally. However, these measurements only probe the conditions of the fusing plasma within the hotspot. The drive asymmetries also create a corresponding asymmetry in the dense fuel conditions. Recent theoretical work [1] has shown that the velocity and temperature of the dense fuel can be extracted from the back scattered neutron spectra. Additionally, the areal density asymmetry will affect the shape of the down scattered neutron spectrum. In this talk, we will discuss the development of an analysis of the scattered neutron spectrum over an extended energy range. This novel analysis will be used to simultaneously extract both the direction and amplitude of the areal density asymmetry and the hydrodynamic conditions of the dense fuel. This will aid in quantifying the reduced confinement time and residual kinetic energy of the implosion at stagnation. References [1] A. J. Crilly, et al., Physics of Plasmas 27, 012701 (2020)

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