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A Feasibility Study of Using X-ray Thomson Scattering to Diagnose the Stagnated Plasma Conditions of Laser-Direct-Drive, DT Cryogenic Implosions[1] HANNAH POOLE, GIANLUCA GREGORI, Department of Physics, University of Oxford, DUC CAO, RYAN RYGG, SUXING HU, Laboratory for Laser Energetics, University of Rochester, IGOR GOLOVKIN, TIM WALTON, Prism Computational Sciences, REUBEN EPSTEIN, Laboratory for Laser Energetics, University of Rochester, MUHAMMAD KASIM, SAM VINKO, Department of Physics, University of Oxford, SEAN REGAN, Laboratory for Laser Energetics, University of Rochester — The design of inertial confinement fusion (ICF) ignition targets requires radiation-hydrodynamics simulations with accurate models of the fundamental material properties (i.e., equation of state, opacity, and conductivity). A feasibility study of using spatially-integrated, spectrally-resolved, X-ray Thomson scattering (XRTS) measurements to diagnose the temperature, density, and ionization of the compressed DT shell and hot spot of a laser-direct-drive implosion at stagnation was conducted. Synthetic scattering spectra were generated using 1-D implosion simulations from the LILAC code that were post processed with the X-ray Scattering (XRS) code. The optimal configuration for simultaneous collective and non-collective scattering measurements to diagnose the different regions of the stagnated plasma will be presented.

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