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Exploding Pusher Targets for Electron-Ion Coupling Measurements HEATHER D. WHITLEY, JESSE PINO, MARILYN SCHNEIDER, RONNIE SHEPHERD, LORIN BENEDICT, JOSEPH BAUER, FRANK GRAZIANI, Lawrence Livermore National Laboratory, WARREN GARBETT, Atomic Weapons Establishment — Over the past several years, we have conducted theoretical investigations of electron-ion coupling and electronic transport in plasmas. In the regime of weakly coupled plasmas, we have identified models that we believe describe the physics well, but experimental data is still needed to validate the models. We are currently designing spectroscopic experiments to study electron-ion equilibration and/or electron heat transport using exploding pusher (XP) targets for experiments at the National Ignition Facility. Two platforms are being investigated: an indirect drive XP (IDXP) with a plastic ablator and a polar-direct drive XP (PDXP) with a glass ablator. The fill gas for both designs is D_2. We propose to use a higher-Z dopant, such as Ar, as a spectroscopic tracer for time-resolved electron and ion temperature measurements. We perform 1D simulations using the ARES hydrodynamic code, in order to produce the time-resolved plasma conditions, which are then post-processed with CRETIN to assess the feasibility of a spectroscopic measurement. We examine target performance with respect to variations in gas fill pressure, ablator thickness, atom fraction of the Ar dopant, and drive energy, and assess the sensitivity of the predicted spectra to variations in the models for electron-ion equilibration and thermal conductivity. Prepared by LLNL under Contract DE-AC52-07NA27344. LLNL-ABS-675219

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