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Kinetic Effects on the IFE Ion Energy Spectra* GREGORY A. MOSES, JOHN F. SANTARIUS, Univ. of Wisconsin — During an ICF post-burn expansion, ion collisional mean free paths can become significantly larger than the shock thickness, limiting the maximum momentum and energy transfer from the shock to the background plasma. For one potential ICF target of the high average power laser (HAPL) fusion reactor conceptual design study [J.D. Sethian, et al., Nuclear Fusion 43, 1693 (2003)], the University of Wisconsin's 1-D radiation hydrodynamics code, BUCKY, predicts that, at 34.592 ns, the primary shock wave occurs in the zones at the plastic(CH) DT interface just outside of the pure DT zones, and another shock occurs at the interface where the plastic impacts the gold. The dense core inside r$\simeq$10 mm remains well described by hydrodynamics. The mean free path in the primary shock's frame for slowing down of CH ions on the shock DT ions and electrons approximately equals the shock thickness. The purely radiation hydrodynamic calculation also predicts that at this time the shock thickness where the CH ions impact the Au ions is nearly 1000 times smaller than the mean free path, implying that kinetic effects alter the dynamics at a much earlier time. Results of addressing this problem by implementing energy deposition for moderate-to-large mean free paths using zone-by-zone differential masses and velocities will be reported.
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