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**PIC Simulations of Laser-Irradiated Foam Filaments: Plasma Heating, Interpenetration, and Stagnation**[1] B. J. WINJUM, UCLA, S. LANGER, M. BELYAEV, S. WILKS, J. MILOVICH, O. JONES, LLNL — We have been studying the early interpenetration and stagnation processes of laser-irradiated additive-manufactured foam materials with particle-in-cell simulations. Here we present 1D and 2D simulations of solid-density, pre-ionized foam filaments (slabs in 1D and cylinders in 2D) with and without an incident laser. The foam filaments consist of single or multiple ion species at temperatures ranging from 10 eV to 1 keV and separated from each other by vacuum regions ranging from 0.1 to 10 microns in width. We discuss the impact of an incident laser on heated filaments as they expand and fill space, as well as the range of effects that occur as plasma particles stream between filaments, spanning the range from relatively collisionless interpenetration to very collisional interpenetration giving rise to small shocks where the counter-streaming plasmas meet. We comment on the heating that occurs during stagnation, as well as on our diagnosis of quantities that can be compared with rad-hydro calculations in an attempt to bring together PIC and hydro modeling of realistic foams.

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