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Measuring the Propagation of a Supersonic Radiation Front in Foam via Spatially Resolved Spectral Imaging of a Tracer Layer J.M. TACCETTI, P.A. KEITER, N. LANIER, K. MUSSACK, K. BELLE, B.G. DEVOLDER, G.R. MAGELSSEN, Los Alamos National Laboratory — We present results obtained at Omega with a diagnostic designed to characterize the propagation of a supersonic radiation front in low-density foam. Methods used to measure the propagation of a subsonic radiation wave, which rely on imaging the hydrodynamic evolution of objects placed in its path, cannot be used for supersonic waves. Instead, a tracer is embedded in the foam and its charge state diagnosed as it is heated by the radiation. We use a Ti foil, its face perpendicular to the direction of wave propagation. A broad-band x-ray source illuminates the face of the foil, and its absorption of these x-rays is measured using a Bragg spectrometer, with a high-speed detector recording spatial information along the wave propagation direction and spectral information in the orthogonal one. We thus obtain a spatially and temporally resolved measurement of the ionization state of the tracer, and making certain assumptions, of its temperature and that of the foam. We also describe a version of the diagnostic planned for experiments on NIF.

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