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Measurements of shock-front structure in multi-species plasmas on OMEGA[1] HANS G. RINDERKNECHT, H.-S. PARK, J. S. ROSS, S. C. WILKS, P. A. AMENDT, R. F. HEETER, Lawrence Livermore National Laboratory, J. KATZ, Laboratory for Laser Energetics, University of Rochester, N. M. HOFFMAN, E. VOLD, W. TAITANO, A. SIMAKOV, L. CHACON, Los Alamos National Laboratory — The structure of a shock front in a plasma with multiple ion species is measured for the first time in experiments on the OMEGA laser. Thomson scattering of a 263.25 nm probe beam is used to diagnose electron density, electron and ion temperature, ion species concentration, and flow velocity in strong shocks ($M \sim 5$) propagating through low-density ($\rho \sim 0.1$ mg/cc) plasmas composed of H(98%)+Ne(2%) and H(98%)+C(2%). Separation of the ion species within the shock front is inferred. Although shocks play an important role in ICF and astrophysical plasmas, the intrinsically kinetic nature of the shock front indicates the need for experiments to benchmark hydrodynamic models. Comparison with PIC, Vlasov-Fokker-Planck, and multi-component hydrodynamic simulations will be presented.

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