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Characterization of Laser-Produced Plasmas Relevant to Magnetized Collisionless Shocks D.B. SCHAEFFER, A.S. BONDARENKO, E.T. EVERSON, S.E. CLARK, C.G. CONSTANTIN, C. NIEMANN, University of California - Los Angeles — Recent experiments performed at the University of California, Los Angeles (UCLA) have generated magnetized collisionless shocks driven by a laser-mediated magnetic piston. The effectiveness of the piston at coupling energy between a laser-plasma and an ambient plasma depends highly on the nature of the laser-plasma, which has been hitherto poorly characterized. We present experiments that provide new details on the composition and evolution of laser-produced plasmas relevant to a magnetic piston. Thomson scattering was used to probe the electron temperature and density up to several cm from the target and several microseconds after ablation. Ionization states and blow-off velocities of the ablated plasma were further measured with emission spectroscopy and fast-gate filtered photography. The data compares well to analytic models describing the spatial and temporal temperature and density evolution of the plasma. 1D HELIOS simulations of the laser-target interaction also agree favorably with data that shows fast ions dominated by a single charge state primarily drive the magnetic piston.

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