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Temperature and Density Measurements in Low-Density, Laser-Driven Magnetized Plasmas Using Thomson Scattering D.B. SCHAEFFER, University of California, Los Angeles (UCLA), D.S. MONTGOMERY, Los Alamos National Laboratory (LANL), A.S. BONDARENKO, L.A. MORTON[1], UCLA, J.R. JOHNSON, T. SHIMADA, LANL, C.G. CONSTANTIN, E.T. EVERSON, C. NIEMANN, UCLA — We present electron temperature and density data from Thomson scattering measurements on recent collisionless shock experiments on the Trident laser at Los Alamos National Laboratory. A graphite or CH target was placed inside a static magnetic field (~ 1 kG) created by a 50 cm-diameter Helmholtz coil and was ablated by two sequential laser pulses at 1053 nm. The first pulse created an ambient low-density, magnetized plasma while the second pulse created a super-Alfvénic ($M_A \sim 10$) plasma to shock the ambient plasma. A seperate laser beam at 527 nm was used for Thomson scattering to characterize the ambient plasma $3-19$ cm radially from the target and $0.5-9.7$ μs after the first ablation. The electron temperature was found to be $10-50$ eV and, combined with Rayleigh scattering, the electron density was found to be $10^{13}-10^{15}$ cm^{-3}. Several carbon emission lines were also observed in the Thomson spectrum and were compared to FLYCHK simulations to characterize the ambient plasma charge state.

[1]Now at University of Wisconsin, Madison

Derek Schaeffer
University of California, Los Angeles

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