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Supra-thermal electron acceleration in collisionless shocks on OMEGA T. M. JOHNSON, J. A. PEARCY, A. BIRKEL, M. GATU JOHNSON, J. A. FRENJE, F. H. SEGUIN, R. D. PETRASSO, C. K. LI, MIT, V. T. TIKHONCHUK, CELIA, University of Bordeaux — Acceleration of high energy particles in collisionless shocks have studied through theory and simulation for years but experimental validation has been lacking. This shock acceleration in astrophysical environments has been a long-standing candidate for the origin of cosmic rays. Recent OMEGA experiments using supersonic plasma flows have created astrophysically relevant collisionless shocks and shown evidence of electron acceleration. A laser-driven supersonic plasma flow collides with a gas bag of H2 to create a magnetized collisionless shock. Proton radiography measurements show Weibel filamentation, which leads to the generation of upstream magnetic turbulence. Electron spectra show a power law high energy tail indicative of acceleration. Here, we explore a number of electron acceleration mechanisms present in collisionless shocks and their connection to the measured electron energy spectra. This work was supported in party by the U.S. DOE, NLUF, and LLE.

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