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Laser driven shock waves in a large magnetized plasma CHRISTOPH NIEMANN, UCLA, MAYO VILLAGRAN MUNIZ, UNAM, CARMEN CONSTANTIN, NATHAN KUGLAND, PAT PRIBYL, UCLA, CRAIG HOGLE, Carleton, ZOLTAN LUCKY, MATT WEISBART, WALTER GEKELMAN, UCLA — We will present the first experiments on the interaction of an energetic, rapidly expanding laser-produced plasma with an ambient magnetized plasma that supports Alfven waves. The experiments are performed with a high-power laser coupled to the Large Plasma Device (LAPD). Focused laser intensities in excess of 10^{14} W/cm² produce an ablating plasma-plume with expansion velocities of several 100 km/s. Prior to the laser pulse an ambient plasma with a size of 18 m lengths and 50 cm diameter at 4×10^{12} cm⁻³ and Te=5 eV is created in an axial magnetic field of 400 G. The interaction of the two plasmas will lead to the formation of shock waves with M_A and β above unity and a density sufficiently small to approach the collisionless regime. We will show measurements of the magnetohydrodynamic turbulence that the shock creates as well as its effect on the particle velocity distribution.

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