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Super-Alfvénic Magnetic Field Fluctuations Generated from Low-Density, Magnetized Laser-Plasma Expansions E.T. EVERSON, UCLA, A.S. BONDARENKO, L.A. MORTON, D. SCHAEFFER, R. LOPEZ, C.G. CONSTANTIN, D. MONTGOMERY, T. SHIMADA, R. JOHNSON, S. LETZRING, C. NIEMANN — In recent experiments at the Trident Laser Facility, at the Los Alamos National Laboratory (LANL), the three beam configuration and a pulsed Helmholtz coil were utilized to investigate laser-driven, magnetized shocked plasmas. The 56 cm, 4.2 kJ pulsed Helmholtz coil was used to create a $0.1 - 1.0$ kG magnetic field over an experimental volume of $\sim 4 \times 10^3$ cm^3. Two sequential laser pulses, spaced $1.0 - 10.0$ μs apart, were used to ablate a CH or graphite target that was imbedded in the field. The first laser pulse created an ambient magnetized plasma and the second laser pulse created a debris plasma to shock the ambient plasma. The third laser pulse was frequency-doubled and employed for Thomson scattering measurements to characterized the ambient plasma density ($10^{13} - 10^{15}$ cm^{-3}) and electron temperature ($10 - 50$ eV). An array of single-axis, 1 mm b-dot probes were used to measure magnetic field compression, expulsion, and fast-diffusion inside and around the diamagnetic cavity formed by the laser-plasma expansion. A magnetic field compression pulse in the shocked plasma was observed to separate and propagate away from the leading edge of the diamagnetic cavity at an Alfvénic Mach number on the order of 10 ($M_A \sim 10$).

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