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Initial Results from 3D Electric and Magnetic Field Measurements of the Interaction of a Laser-Produced and Ambient Plasma P.V. HEUER, D.B. SCHAEFFER, L.R. HOFER, C.G. CONSTANTIN, A.S. BONDARENKO, E.T. EVERSON, S.E. CLARK, W. GEKELMAN, C. NIEMANN, University of California, Los Angeles — Utilizing high-repetition lasers combined with a high-repetition ambient plasma allows for detailed 3D scans of the interaction of the laser-produced and ambient plasmas. We present the first results from experiments combining a newly-commissioned high-repetition (1 Hz) laser with the 1 Hz ambient plasma of the Large Plasma Device (LAPD) at the University of California, Los Angeles. The laser (20 J, 14 ns) was focused on a cylindrical plastic target embedded in the ambient LAPD plasma, resulting in an ablated debris-plasma that expanded perpendicular to the background magnetic field. The debris-ambient plasma interaction was studied with 3-axis magnetic flux probes, mounted on a 3D motion drive for detailed, high-resolution planar scans both along and perpendicular to the background field. Measurements were also taken using filtered fast-gate (ns) imaging, emissive Langmuir probes, and emissive spectroscopy. The results show that the debris ions are de-energized inside the diamagnetic cavity, while the ambient ions are accelerated through laminar electric fields.

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