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Colliding Laser-Produced Plasmas on LaPD[1] ANDREW COLLETTE, WALTER GEKELMAN, UCLA — The expansion and interaction of dense plasmas in the presence of a magnetized background plasma is important in many astrophysical processes, among them coronal mass ejections and the many examples of plasma jets from astrophotography. Turbulence is expected to be present in many such configurations. We describe a series of experiments which involve the collision of two dense (initially, $n > 10^{15}\text{cm}^{-3}$) laser-produced plasmas within an ambient, highly magnetized plasma. The laser-produced plasmas form diamagnetic cavities in which a large percentage of the background magnetic field (600G) has been expelled. First-stage observations using a fast (3ns exposure) camera indicate complicated structure at late times, in addition to coherent corrugated structures on the bubble surfaces. The data hint at the presence of turbulence in the interaction. The second stage of observation consists of direct investigation of the magnetic field using probes. A novel diagnostic system composed of small (300-500 micron) 3-axis differential magnetic field probes in conjunction with a ceramic motor system capable of extremely fine (sub-micron) positioning accuracy is currently under development. An ensemble of magnetic field data from fixed and movable probes makes possible the calculation of the cross-spectral function.

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Andrew Collette
UCLA

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