Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Current Systems Generated by Colliding Laser-Produced Plasmas[1] ANDREW COLLETTE, WALTER GEKELMAN, Department of Physics and Astronomy, UCLA — There are many situations, either in space (e.g. CMEs, supernovae), or man-made, in which a dense plasma expands into a magnetized background plasma capable of supporting Alfvén waves. The generation of shear Alfvén waves by an expanding laser-produced plasma (lpp) has been observed previously at the LArge Plasma Device at UCLA [1]. In a recent experiment at LAPD, the collision of two dense ($\delta n/n_0 >> 1$, where $n_0 \sim$ 1-4 x $10^{12}/cm^3$) lpps within an ambient, highly magnetized ($R_{ci} \sim 4mm << \Delta \sim 1m$, where Δ is the machine diameter) is studied. A 150MW laser is pulsed with the background plasma at 1Hz, in a reproducible experiment to obtain a large volumetric dataset. We have directly observed a system of complex, fully 3-dimensional time-dependent current systems associated with the shear Alfvén waves generated by the two lpps. The magnetic helicity associated with these current systems will be presented and compared to their topology, along with a process which strongly resembles magnetic reconnection at a point where the two current channels pull apart. Data will be presented as a 3-D movie.

[1] M. Van Zeeland *et al*, Phys. Rev. Lett., **87**(10):100501-1-100501-4, 2001.

[1]Work supported by NSF grant Phy-0408226.

Andrew Collette
UCLA

Date submitted: 19 Jul 2006 Electronic form version 1.4