Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Laser produced plasma clouds as a source and obstacle for multi-ion Alfven wave propagation[1] S. VINCENA, W. GEKELMAN, F. TSUNG, UCLA — We present results on the interaction of Alfven waves and energetic, laser-produced plasmas (LPP's). The experiment consists of a large, ambient, magnetized plasma, within which the carbon LPP is created. The LPP is generated using a turn-key Nd:YAG (1064nm, 1J, 10ns) laser. The background plasma is generated by the Large Plasma Device (LAPD) at UCLA. The background species is helium, $n = 10^{12}$ cm^{-3}, D=60cm, L=1660cm cylinder. The LPP acts as a source of energetic carbon ions: 10^{15} particles, v=10^7 cm/s $= 0.1 v_A$ whose expansion is directed primarily along the background magnetic field; the resulting cloud is of interest for two reasons: (1) the carbon cyclotron motions act as an electric dipole antenna, which radiates shear Alfven waves in the He plasma, which outrun the cloud expansion. (2) the relatively slow expansion of the LPP compared to the Alfven speed produces a spatially localized region of a two-ion species plasma which can act as a barrier for externally launched shear Alfven waves due to the ion-ion hybrid resonance layer in the cloud. Wave field measurements will be presented of both outgoing and incoming shear Alfven waves to the carbon cloud. Comparisons of the cyclotron emission are made to predictions by the OSIRIS PIC code.

[1]Work funded by the US DoE and NSF.

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Date submitted: 26 Jul 2010 Electronic form version 1.4