Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Scattering of magnetic mirror trapped electrons by an Alfven wave[1] YUHOU WANG, WALTER GEKELMAN, PATRICK PRIBYL, UCLA Dept of Physics, DENNIS PAPADOPOULOS, ALEX KARAVAEV, XI SHAO, SURJA SHARMA, University of Maryland — Energetic electrons produced naturally or artificially can be trapped in earth's magnetic field for months, threatening the growing population of space satellites. An experimental study of artificially de-trapping these particles is performed on Large Plasma Device (LaPD) at UCLA (the quiescent afterglow plasma in which the experiment was done had :$n \approx 5 \times 10^{11} cm^{-3}, B = 860G, T_e = 0.5eV, L = 18m, diameter = 60cm$), matching critical parameter ratios in the lab plasma to those in space. In this experiment, electrons with large $v_\perp$ are produced by microwave heating (2.45GHz, 5kW) at upper-hybrid frequency, and trapped by a magnetic mirror field (mirror ratio ≈1.5). A shear Alfven wave (f=220kHz,$B_{wave} = 2G$) is launched with a rotating magnetic field source. It is observed that the wave eliminates the trapped electrons. This effect is observed via different diagnostics. Plasma density and temperature perturbations from the Alfven wave are observed along with the scattering. The scattering mechanism is under investigation.

[1]Work supported by ONR MURI grant.

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Date submitted: 28 Jul 2010 Electronic form version 1.4