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Experiments on the scattering of fast electrons by Alfvén waves¹
ALEX GIGLIOTTI, WALTER GEKELMAN, PATRICK PRIBYL, YUHOU WANG, UCLA Dept of Physics, ALEXEY KARAVAEV, XI SHAO, DENNIS PADOPOULOS, University of Maryland — High energy ions and electrons with anisotropic distribution functions can be trapped in the earth's radiation belts for months, which pose a danger for satellites. A electron population with large v_{\perp} and was introduced in the afterglow of the background LAPD plasma ($n_e = 2.0e^{11}cm^{-3}$, $T_e = .25eV$). Microwaves at 2.45 GHz were launched into the plasma at an axial and radial location where $f_{micro} = f_{UH}$. A small (2 cm dia) electron hot spot was generated. Shear Alfvén waves ($f = 192$ kHz) launched by an orthogonal loop antenna, with magnitude $B_{wave} \sim 2G$ destroyed the hot spot within 10 cycles. The hot spot returns when the Alfvén wave is shut off. Space-time evolution of the plasma density, flow and electron are presented. The mechanism of the electron de-trapping is under investigation. Planned experiments involve the interaction of fast ion rings with shear Alfvén waves, and whistler waves with the anisotropic electrons.

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