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Pitch Angle Scattering of Electrons by Alfven Waves Generated with Rotating Magnetic Field Source A.V. KARAVAEV, X. SHAO, N. GUMEROV, A.S. SHARMA, K. PAPADOPOULOS, Dept. of Physics and Astronomy, Univ. of Maryland, W. GEKELMAN, P. PRIBYL, Y. WANG, B. VAN COMPERNOLLE, Dept. of Physics and Astronomy, UCLA — The pitch angle scattering by large amplitude whistler and Alfven waves is an attractive mechanism for the precipitation of electrons in the radiation belt. Recent experiments in LAPD/UCLA have shown rapid loss of energetic electrons in the presence of waves and this is studied in detail using simulations with experimental parameters. The Alfven waves generated by a Rotating Magnetic Field (RMF) antenna in LAPD have sharp gradients in the transverse direction. These rapidly varying magnetic fields leads to the breaking of the adiabatic invariant of electrons and precipitate them to the loss cone via non-resonant scattering. The generation of Alfven waves by the RMF antenna is simulated with a two fluid code and the resulting fields are used in a particle tracing code to study the pitch angle scattering of electrons. It is found that the pitch angle diffusion coefficient for the non-resonant scattering scales as the square of the ratio of the electron Larmor radius to the transverse wavelength. Further, the fluctuations generated by the two loop RMF source fills the plasma volume more effectively and is more effective in pitch angle scattering the electrons than using one loop antenna Work supported by ONR MURI grant.

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