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Whistler Scattering of Suprathermal Electrons in the Solar Wind: Particle-in-Cell Simulations S. PETER GARY, SHINJI SAITO, Los Alamos National Laboratory — Recent solar wind observations show that superathermal electrons (100 eV $\leq E_{\parallel} \leq$ 1 keV) of the magnetic-field-aligned "strahl" component can, under conditions of enhanced, high-frequency magnetic fluctuations, exhibit pitch-angle distributions which become broader with increasing electron kinetic energy. Magnetosonic-whistler fluctuations at $\mathbf{k} \times \mathbf{B}_o = 0$ (where $\mathbf{B}_o$ is the background magnetic field) have a strong cyclotron resonance with such electrons. This resonance enables strong pitch-angle scattering, typically leading to an increase in the perpendicular (to $\mathbf{B}_o$) energies of these electrons. Particle-in-cell simulations in a magnetized, homogeneous, collisionless plasma of electrons and protons are used to study the electron response to whistler fluctuations. The simulations confirm that scattering by these fluctuations indeed leads to broadening of strahl pitch-angle distributions. Further simulations will attempt to determine the conditions on magnetic fluctuation spectra and electron velocity distributions such that the properties of the observations mentioned above can be reproduced.

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