# Landau resonance between electrons and lower-hybrid waves in the inner magnetosphere

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Lower-hybrid waves are frequently observed near the geomagnetic equator in the inner magnetosphere (i.e., equatorial noise). They are in the frequency range between the proton gyrofrequency and the LH frequency, and were found to propagate approximately perpendicular to the background magnetic field with almost linear polarization. We have focused on the capability of the LH waves to scatter electrons, and showed that the diffusions could occur via both cyclotron and Landau resonances. To have the cyclotron resonance to occur, the electron energies should be higher than 1.56 MeV. On the contrary, the Landau resonance occurs even for relatively lower energies from 1.4 keV. Here, the linear resonance condition is assumed under the observed LH wave parameters such as the propagation angle of 85 degree and the frequency of 130 Hz in a plasma environment with the Alfven velocity of 1150 km/s.

In this presentation, we discuss the Landau resonance between electrons and LH waves, by performing test particle simulation. The LH waves are given as a superposition of sinusoidal waves with different frequencies propagating highly perpendicular to the background magnetic field. The given waves obey the cold plasma dispersion relation. We evaluate the pitch-angle diffusion coefficient of electrons with energies from a few eV to 1 MeV. We discuss changes in pitch-angle distributions related to the diffusion processes.

Keywords: pitch-angle diffusion, electron, lower-hybrid wave, inner magnetosphere

 