

Electron acceleration by lower-hybrid waves near the geomagnetic equator: One-dimensional test particle simulation study

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THEMIS satellite mission observed equatorial emissions with a multi-banded frequency structure in the Earth's inner magnetosphere (Wang et al, 2015). The observed waves are in a range between proton gyrofrequency to lower-hybrid frequency, propagating nearly perpendicular to the background magnetic field, and almost linearly polarized. These features of observed waves are consistent with the properties of lower-hybrid waves. These lower-hybrid emissions are related to whistler-mode waves, which are well known for their capability to accelerate radiation belt electrons. In this presentation, we focus on modeling the electron accelerations by the lower-hybrid waves. Specifically, the test particle simulation method is adopted. In this simulation, we construct the lower-hybrid waves based on a cold plasma dispersion relation using parameters consistent with the THEMIS observation on 7 May 2008. The relation between the extent of electron accelerations and the wave angle, the angle between the wave vector and the background magnetic field, will be investigated and reported.