E109-006 **Room: 101A** **Time: May 30 10:15-10:30**

Theory and simulation of the generation of whistler-mode chorus

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The generation process of whistler-mode chorus emissions is analyzed by both theory and simulation.
Driven by an assumed strong temperature anisotropy of energetic electrons, the initial wave growth of chorus is linear. After the linear growth phase, the wave amplitude grows nonlinearly. It is found that the seeds of chorus emissions with rising frequency are generated near the magnetic equator as a result of a nonlinear growth mechanism that depends on the wave amplitude.
We derive the relativistic second-order resonance condition for a whistler-mode wave with a varying frequency. Wave trapping of resonant electrons near the equator results in the formation of an electromagnetic electron hole in the wave phase space.
For a specific wave phase variation, corresponding to a rising frequency, the electron hole can form a resonant current that causes growth of a wave with a rising frequency.
Seeds of chorus elements grow from the saturation level of the whistler-mode instability at the equator, and then propagate away from the equator.
In the frame of reference moving with the group velocity, the wave frequency is constant.
The wave amplitude is amplified by the nonlinear resonant current, which is sustained by the increasing inhomogeneity of the dipole magnetic field over some distance from the equator.
Chorus elements are generated successively at the equator so long as a sufficient flux of energetic electrons with a strong temperature anisotropy is present.