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Whistler Anisotropy Instabilities as the Source of Banded Chorus: Van Allen Probes Observations and Particle-in-Cell Simulations S. PETER GARY, Space Science Institute, XIANGRONG FU, MISA M. COWEE, REINHARD H. FRIEDEL, HERBERT O. FUNSTEN, Los Alamos National Laboratory, GEORGE B. HOSPODARSKY, CRAIG KLETZING, WILLIAM KURTH, University of Iowa, BRIAN A. LARSEN, Los Alamos National Laboratory, KAIJUN LIU, Auburn University, ELIZABETH A. MACDONALD, NASA/Goddard Space Flight Center, KYUNGGUK MIN, Auburn University, GEOFFREY D. REEVES, RUTH M. SKOUG, DAN WINSKE, Los Alamos National Laboratory — Magnetospheric banded chorus events are enhanced whistler waves with frequencies $\omega_r < \Omega_e$ where Ω_e is the electron cyclotron frequency, and a characteristic spectral gap at $\omega_r \simeq \Omega_e/2$. Here two-dimensional particle-in-cell simulations in a magnetized, homogeneous, collisionless plasma test the hypothesis that banded chorus is due to two branches of the whistler anisotropy instability excited by two distinct, anisotropic electron components. The electron densities and temperatures are derived from HOPE instrument measurements on the Van Allen Probes A satellite during a banded chorus event on 1 November 2012. Observations show a three-component electron model consisting of a dense, cold (a few tens of eV) population, a less dense, warm (a few hundred eV) anisotropic population, and a still less dense, hot (a few keV) anisotropic population. Simulations show that the warm component drives quasi-electrostatic upper-band chorus, and the hot component drives electromagnetic lower-band chorus; the gap near $\Omega_e/2$ follows from growth of the two distinct instabilities.

S. Peter Gary
Space Science Institute

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