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Whistler Turbulence Forward Cascade: Three-Dimensional Particle-in-Cell Simulations S. PETER GARY, Space Science Institute, OU-LIANG CHANG, JOSEPH WANG, University of Southern California — Three-dimensional particle-in-cell (PIC) simulations of whistler turbulence in a magnetized, homogeneous, collisionless plasma have been carried out. An initial relatively isotropic spectrum of long-wavelength whistler mode fluctuations is imposed upon the system. The simulations follow the temporal evolution of the field fluctuations as they decay into a broadband, turbulent spectrum at shorter wavelengths via a forward cascade with an anisotropy in the sense of stronger fluctuation energy at $k_\perp$ than at comparable $k_\parallel$. Reduced $k_\perp$ magnetic fluctuation spectra show a clear break near the inverse electron inertial length scale, from steep spectra at long wavelengths to still steeper spectra at shorter wavelengths, similar in character to spectra at electron scales recently measured in the solar wind. Computations have been done at various values of the electron beta, where β_e is changed by altering the ratio of the background plasma density to the background magnetic field energy density. Preliminary results show that an increasing β_e corresponds to a faster cascade, more nearly isotropic spectra, stronger electron heating, and greater damping of the whistler fluctuations.

S. Peter Gary
Space Science Institute

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