

Magnetic Alfvén-cyclotron fluctuations of anisotropic nonthermal plasmas

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©2015. American Geophysical Union. All Rights Reserved. Remote and in situ observations in the solar wind show that ion and electron velocity distributions persistently present deviations from thermal equilibrium. Ion anisotropies seem to be constrained by instability thresholds which are in agreement with linear kinetic theory. For plasma states below these instability thresholds, the quasi-stable solar wind plasma sustains a small but detectable level of magnetic fluctuation power. These fluctuations may be related to spontaneous electromagnetic fluctuations arising from the discreteness and thermal motion of charged particles. Here we study magnetic Alfvén-cyclotron fluctuations propagating along a background magnetic field in a plasma composed of thermal and suprathermal protons and electrons via the fluctuation-dissipation theorem. The total fluctuating magnetic power is estimated in a proton temperature anisotropy-beta diagram for three different families of proton distribution f