MODELING THE MAGNETIC ENERGY SPECTRUM AT SUB-ION SCALES IN THE SOLAR WIND

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A phenomenological model for the perpendicular magnetic spectrum of Kinetic Alfvén waves in the Solar Wind is presented, that extends previous analyses [1,2]. The main result is associated to the non-universal character of the so-called "dissipation" range spectrum, where the power law index appears to depend on the critical balance parameter measuring the ratio of the nonlinear to the linear wave propagation characteristic time scales. For plasma beta of order unity and equal ion and electron temperatures, it predicts a range of spectral exponents consistent with solar wind and magnetosphere observations [3]. Landau damping plays a crucial role, not only providing an exponential decay of the spectrum at the electron scale, but also allowing for a modification of the spectral exponent. The above predictions appear to be supported by direct numerical simulations of the FLR-Landau fluid model.

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