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Linear and Non-Linear Landau Resonance of Kinetic Alfven Waves: Consequences for Electron Distribution and Wave Spectrum in the Solar Wind[1] LEONID RUDAKOV, Icarus Research Inc. and University of Maryand, Departments of Physics and Astronomy, MANISH MITHAIWALA, GURUDAS GANGULI, CHRIS CRABTREE, Naval Research Laboratory — Kinetic Alfven wave turbulence in solar wind is considered and it is shown that non-Maxwellian electron distribution function has a significant effect on the dynamics of the solar wind plasmas. Linear Landau damping leads to the formation of a plateau in the parallel electron distribution function which diminishes the Landau damping rate significantly. Nonlinear scattering of waves by plasma particles is generalized to short wavelengths and it is found that for the solar wind parameters this scattering is the dominating process as compared to three wave decay and coalescence in the wave vector range $1/\rho_i < k < \omega_{pe}/c$. Incorporation of these effects leads to the steepening of the wave spectrum as $|\delta B_k|^2 \sim k_\perp^{-\nu}$ between the inertial and the dissipation ranges. Preliminary analysis of the integral equation in k-space shows that the spectral index should be between 2 and 3, consistent with observations in the solar wind. This region can be labeled as the scattering range.

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