Electromagnetic Waves Generated by Ion Distribution with Velocity Space Holes

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The general stability properties of ion distributions with velocity space holes of the type expected in the vicinity of the field reversal region in the Earth's magnetotail is investigated. It is shown that such distributions are unstable to electromagnetic waves with wave vector directed along the Sun-Earth line.
The growth rate of the excited waves is strongly depended on ion hole parameters and electron and ion temperatures. The solution of quasi-linear equation is found and shown that the saturation of the instability results in a flattening of the initial distribution function. The energy level of the excited waves is obtained as a function of the ion hole parameters.