

宇宙プラズマ中の波動モード変換過程の粒子シミュレーション

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PIC Simulations of Wave-mode Conversion in Space Plasmas

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Bernstein modes are electrostatic waves in plasmas propagating perpendicularly to an external magnetic field [1]. They have characteristic frequencies close to the electron cyclotron frequency/upper hybrid frequency and its harmonics. The Bernstein waves can couple with electromagnetic waves (like whistler mode chorus) on density irregularities. It means that the electromagnetic wave can scatter on such an irregularity to the electrostatic mode [2,3]. It was proposed that similar mechanism might exist for direct scattering of electrostatic mode to electromagnetic mode [4]. In this contribution we study scattering of the electron Bernstein wave modes to electromagnetic L-O mode using 2D-3V electromagnetic PIC code which allows us to analyze both the longitudinal electrostatic waves and transversal electromagnetic waves. Our results are compared with observational results described in [4] since authors suggest this mechanism as a source of wideband nonthermal radiation.

References:

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