

Electromagnetic ion cyclotron instability by an ion beam:2D Hybrid simulation

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We present results of a two-dimensional hybrid simulation of the electromagnetic ion beam interaction. We show a case that there is a weak ion beam drifting relative to a background ion population along a uniform magnetic field with relative velocity. In this case the beam instability is given rise to and the parallel right-handed resonant modes play an important role, which are nearly coincided with the linear method that we can get the same conclusion from the calculation of vlasov equation with KUPDAP. At the linear stage the parallel modes give rise to a obviously diffusion of weak ion beam and the background beam is driven to be enlarged little in the distribution of velocity diagram. Besides, the process influences strongly the evolution of the electromagnetic energy. They create regular pulses of the energy of the electromagnetic field. The properties can be observed on the evolution of magnetic energy easily. We maintain the work that is being done now can be regarded as a basement to develop the simulation of the interaction between the background plasma beam and the Heavy ion beam ejected from ion engine.