

Electromagnetic wave by injection of hot ion/electron beam with parallel AC electric field in Saturnian magnetosphere

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Abstract:

The electromagnetic ion-cyclotron waves observed by the various flybys in Saturnian magnetosphere has been investigated in this paper. Various type of large frequency radio emissions by mechanism of resonant interaction has been observed in magnetosphere of Saturn. In this paper, the phenomenon of wave-particle interaction between electromagnetic ion-cyclotron waves along with magnetic field lines and fully ionized magnetospheric plasma particles has been considered with parallel propagation of wave to evaluate the detailed dispersion relation with generalised distribution in the presence of parallel AC electric field in collision-less magnetoplasma at $6.18 R_s$. Using method of characteristic solution and kinetic approach, expression for growth rate has been derived. After injecting hot ion/electron beam, parametric analysis of following plasma parameters like temperature anisotropy, AC frequency etc., has been done and the effect of these plasma parameters on growth rate has been studied via graphs plotted.

Keywords- Electromagnetic ion-cyclotron waves, Generalised distribution, hot injection, Saturn magnetosphere