

Comparative study of the effect of cold ions and thermal anisotropy on the convective electromagnetic proton cyclotron instability

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Although the role played by cold ions on the electromagnetic proton-cyclotron instability has been thoroughly investigated, there are some aspects which deserve further attention. Moreover, since the presence of ion cyclotron waves in the magnetosphere has been experimentally established it is important to have a full understanding of the role played by cold ions. Thus, it is shown here that the main effect of cold ions on the proton-cyclotron instability is to shift the unstable spectrum. If the only cold species are protons, then the shift of the spectrum is always towards lower frequency values, i.e. away from the marginal mode. If in the absence of cold protons the maximum convective growth rate lies far from the marginal mode, the only effect of cold protons is to shift the spectrum further away from the marginal mode. However, if the maximum convective growth rate in the absence of cold protons lies close to the marginal mode, then the shift of the spectrum leads also to a large