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# Ion Beam Excited Dust Alfvén Wave Instability in Plasma with Dust Grains

**Ved Prakash**

India Meteorological Department,  
Ministry of Earth Sciences, Lodi Road, New Delhi, India

## Abstract

*Ion beam is one of the most important sources that drives plasma instabilities and is ubiquitous in a large variety of space and astrophysical plasma. An ion beam propagating through dusty plasma drives electromagnetic dust Alfvén waves to instability via ion cyclotron interaction. The effects of the fluctuating charge on dust grains and magnetic field on the dispersion properties and growth rate of the dust Alfvén wave instability have been studied. It is shown that the presence of charged dust grains and ion beam modify the dispersion relation of low frequency dust Alfvén wave. The frequency of the dust Alfvén wave reduces in the presence of negatively charged dust grains. The charge fluctuation terms lead to dissipation of the dust-Alfvén modes in a dusty plasma. However, the damping rate reduces in the presence of ion beam. The maximum growth rate increases with an increase in parallel wave number and the beam density. An increase in the external static magnetic field increases the growth rate of the instability. The results of the proposed theory are applied to understand some of the experimental observations. Numerical calculations are done using the dusty plasma parameters suitable for the earth's magnetosphere.*

## References

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