Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Dupree diffusion effect on the space-charge wave in a kappa distribution plasma column MYOUNG-JAE LEE, YOUNG-DAE JUNG, Hanyang University — The diffusion effects on the dispersion equations of ion-acoustic space-charge wave in a Lorentzian plasma column composed of nonthermal turbulent electrons and cold ions are investigated based on the analysis of normal modes and the separation of variables. It is found that the real portion of the wave frequency of the space-charge wave in a Maxwellian plasma is greater than that in a Lorentzian plasma. It is also found that the magnitude of the damping rate of the space-charge wave decreases with an increase of the spectral index of the Lorentzian plasma. It is also shown that the magnitude of the scaled damping rate increases with an increase of the Dupree diffusion coefficient. Moreover, the influence of the non-thermal character of the Lorentzian plasma on the damping rate is found to be more significant in turbulent plasmas with higher diffusion coefficient. The variations of the wave frequency and the growth rate due to the characteristics of nonthermal diffusion are also discussed.

Myoung-Jae Lee
Hanyang Univ

Date submitted: 21 May 2020   Electronic form version 1.4