Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Dispersion relation for the dust-acoustic wave in a Lorentzian plasma[1] MYOUNG-JAE LEE, TAEJOON KIM, Department of Physics, Hanyang University, Seoul, Korea, KYU-SUN CHUNG, HYUN-JONG WOO, Department of Electrical Engineering, Hanyang University, Seoul, Korea — The electrostatic mode of dust-acoustic (DA) surface waves propagating on the interface between a vacuum and a complex plasma is kinetically investigated by using the dispersion relation based on the Vlasov-Maxwell equations. The complex plasma consists of Lorentzian (kappa) electrons and ions, and cold dusty particles. The results show that in the long wavelength limit ($k_x\lambda_D \to 0$), the frequency of the wave is reduced to $\omega \approx (\mu_\kappa)^{1/2} k_x C_D$ where μ_κ is a kappa (spectral index) dependent factor and $C_D = \omega_{pd}\lambda_D$ is the well known dust acoustic speed. We see that the frequency increases as the ratio of dust density to ion density increases. Some interesting results of the DA surface waves supported by the Lorentzian plasma are discussed.

[1]This work was supported in part by the 2nd stage Brain Korea 21 Program and in part by the National Research Laboratory (NRL) Program of Korea Science and Engineering Foundation (KOSEF) under the Korean Ministry of Science and Technology.

Myoung-Jae Lee
Department of Physics, Hanyang University, Seoul, Korea

Date submitted: 19 Jul 2007 Electronic form version 1.4