

Abstract Submitted  
for the DPP07 Meeting of  
The American Physical Society

**Dispersion properties of the dust-acoustic waves in a Lorentzian plasma containing elongated dust grains.**<sup>1</sup> TAEJOON KIM, MYOUNG-JAE LEE, Department of Physics, Hanyang University, Seoul, Korea, KYU-SUN CHUNG, Department of Electrical Engineering, Hanyang University, Seoul, Korea — The dispersion relation for electrostatic waves propagating in an unmagnetized dusty plasma whose constituents are electrons, ions, and elongated charged dust grains is obtained and analyzed. Electrons and ions are assumed to be Lorentzian ( $\kappa$  velocity distribution) and dust grains are assumed to be cold. We consider the one-dimensional dust grain rotation so that the principal moment of inertia has  $z$ -component only. In the limit of low frequency, i.e.,  $\omega \ll kv_e, kv_i$ , the dust acoustic (DA) wave dispersion relation is kinetically derived by employing Poisson-Maxwell equations. The result shows that the dispersion relation can admit complex solutions and the growth rate is proportional to the rotation frequency. The effects of spectral index  $\kappa$  are also discussed.

<sup>1</sup>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.

Taejoon Kim  
Department of Physics, Hanyang University, Seoul, Korea

Date submitted: 20 Jul 2007

Electronic form version 1.4