

Ion-driven instabilities of surface dust ion-acoustic waves in a dusty space plasma layer

Myoung-Jae Lee¹ and Young-Dae Jung²

¹Department of Physics, Hanyang University, Seoul 04763, South Korea

²Department of Applied Physics, Hanyang University, Ansan, Kyunggi-Do 15588, South Korea

The growth rates of the dust ion-acoustic (DIA) surface wave in the dusty plasma layer containing ion streaming passing through the stationary electrons and dusty grains at the speed of wave phase velocity are derived and numerically analyzed. We have found that the growth rates for the resonant symmetric and antisymmetric waves are similar to the case of semi-bounded plasma when we have a thick-layer. However, in the case of symmetric wave, the growth rate towards to the bulk wave as the layer thickness reduces. In the case of the antisymmetric wave, the growth rate increases fast as the layer thickness decreases. The growth rates of surface waves in a plasma layer are compared with those of semi-bounded and bulk waves.