

Size Effects on the Scattering of Electron and Spherical Dust Grain in Dusty Plasmas

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The finite size effects of the charged dust grain on the electron-dust grain collisions are investigated in complex dusty plasmas. The stationary phase analysis and the effective potential due to the renormalized dust charge are employed to obtain the phase shift for the scattering of the electron and the spherically charged dust grain as a function of the impact parameter, collision energy, Debye length, and dust radius. It is found that the size effect of the dust grain enhances the electron-dust grain scattering cross section in dusty plasmas. It is also found that the size effect on the scattering cross section increases with increasing plasma density. In addition, it is found that the size effect on the electron-dust scattering cross section decreases with an increase of the plasma temperature.

Key words: Size Effects; Electron-Dust Grain Scattering; Dusty Plasmas.