Some unique properties of dusty plasma

Timofeev A V[1,2,3]

[1] Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg 2, Moscow 125412, Russia
[2] Moscow Institute of Physics and Technology, Institutskiy Pereulok 9, Dolgoprudny, Moscow Region 141701, Russia
[3] National Research University Higher School of Economics, Myasnitskaya 20, Moscow 101000, Russia

timofeev@jiht.ru

Dusty plasma is a system of charged microparticles in plasma. Microparticles acquire a charge due to the different mobility of electrons and ions in a gas discharge. Dusty plasma systems have been long considered as a toy model for ordinary condensed matter. Experimentally observed structures of dust particles in a gas discharge plasma are employed to study phase transitions, transport processes and wave phenomena with the methods of video microscopy. At the same time, a set of unique properties makes dusty plasma not just a toy model but an independent object of research. These properties are dissipativity, thermodynamic openness, nonreciprocal character of particle interactions etc. The physical incarnation of these properties is manifested in the influence of the temperature of a neutral gas, dust particles charge fluctuations, ion flux, ion shadow effect, ion wake effect, etc. on structural and dynamics characteristics of dusty plasma system.