

Confinement impact on the complex plasmas structure

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I will discuss the impact of confining parabolic potential (confinement) on the equilibrium configurations of a low dimensional (1D, 2D) confined strongly coupled complex (dusty) plasmas. In particular, it will be shown that the dust component of the complex plasma is essentially inhomogeneous in such a confining potential: the density of microparticles drops significantly to the system boundaries. This effect qualitatively changes the character of phase transitions (melting and crystallization) in such systems. For example, melting (crystallization) of the confined 2D plasma crystal occurs with the formation of a melting (crystallization) wave, which propagates from the boundaries of the system to its center (in the case of crystallization, it propagates from the center to the boundaries). It has been shown that the equilibrium distribution of the density of the particles is determined only by the softness of the inter particle interaction, which makes it possible to determine the key plasma parameters by non invasive way.