Energy transfer between horizontal degrees of freedom in dusty plasma

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Energy transfer between degrees of freedom are of great interest [1-5]. One of mechanics of energy transfer is based on parametric resonance [2-4]. This mechanism works both for energy transfer between vertical and horizontal degrees [4-5] of freedom and between two horizontal. This research is focused on energy transfer between horizontal degrees of freedom.

Model of dusty plasma system including fluctuations of dust particles charge and features of near-electrode layer is presented. Initial stages of energy transfer between horizontal degrees of freedom are described using simplified model, which can be studied analytically. MD-simulation of full model is used to describe later stages.

Conditions of energy transfer occurrence are obtained. Growth rates of energy and saturation energy are derived for a wide range of parameters. Results obtained for simplified and full models are compared with each other and allow to described energy transfer in dusty plasma more accurate.

References