Parameterization of the Local Structure of Micro-Mechanical Systems (Granular Materials)

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Present state of matter with general universal theory of granular systems do not permit to describe already static structure and their deformations of this materials enough satisfactory. The problem consist on the divercity of observable realization of the different coexisted local symmetries in granular packing which properties and stability depends on several internal and external parameters (confinements, perturbations, nonlinearity in contacts, dissipative interparticle forces, external fields, inhomogeneity, decoration) [1-4].

We perform experimental study and theoretical modeling of 2D system of highly packed hard discs subject into gravity and weakly perturbed vertically. Polycrystalline structure, which characterized by mixture between different symmetries of the local ordering has been observed experimentally. Complex kinetics of transitions between differently structurized clusters, as it was observed, strongly depends on many valuble parameters not all of which are enough well controlled.

We conclude there are not enough arguments to characterize the structurisation which happens in the agitated granular materials (in general) as phase transitions of the definitive order(first-, or second- order).

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