

## Granular Gases Of Elongated Grains

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Granular gases are dilute ensembles of grains, superficially similar to our picture of atomic gases. However, collisions between the grains are dissipative. They represent an interesting model system to investigate statistical physics far from thermal equilibrium. The literature comprises numerous analytical or numerical predictions of their dynamics, while experimental confirmations are rare and usually concerned with two-dimensional experiments or low particle numbers. Microgravity is necessary to create a three-dimensional ensemble under weak external excitation. In previous studies with gases of spherical grains, clustering and an insufficient temporal and spatial resolution hindered a detailed evaluation of individual particle dynamics. So far, mainly ensembles of spherical particles were investigated.

After a review of general results on granular gases and of experiments with granular materials of non-spherical shapes, granular gases of elongated grains will be introduced. Our data were collected from a sounding rocket flight and in drop tower experiments. The rods can be tracked in 2D and 3D. A detailed statistical analysis of their distribution and motion will be given. Characteristic features are non-Gaussian velocity distributions, a breakdown of equipartition of kinetic energies, a characteristic energy input mechanism, and the particular cooling dynamics of those gases.

