

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Granular gases of rodlike grains in micro-gravity experiments¹

KIRSTEN HARTH, KATHRIN MAY, TORSTEN TRITTEL, SANDRA WEGNER, RALF STANNARIUS, Otto-von-Guericke University Magdeburg, Institute of Experimental Physics, Universitätsplatz 2, 39106 Magdeburg — Understanding the dynamics of granular materials is relevant both in fundamental physics and from the technological point of view, but many well-known phenomena are still insufficiently understood. Granular gases are dilute ensembles of macroscopic grains, interacting by inelastic collisions. Permanent energy supply is required to maintain dynamic equilibrium. Granular gases of spherical grains have been widely investigated theoretically and in experiments in 2 dimensions. Microgravity is necessary for maintaining such a gas in 3 dimensions (3D). Only dynamics in the Knudsen-regime and clustering instabilities were accessible in previous experiments. Our experiment with rodlike grains offers access to statistical dynamics in the rod-rod collision dominated regime as well as the opportunity to measure the rotational degrees of freedom of the particles. We present recent results from sounding rocket and drop-tower experiments. Ensembles of rods are confined in a 3D container, monitored by video cameras. Individual rods are tracked in consecutive frames. We analyse spatial and temporal density fluctuations, translational and rotational velocity distributions, the partition of kinetic energy and the influence of different experimental parameters.

¹DLR, SNSB and ESA are acknowledged for funding within projects REXUS-GAGa, GAGa DropT and GAGa.

Kirsten Harth
Otto-von-Guericke University Magdeburg,
Institute of Experimental Physics,
Universitätsplatz 2, 39106 Magdeburg

Date submitted: 27 Nov 2012

Electronic form version 1.4