EPSC Abstracts,
Vol. 2, EPSC2007-A-00195, 2007
European Planetary Science Congress 2007

Translations and Rotations are correlated in Granular Gases

N.V. Brilliantov (1), **T. Poeschel** (2), T. Kranz (3), and A. Zippelius (3)

(1) Moscow State University, 119899 Moscow, Russia
(2) Institut für Unfallchirurgie, Charité, 13353 Berlin, Germany
(3) Institute of Theoretical Physics, University of Göttingen, Germany

In a granular gas of rough particles the axis of rotation is shown to be correlated with the translational velocity of the particles. The average relative orientation of angular and linear velocities depends on the parameters which characterize the dissipative nature of the collision. We derive a theory for these correlations and validate it with numerical simulations for a wide range of coefficients of normal and tangential restitution. The limit of smooth spheres is shown to be singular: even an arbitrarily small roughness of the particles gives rise to orientational correlations.