Abstract for an Invited Paper
for the DFD07 Meeting of
The American Physical Society

Flow of Dense Granular Media; A Peculiar Liquid

OLIVIER POULIQUEN, CNRS-Universite de Provence

Rice flowing out of a silo, rocks tumbling down a slope, sand avalanching on a dune, are examples of simple granular flows. Their description still represents a challenge due to the lack of constitutive laws able to describe the rich phenomenology observed with granular materials. However, the numerous experiments and simulations carried out during the last ten years have given keys for a better understanding. This talk will review the general properties of granular flows, before focusing on the dense flow regime where granular media flow like a liquid. In this regime, simple constitutive laws can be proposed, in which the granular fluid is described as a peculiar visco-plastic liquid. This talk will show that this approach gives quantitative predictions in several configurations, providing a relevant framework for adressing granular hydrodynamic problems. The second part of this presentation will discuss the limits of this approach, the important open problems, and the consequences of this development for the more complex case of mixture of grains and fluid. This work has been done with Pierre Jop, Yoel Forterre and Mickael Paihla.