

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Constitutive relations in dense granular flows JOHN DROZD, COLIN DENNISTON, University of Western Ontario — We use simulations to investigate constitutive relations in dry granular flow. Our system is comprised of mono- and poly-disperse sets of spherical grains falling down a vertical chute under the influence of gravity. We observe three phases or states of granular matter: a free-fall dilute granular gas region at the top of the chute, a granular fluid in the middle and then a glassy region at the bottom. We test various proposed constitutive relations to provide a basis for analytically solving for the stresses in granular flows. Finally, we examine the energy conservation and heat flow in our systems and show that the heat conductivity constitutes distinct power-law dependencies on the granular temperature in the glassy and fluid regions of our system.

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Date submitted: 21 Nov 2008

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