Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Continuum modeling of mechanically-induced creep using the nonlocal fluidity model DAVID HENANN, Brown University, KEN KAMRIN, MIT — Recently, the nonlocal fluidity model applied to granular materials has successfully been used to predict the size of flow features in a wide variety of flow configurations, including all variations of the split-bottom cell as well as other geometries. A related problem in granular flow is that of mechanically-induced creep, in which shear deformation in one region of a granular medium fluidizes quiescent regions far from the sheared zone. This enables creep deformation when a force is applied in the quiescent region through an intruder such as a cylindrical or spherical probe. In this talk, we show that the nonlocal fluidity model is capable of describing this phenomenology. Specifically, we explore the creep of a rod in an annular Couette cell and show that the model captures all salient features observed in experiments.

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Date submitted: 09 Jan 2014 Electronic form version 1.4