Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

**Dynamic crystallization in granular flow**[1] ALINE HUBARD, MARK D. SHATTUCK, The City College of New York — We explore dynamic crystallization in simulations of two dimensional (2D) inelastic frictional hard disks as a model for granular materials. Previous simulations and experiments show formation of hexagonal structures in quasi-2D systems under vibration, rotation, and shearing. In experiments of a uniform but non-equilibrium steady-state (UNESS) under constant pressure the gas-crystal transition shows all of the classic signs of a first-order sublimation phase transition including discontinuous change in density, rate dependent hysteresis, and an equation of state consistent with sublimation. We use molecular dynamics to simulate steady shear under a variety of boundary conditions to determine a dynamic equation of state in the in the density range of the crystallization transition. We compare the dynamic equation of state with that found in non-flowing UNESS experiments, simulations, and theory.

[1]Funding: National Science Foundation DMR-0934206, CBET-0968013.

Mark D. Shattuck
The City College of New York

Date submitted: 30 Dec 2010 Electronic form version 1.4