

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

**The Transition of Two Dimensional Hard Spheres Under Gravity
from the Liquid to Solid State Using a Global Equation of State**

ALISON E. KOSER, PAUL V. QUINN, SR., Kutztown University — Using a global equation of state, derived empirically from Luding, we can accurately model the density profile of two-dimensional hard spheres with diameter d and mass m under gravity given a temperature T . [*Physica A*, **271**, 192 (1999)] We then compare our theoretical graphs to MD simulated data. In a given system, if the temperature is below some critical value T_c obtained by the density profile, then crystallization occurs and we can solve for the number of frozen layers. Again, we compare our theoretical values for number of frozen layers with the number of frozen layers from the simulated data. In addition, we use the global equation to solve for the center of mass and its fluctuations as a function of T .

Abstract APS

Date submitted: 12 Mar 2009

Electronic form version 1.4