Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Pinning Susceptibility at the Jamming Transition[1] AMY GRAVES, ELLIOT PADGETT, Swarthmore College, CARL GOODRICH, ANDREA LIU, University of Pennsylvania — Jamming in the presence of fixed or pinned obstacles, representing quenched disorder, is a situation of both practical and theoretical interest. We study the jamming of soft, bidisperse discs in which a subset of discs are pinned while the remaining particles equilibrate around them at a given volume fraction. The obstacles provide a supporting structure for the jammed configuration which not only lowers the jamming threshold, ϕ_J, but affects the coordination number and other parameters of interest as the critical point is approached. In the limit of low obstacle density, one can calculate a pinning susceptibility χ_P, analogous to the magnetic susceptibility, with obstacle density playing the role of the magnetic field. The pinning susceptibility is thus expected to diverge in the thermodynamic limit as $\chi_P \propto |\phi - \phi_J|^{-\gamma_P}$. Finite-size scaling calculations allow us to confirm this and calculate the critical exponent, γ_P.

[1]Acknowledgement is made to the Donors of the Petrolium Research Fund administered by the American Chemical Society, Swarthmore College's Eugene M. Lang Faculty Fellowship, NSF grant DMR-1062638 and DOE grant DE-FG02-05ER46199.

Amy Lisa Graves
Swarthmore College

Date submitted: 19 Nov 2012 Electronic form version 1.4