

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Melting in a finite, two-dimensional Yukawa system** T.E. SHERIDAN, Ohio Northern University — A complex (dusty) plasma disk is a two-dimensional system of monodisperse microspheres confined by a parabolic well and interacting through a Yukawa potential. (Complex plasma is an open, dissipative system.) Consequently, a complex plasma disk is a physical realization of a finite, two-dimensional Yukawa system. Recent experiments on a complex plasma disk with  $n \approx 3900$  dust particles [T. E. Sheridan, *Phys. Plasmas* **15**, 103702 (2008)] indicate that the system melts via two second-order topological phase transitions. In the present work, we will model these experimental results using the Metropolis algorithm to generate ensembles of configurations consistent with a given thermodynamic temperature. Model results will be compared with experiment. In particular, we wish to determine the exponent characterizing the power law decay of the bond-orientational correlation function in the hexatic phase, which the experimental results indicate may be greater than that predicted by KTHNY theory.

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Date submitted: 21 Nov 2008

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