Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Universal Aspects of Coulomb Frustrated Phase Separation REZA JAMEI, STEVEN KIVELSON, Stanford Univ. Phys. Dept., BORIS SPIVAK, University of Washington — We study the consequences of Coulomb interactions on a system undergoing a putative first order phase transition. In two dimensions (2D), near the critical density, the system is universally unstable to the formation of new intermediate phases, which we call "electronic microemulsion phases," which consist of an intermediate scale mixture of regions of the two competing phases. A corollary is that there can be no direct transition as a function of density from a 2D Wigner crystal to a uniform electron liquid. In 3D, if the strength of the Coulomb interactions exceeds a critical value, no phase separation occurs, while for weaker Coulomb strength, electronic microemulsions are inevitable. This tendency is considerably more pronounced in anisotropic (quasi 2D or quasi 1D) systems, where a devil's staircase of transitions is possible.

Reza Jamei
Stanford University

Date submitted: 03 Dec 2004 Electronic form version 1.4