

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Disorder Induced Transition into a One-Dimensional Wigner Glass SHIMUL AKHANJEE, JOSEPH RUDNICK, UCLA — The destruction of quasi-long range crystalline order as a consequence of strong disorder effects is shown to accompany the strict localization of all classical plasma modes of one-dimensional Wigner crystals at $T = 0$. We construct a phase diagram that relates the structural phase properties of Wigner crystals to a plasmon delocalization transition recently reported. Deep inside the strictly localized phase of the strong disorder regime, we observe “glass-like” behavior. However, well into the critical phase with a plasmon mobility edge, the system retains its crystalline composition. We predict that a transition between the two phases occurs at a critical value of the relative disorder strength. This transition has an experimental signature in the AC conductivity as a local maximum of the largest spectral amplitude as function of the relative disorder strength.

Shimul Akhanjee
UCLA

Date submitted: 26 Nov 2007

Electronic form version 1.4