Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Structural phases in complex plasmas TRUELL HYDE, BERNARD SMITH, KE QIAO, LORIN MATTHEWS, JERRY REAY, MIKE COOK, JIMMY SCHMOKE, CASPER, Baylor University, PO Box 97310, Waco, TX 76798-7310 — Dust particles imbedded within a plasma will acquire an electric charge from collisions with free electrons in the plasma. If the ratio of the inter-particle potential energy to the average kinetic energy is sufficient, the particles can form either a "liquid" structure with short range ordering or a crystalline structure with longer range ordering. With the dust particles residing in two-dimensionally extended lattice planes, different stable crystalline phases have been observed experimentally and energetically favored structures identified employing various DC biases. These experimental results are shown to be in good agreement with theoretical predictions for this strongly coupled complex plasma. They are also shown to be in good agreement with results from experimental observations determining the structural phases of crystallized ion plasmas.

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Date submitted: 20 Jul 2005 Electronic form version 1.4