Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Collective Modes in 2D Yukawa Solids and Liquids PETER HARTMANN, ZOLTAN DONKO, MTA-SZFKI, H-1525 Budapest, P.O.B. 49, Hungary, GABOR KALMAN, PRADIP BAKSHI, Dept. of Phys., Boston College, Chestnut Hill, MA 02467, USA, STAMATIOS KYRKOS, Dept. of Chem. & Physics, Le Moyne College, Syracuse, NY 13214, USA, MARLENE ROSENBERG, Dept. of Electrical and Computer Eng., UCSD, La Jolla, CA 92093, USA — We report comparative studies on collective excitations in 2D strongly-coupled complex plasmas, interacting through a Yukawa potential, encompassing both the solid and the strongly coupled liquid states. Dispersion and polarization of the collective modes in the solid state are calculated through lattice-summations[1], while in the liquid state through Molecular Dynamics simulations[2] in conjunction with theoretical Quasilocalized Charge Approximation[3] (QLCA) analysis. The latter closely emulates the dispersion resulting from angular averaging in the lattice. In general, however, the lattice dispersion is substantially different from that of liquid. MD simulations show the dramatic transformation of the anisotropic phonon dispersion of the crystal lattice near the solid-liquid transition into the isotropic liquid dispersion. The transition boundary is identified through independent equilibrium analysis[4]. [1]T. Sullivan et.al., *JPA* **39** 4607 (2006);[2]G.J. Kalman et.al., *PRL* **92** 065001 (2004);[3]K.I. Golden, G.J. Kalman, *Phys. Plasmas* **7** 14, (2000);[4]P. Hartmann et.al., *Proc. of 11th WS on Dusty Plasma* (2006), to be publ.

Gabor Kalman
Dept. of Phys., Boston College, Chestnut Hill, MA 02467, USA

Date submitted: 22 Jul 2006 Electronic form version 1.4