

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Cutoff wave number for shear waves in a 2D dusty plasma¹ V. NOSENKO, J. GOREE, Dept. of Physics & Astronomy, University of Iowa, USA, A. PIEL, Christian-Albrechts Universität, Kiel, Germany — The cutoff wave number for shear waves in a liquid-state strongly-coupled dusty plasma was measured experimentally. The phonon spectra of random particle motion were measured at various temperatures in a monolayer dusty plasma. In a liquid state of this particle suspension, shear waves were detected only for wavelengths smaller than 20 to 40 Wigner-Seitz radii, depending on the Coulomb coupling parameter. In the experiment, a monolayer suspension of polymer microspheres was levitated in the sheath above a horizontal electrode in a radio-frequency plasma. The particles interacted with a Yukawa potential, and formed a triangular lattice. To melt this lattice and form a liquid, we used a laser-heating method. Two focused laser beams were moved rapidly around drawing Lissajous figures in the monolayer and applying random kicks to the particles. The kinetic temperature of the particles increased with the laser power applied, and above a threshold a melting transition was observed. This laser-heated dusty plasma has some characteristics of a thermal equilibrium.

¹Work supported by NASA and DOE.

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Date submitted: 23 Jul 2006

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