Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Heating and cooling in dusty plasmas[1] Y. FENG, J. GOREE, BIN LIU, Dept. of Physics and Astronomy, The Univ. of Iowa — A dusty plasma is a partially ionized gas containing small particles of solid matter, which are typically micron size. These particles gain a large electric charge by collecting electrons and ions from the ambient plasma, so that they interact with a large potential energy, yielding a strongly-coupled plasma. Particles can thereby organize in a crystal, which in our experiment is a single layer of microspheres. We can melt this crystal to form a liquid by heating it with random kicks from moving laser beams. The laser imparts a radiation-pressure force on the particles, which also experience frictional drag simultaneously by gas atoms. At steady state, a balance of laser heating and gas cooling determines a temperature. Results will be reported for an experiment where we disturb this balance with a sudden change in heating power to study the temporal development of melting and freezing.

[1]Supported by DOE and NASA

John Goree
The Univ. of Iowa

Date submitted: 29 Aug 2007 Electronic form version 1.4