

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Laser manipulation of dust particles in Coulomb balls¹ TIM FLANAGAN, J. GOREE, Dept. of Physics & Astronomy, The Univ. of Iowa — A dusty plasma is a partially ionized gas that contains small particles of solid matter, or dust. Dust particles become charged by collecting electrons and ions from the plasma, which can cause them to interact with a large potential energy in comparison with their thermal energy. This strong coupling causes dust particles to arrange themselves as a solid or liquid. One type of dusty plasma is the recently discovered Coulomb ball (Arp *et al.*, PRL 2004), which is a 3D spherically shaped suspension of dust. The ball becomes trapped due to a balance of three forces: the electric force due to the plasma electric field and a thermophoretic force resulting from a temperature gradient in the gas, which are both directed upward, and gravity. In this experiment, a glow-discharge plasma is used to confine 4.8 μm microspheres forming a Coulomb ball inside a glass box atop a heated electrode. We report experimental results where radiation pressure, from one or more laser beams, is used to push some of the dust particles, creating a flow and reshaping the Coulomb ball.

¹Supported by DOE and NASA

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Date submitted: 05 Jul 2007

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