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Dust Particle Dynamics in a Varying Gravitational Field ALIYA MERALI, TCNJ, ANDREW ZWICKER, PPPL, DPX TEAM — The properties of silica dust suspended in an argon DC glow discharge plasma are analyzed in varying gravitational field. The plasma was created in a 6" x 1.5" glass chamber. 340 V was applied to the top of two stainless steel electrodes, placed 4" apart. In order to trap the dust during microgravity, a floating stainless steel mesh was suspended from the top electrode. The experiment used a current of 1-2 mA and a pressure of 80 to 155 mTorr while gravity ranged from 0 to 1.8g by flying through a series of 30 parabolas. Two CCD cameras recorded the dust cloud illuminated by a 5 mW laser sheet. One camera allowed observation of the interparticle spacing of the dust cloud and individual particle motion. The second camera recorded a wide field view of the overall cloud motion. In hyper-gravity, the dust cloud was 0.26 cm by 1.4 cm. As the gravitational field approached zero, the cloud moved from the center of the chamber, disassembled and reformed on the chamber wall. As gravity increased, the dust particles returned to the center of the chamber and reorganized in their initial formation. During the decrease in the gravitational field, a dust acoustic wave was spontaneously formed as the density of the cloud increased. To better understand the motion of the particles, the electrostatic field was modeled using a particle in cell code.

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