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UV Induced Motion of a Fluorescent Dust Cloud in a DC Glow Discharge Plasma MICHAEL HVASTA, The College of New Jersey, ANDREW ZWICKER, Princeton Plasma Physics Lab, PPPL / SULI TEAM — Understanding dust dynamics is a key concern for both processing and astrophysical plasmas. To this end, an experiment was designed where a silica (<5 μm) and fluorescent dust mixture was added to an argon DC glow discharge plasma. The fluorescent dust allows one to observe the entire 3D structure of the cloud when it is illuminated by a 100 watt UV ($\lambda = 365$ nm) lamp. This method offers an advantage over laser scattering techniques that only allow 2D slices of the cloud to be observed and is simpler than scanning mirror techniques or PIV (Particle Image Velocimetry). Under typical parameters (P=150 mTorr, V_{anode}= 100 V, $V_{cathode}$= 400 V, I_{total} =<2mA) when the cloud is exposed to the UV, the mixture fluoresces, moves ∼2mm towards the light source and begins rotating. Particle rotational velocities in excess of 3 $^{mm}/_{s}$ have been observed near the cloud's periphery while particle velocities decrease towards the center of the cloud. Both cloud translation and rotational velocity were found to be a function of UV intensity. Theoretical and experimental results will be presented.

Michael Hvasta
The College of New Jersey

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