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Observation of Dust Particle Gyromotion in a Magnetized Dusty Plasma[1] C.S. COMPTON, SFA Inc., W.E. AMATUCCI, G. GATLING, Naval Research Laboratory, E. TEJERO, SFA Inc. — In dusty plasma research, gyromotion of the dust has been difficult to observe experimentally. Previous experiments by Amatucci et al. have shown gyromotion of a single dust particle [1]. This early work was performed with alumina dust that had a size distribution and non-uniformly shaped particles. In the current experiment, evidence of spherical, monodispersed, dust particles exhibiting gyromotion has been observed. Silica particles 0.97 micrometers in diameter are suspended in a DC glow discharge argon plasma. The experiment is performed in the Naval Research Laboratory's DUsty PLasma EXperiment (DUPLEX Jr.). DUPLEX is a 61-cm tall by 46-cm diameter acrylic chamber allowing full 360 degree optical access for diagnostics. The neutral pressure for the experiment is 230 mTorr with a 275 V bias between the circular electrodes. The electrodes have a separation of 4 cm. A strong magnetic field is created by 2 pairs of neodymium iron boride magnets placed above and below the anode and cathode respectively. The resulting field is 1.4 kG. The dust particles are illuminated with a 25 mW, 672 nm laser. Images are captured using an intensified CCD camera and a consumer digital video cassette recorder. Recent evidence of gyromotion of spherical, monodispersed, dust particles will be presented. [1] Amatucci, W.E., et al., Phys. Plasmas, 11, 2097 (2004)

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