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Construction and implementation of a novel dust dropper for the PPPL Dusty Plasma Experiment ROY TINGUELY, Princeton Plasma Physics Laboratory, Iowa State University, ARTURO DOMINGUEZ, ANDREW CARPE, ANDREW ZWICKER, Princeton Plasma Physics Laboratory — The applications of dusty plasma research are far-reaching, from understanding astrophysical systems to studying plasma-wall interactions in magnetically confined plasma experiments. Unfortunately, dusty plasma environments can be difficult to control and replicate in laboratory settings. This poster details the construction, vacuum operation, and initial results of a multifaceted dust dropper, which is being implemented in the PPPL Dusty Plasma Experiment and is expected to improve the reproducibility and characterization of dust cloud formation. The cylindrical plastic shaker comprises four pairings of electromagnets and neodymium magnets, with eight stabilizing springs. The amplitude and frequency of a pulsed current determine the dust dispersal rate, while a biased metallic mesh regulates the area of dispersion and size and charge of dropped particles. Preliminary testing shows that, for 44 micron silica dust, steady dispersal rates as fast as 0.2 mg/s (approximately 1700 particles/s) can be achieved.

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