The presence of voids (dust-free regions) in dusty plasmas has been considered for some time. Early studies include the observation of the “great void mode” in a laboratory experiment with growing dust grains [1] and self-generated voids in microgravity experiments generated by a balance of an outward ion drag force and an inward electrostatic force acting upon the dust grains [2]. In addition to self-generated void structures, there have also been studies of void regions formed around biased probes in dusty plasmas [3,4].

However, many of the mechanisms these voids are not yet fully understood. In particular, in the presence of a magnetic field, the magnetization of the ions can have a profound influence on the ion-dust interaction as it is anticipated that the Debye screen around the dust grain will become asymmetric with increasing magnetic field. It is anticipated that the ion drag force on the grains will become modified as the transport of ions in the plasma becomes constrained to magnetic field lines. As a result, the balance between the electrostatic and ion drag forces may be modified, leading to changes in void formation.

In the Magnetized Dust Plasma Experiment (MDPX), recent studies have focused on the creation of probe-induced dust voids and characterizing the influence of the magnetic field on the void region. This presentation will discuss the results of those studies and their agreement with a proposed model for magnetized voids.

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