

Magnetic fields in dusty plasmas: pattern formation, particle growth, and other recent studies in the Magnetized Dusty Plasma Experiment

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For over a decade, it has been postulated that the addition of a magnetic field can have a profound influence on the properties of a complex/dusty plasma. The Magnetized Dusty Plasma Experiment (MDPX) device at Auburn University is the most recent facility to study dusty plasmas in strongly magnetized plasmas. The MDPX device is a flexible, high magnetic field research instrument with a mission to serve as an open access, multi-user facility for the dusty plasma and basic plasma research communities. In a strong magnetic field, the transport of ions and electrons in the plasma will be modified. This changes how the microparticles become charged and modifies the Debye screening of the microparticles by the surrounding plasma, thus altering the inter-particle interactions within the plasma. In particular, under conditions when the magnetic field is sufficiently large, $B \geq 0.5$ T, a variety of emergent phenomena are observed including a new type of imposed spatial ordering, significantly modified particle charging, significant modification of wave properties, and a strong coupling between ion and microparticle transport. This presentation will focus on recent studies with a specific emphasis on studies of imposed ordering of the dust particles and modification of particle growth at high magnetic field. Time permitting, other recent work on optical measurements and modeling of the plasma will be presented.

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