

Abstract Submitted
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Study on the plasma sheath over a rectangular depression using dust NICHOLAS WEINER, T.E. SHERIDAN, Ohio Northern University — Plasma is a quasi-neutral ionized gas made up of positive ions and electrons. The plasma sheath is a boundary that is formed between the plasma and a material surface. The more mobile electrons are confined by the electric field in the sheath, while the positive ions are pushed out of the plasma. Charged micron-diameter dust particles can levitate in the sheath electric field by balancing their weight with an upward electric force. The vertical confining well is significantly deeper than the horizontal well, creating a two-dimensional dusty plasma. Microscopic dust particles can be used to provide local measurements of properties of the sheath, including Debye length, electric field, and sheath width. A cluster of two dust particles was used to characterize the plasma sheath over a cathode with a rectangular depression. The width of the sheath is inferred from the dust height. The normal mode frequencies are used to calculate the the ellipticity of the sheath edge, the local Debye length, and the vertical electric field. The vertical electric field and the Debye length can be used to approximate the electron temperature.

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