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Properties of the plasma sheath edge above a rectangular depression in DONUT THOMAS E. STEINBERGER, T.E. SHERIDAN, Ohio Northern University — Plasma is a gas consisting of positively and negatively charged particles, such as electrons and positive ions. The electric field inside a plasma is very small since plasma is a conductor. When plasma is in contact with a material boundary (i.e., a "wall") a boundary layer called the plasma sheath forms. The electric field inside the sheath is large and points away from the wall. The sheath electric field reduces the loss of highly mobile electrons, while accelerating ions out of the plasma, so that in steady state the electron and ion loss rates balance. The shape of the sheath edge is determined by the shape of the wall and the width of the sheath. We report experimental measurements of sheath conformation to a rectangular depression in a flat horizontal electrode (i.e., "the wall") in the Dusty Ohio Northern University experimenT (DONUT) for various aspect ratios. Clusters of two microscopic dust particles float above the depression at the sheath edge. The horizontal shape of the sheath edge is determined from the horizontal center-of-mass frequencies for the dust particles. The vertical electric field is found from the force balance on the dust particles, and the local charge density is measured using the vertical center-of-mass frequency.

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