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Experimental characterization of the plasma sheath using two dust particles NICHOLAS R. WEINER, T.E. SHERIDAN, Ohio Northern University — Plasma is an ionized gas that exhibits long-range particle-particle interactions which are manifested in collective behavior such as the plasma sheath. The plasma sheath is the boundary layer between plasma and a material wall. The sheath has a large electric field that confines highly mobile electrons and forces positively charged ions out of the plasma. For a horizontal electrode, the sheath's upward electric force can balance the weight of small dust particles and cause them to levitate near the sheath-plasma interface. The motion of these levitating particles can be used to characterize the plasma sheath. A rectangular depression placed on an rf-powered electrode has been used to create a plasma sheath. Two dust particles were trapped in the plasma sheath and the normal mode frequencies of the two-particle cluster allow us to determine the ellipticity of the sheath edge, the Debye length, the dust charge and the vertical electric field.

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