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Plasma sheath measurement using two dust particles NICHOLAS R. WEINER, T.E. SHERIDAN, Ohio Northern University — Plasma is a gas of charged particles that interact through electromagnetic forces. Because of the long-range particle-particle interaction, plasma displays collective behavior such as the sheath. The plasma sheath is the boundary layer that separates plasma from a material wall. The large sheath electric field confines high-speed electrons and accelerates positive ions out of the plasma. Charged, microscopic dust particles may float near the sheath-plasma interface. As a consequence, dust particle motions can be used to characterize the sheath. A conducting rectangular confining well was placed on a negative electrode, and two dust particles were trapped in resulting plasma sheath. Natural frequencies of the oscillation modes of the two-particle clusters have been measured, allowing us to determine the ellipticity of the potential energy well parallel to the electrode, the dust particle charge, and the plasma Debye length.

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