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Measurement of Langmuir probe sheath using dusty plasma T. E. SHERIDAN, Ohio Northern University — The radius of the sheath around a thin cylindrical Langmuir probe is measured using dust. The probe tip is oriented perpendicularly to the horizontal, powered electrode in an rf discharge. The current-voltage characteristic of the probe is measured without dust and then with dust. The negatively-charged dust particles are repelled from the probe tip when the probe bias is below the plasma potential, creating a dust-free circular region around the probe tip. We observe a slight decrease in plasma density with dust which is consistent with electron depletion. The probe sheath radius, which we assume is the radius of the dust free region, decreases roughly like the square root of the probe bias. Plasma parameters measured using the Langmuir probe will be compared with measurements using two free-floating dust particles.

Terrence Sheridan
Ohio Northern University

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