

Abstract Submitted
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The Child-Langmuir plasma sheath above a step T. E. SHERIDAN,
Ohio Northern University — The plasma sheath is the space charge boundary layer that separates quasi-neutral plasma from a material surface. Child-Langmuir sheath theory assumes a plasma with cold, collisionless ions and Boltzmann electrons having a temperature T_e contacts a cathode at a potential $\phi_c < 0$ (i.e., below the plasma space potential). We consider the Child-Langmuir sheath above a cathode with a step of height d . If s_0 is the planar Child-Langmuir sheath width, then far from the step we expect the sheath to be planar with a width s_0 . However, in the neighborhood of the step the sheath must change levels, where the lateral transition length is l . Using a particle-in-cell code, we show that the sheath edge is well described by a hyperbolic tangent and that $l \approx s_0$.

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