

Abstract Submitted
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Analytical expression for Child-Langmuir sheath edge around a corner T.E. SHERIDAN, Ohio Northern University — An expression for the position of the sheath edge around a two-dimensional corner cathode with included angle θ_c has been discovered. This expression is valid in the Child-Langmuir approximation, i.e., $\phi_c \gg kT_e/e$, where $-\phi_c < 0$ is the cathode bias and T_e is the electron temperature. In polar coordinates (r, θ) , the sheath edge is given by $(r/s_0) \sin [\pi\theta / (2\pi - \theta_c)] = [\pi / (2\pi - \theta_c)]$ where s_0 is the planar sheath width far from the corner. This result is verified by comparison with numerical solutions of Watterson [J. Phys. D: Appl. Phys. 22, 1300 (1989)] for a knife edge ($\theta_c = 0$) and a convex square corner ($\theta_c = \pi/2$). The observed agreement suggests that this expression is correct for all corner angles, both convex and concave.

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