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Conformal Mapping for Calculating Space Charge Limited Current[1] SREE HARSHA N R, ALLEN L GARNER, Purdue University — Originally derived exactly for planar diodes [1], more recent analysis of space-charge-limited current (SCLC) derived exact, closed form solutions for general rectilinear geometries using variational calculus (VC) [2]. However, deriving rigorous solutions for SCLC for curvilinear diodes remains challenging. This talk applies conformal mapping (CM) to derive exact, closed solutions for multiple curvilinear geometries [3] from first principles. Starting from the known classical CL law for the planar diodes, we applied CM to map several geometries onto the planar geometry to derive SCLC in such geometries. This provides a means to rapidly screen SCLC for more realistic geometries to provide targeted parameters prior to more detailed simulations. Since this method is based on the geometry of the diodes, any modification to the classical CL law, such as relativistic or quantum modifications, may ultimately be incorporated. [1] P. Zhang, A. Valfells, L. K. Ang, J. W. Luginsland, and Y. Y. Lau, Appl. Phys. Rev. 4, 011304 (2017). [2] A. M. Darr, A. M. Loveless, and A. L. Garner, Appl. Phys. Lett. 114, 014103 (2019). [3] H. F. Ivey, J. Appl. Phys. 24, 1466 (1953).

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