

Abstract Submitted
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Modeling high-voltage dielectric insulator breakdown¹ JOHN VERBONCOEUR, SOREN TAVERNIERS, University of California - Berkeley — Modeling angled dielectric insulator breakdown has been notoriously difficult due to a number of numerical challenges, including inaccuracies in the surfaces and impact angles caused by stair-stepped surfaces, and the small but surprisingly significant effects of rounding end points of structures off to grid locations. In this work, we describe techniques to overcome these challenges using a two-dimensional particle-in-cell model. Recent theoretical work has suggested that electron emission near the triple point due to an enhanced electric field is responsible for initiating flashover in high voltage insulation systems and RF breakdown in high power microwave windows [1]. In this work, 2D particle simulation is employed to calculate the breakdown voltage versus insulator angle for two parallel conductors. The model includes secondary electron emission insulator surface, and space charge effects in the volume and at the insulator surface. The model is verified for analytical cases, and is compared to the theory [1].

[1] N. M. Jordan, Y. Y. Lau, D. M. French, R. M. Gilgenbach, and P. Pengavich, J. Appl. Phys. 102, 033301 (2007).

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