

Abstract Submitted
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Simulation of electron emission from conformal boundaries for applications to high-power microwave sources CHET NIETER, DAVID SMITHE, PETER H. STOLTZ, JOHN R. CARY¹, Tech-X Corporation — The finite difference time domain (FDTD) approach for electromagnetic particle-in-cell (EM-PIC) is a proven method for many problems involving interactions of charged particles with electromagnetic fields. Applying these methods to complex geometries that occur in high-power microwave (HPM) sources requires methods to accurately model fields and deal with particle emission and absorption at complex boundaries. We have recently developed conformal boundaries for the FDTD electromagnetic solver in the VORPAL code that have been shown to be 2nd order accurate in space. VORPAL also has models for the field emission of electrons as well as models for secondary electron emission. In order to use these advances to study particle effects in HPM devices we have begun modifying the particle boundaries in VORPAL so they can be used with the conformal geometry. We will present the current results of this work including the addition of current correction algorithms to prevent the build up of unphysical image charges when particles are removed and simulations involving field emission and secondary emission of electrons from conformal surfaces.

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