

Abstract Submitted
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Numerical Studies of Electrode Plasma Formation and Expansion in High Power Charged Particle Beam Diodes¹ I.M. RITTERSDORF², S.B. SWANEKAMP, A.S. RICHARDSON, R.J. ALLEN, J.W. SCHUMER, Naval Research Laboratory — High-power diodes that generate intense electron beams are useful in many applications, such as producing x-rays for flash radiography and nuclear weapon effects simulations. Desorption and ionization of gases from electrodes can form a plasma during operation. Expansion of this plasma into the gap leads to a short circuit, which limits the radiation production. It is difficult for particle-in-cell codes to model the surface physics or the subsequent expansion of the plasma. NRL is beginning a multi-year research effort to study such plasmas. This paper will summarize the relevant literature on plasma formation in high-power diodes with a goal of developing dynamic models that describe the formation and expansion of these plasmas that are suitable for PIC codes.

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