Abstract Submitted
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A simulation of a capacitively coupled oxygen discharge using the oopd1 particle-in-cell Monte Carlo code J.T. GUDMUNDSSON, University of Iceland, M.A. LIEBERMAN, YING WANG, J.P. VERBONCOEUR, University of California at Berkeley — The oopd1 particle-in-cell Monte Carlo (PIC-MC) code is used to simulate a capacitively coupled discharge in oxygen. oopd1 is a one-dimensional object-oriented PIC-MC code [1] in which the model system has one spatial dimension and three velocity components. It contains models for planar, cylindrical, and spherical geometries and replaces the XPDx1 series [2], which is not object-oriented. The revised oxygen model includes, in addition to electrons, the oxygen molecule in ground state, the oxygen atom in ground state, the negative ion O^-, and the positive ions O^+ and O_2^+. The cross sections for the collisions among the oxygen species have been significantly revised from earlier work using the xpdp1 code [3]. Here we explore the electron energy distribution function (EEDF), the ion energy distribution function (IEDF) and the density profiles for various pressures and driving frequencies. In particular we investigate the influence of the O^+ ion on the IEDF, we explore the influence of multiple driving frequencies, and we do comparisons to the previous xpdx1 codes. [1] J. P. Verboncoeur, A. B. Langdon, and N. T. Gladd, Comp. Phys. Comm. 87 (1995) 199 [2] J. P. Verboncoeur, M. V. Alves, V. Vahedi, and C. K. Birdsall, J. Comp. Physics 104 (1993) 321 [2] V. Vahedi and M. Surendra, Comp. Phys. Comm. 87 (1995) 179

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