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**Particle-in-cell Monte Carlo collision simulation of a capacitively coupled discharge in oxygen** JON TOMAS GUDMUNDSSON, University of Iceland, MICHAEL A. LIEBERMAN, Department of Electrical Engineering and Computer Sciences, University of California at Berkeley — The oopd1 particle-in-cell Monte Carlo collision (PIC-MCC) code is used to simulate a capacitively coupled discharge in oxygen. oopd1 is a one-dimensional object-oriented PIC-MCC code in which the model system has one spatial dimension and three velocity components [1]. The oxygen model includes, in addition to electrons, the oxygen molecule in the ground state, the oxygen atom in the ground state, the negative ion $O^-$, the positive ions $O^+$ and $O_2^+$, and the metastable states $O(^1D)$ and $O_2(a^1\Delta_g)$. We explore the electron energy distribution function (EEDF), the electron temperature profile, the density profiles of charged particles and electron heating rates for a capacitively coupled oxygen discharge. We explore the influence of the metastables on the plasma parameters and in particular the influence of detachment by the metastable $O_2(a^1\Delta_g)$ molecule on the electron heating mechanism in the discharge.

[1] J. T. Gudmundsson, E. Kawamura and M. A. Lieberman, A benchmark study of a capacitively coupled oxygen discharge of the oopd1 particle-in-cell Monte Carlo code, Plasma Sources Science and Technology 22(3) (2013) 035011

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