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Radio-frequency breakdown in oxygen and synthetic air[1] ZORAN LJ PETROVIC, MARIJA SAVIC, MARIJA RADMILOVIC-RADJENOVIC, Institute of Physics, Pregrevica 118 Zemun, University of Belgrade — Parallel plate rf discharges have a long history in the materials processing industry, but much of their behavior is still poorly understood, particularly processes taking place during the breakdown. In order to test some simple models of RF breakdown we have performed detailed simulations using well tested Monte Carlo code that allows also verification against RF and DC benchmarks but also treatment of temporal spatial non-localities. This work contains our simulation results of the breakdown voltage curves in oxygen and synthetic air. At first, electrons were released from the middle of the gap and any further development is due to the applied field, random number generator and solutions of kinetic and balance equations. The obtained results qualitatively agree with the existing experimental and simulation results. In addition, spatial distributions of electron concentration, energy and rates of elastic scattering and ionization are also presented and discussed in light of the processes leading to the breakdown. We analyze the role of low threshold inelastic collisions and non-conservative attachment as compared to the previous results for argon.

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