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Two Dimensional Particle-in-cell/Monte Carlo (PIC/MC) Simulation of Radio Frequency Capacitively Coupled Plasmas with a Dielectric Side Wall Boundary[1] YUE LIU, JEAN-PAUL BOOTH, PASCAL CHABERT, LPP, CNRS, Ecole Polytechnique-UPMC-UPSud-UPSay, COLD PLASMA TEAM, LPP TEAM — The majority of previous two dimensional (usually fluid) simulations of radio frequency capacitively coupled plasmas have focused on geometrically-asymmetric reactors (with a much larger grounded electrode than power electrode), which produces a strong dc self-bias. However, a commonly-used geometry comprises electrodes of equal area surrounded by a dielectric side wall, but this has not been widely simulated. We have developed a two dimensional (Cartesian) PIC/MC code based on the work of Hongyu Wang, Wei Jiang and Younian Wang, to simulate argon plasmas in this kind of chamber. Even using a thick dielectric, a peak in plasma density and electron power deposition is adjacent to the dielectric. The profiles of the electron and ion fluxes show that the period-averaged currents to the powered electrode are not locally balanced; the electron flux peaks closer to the dielectric edge, before dropping sharply. Finally, the effect of the dielectric thickness on the surface charge distribution and the angular distributions of ions arriving at boundaries is examined.

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