Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Electric Field Reversals in the sheath region of capacitively coupled RF discharges at different pressures[1] JULIAN SCHULZE, Ruhr University Bochum, ZOLTAN DONKO, Hungarian Academy for Science, BRIAN HEIL, DIRK LUGGENHOELSCHER, THOMAS MUSSENBROCK, RALF PETER BRINKMANN, UWE CZARNETZKI, Ruhr University Bochum — Electric field reversals in single and dual-frequency capacitively coupled RF discharges are investigated at different pressures. Phase resolved optical emission spectroscopy is used to measure the excitation of the neutral background gas caused by the field reversal during sheath collapse. The resulting spatio-temporal excitation profiles are compared to results of a fluid sheath model in the single frequency case and a Particle in Cell simulation in the dual-frequency case. The results show that field reversals occur in both cases, in different gases and at different pressures. An analytical model gives insight into the mechanisms causing the reversal of the electric field. In the dual-frequency case a comparison between PIC simulation and analytical model is performed. It shows that the field reversal is caused by a combination of electron inertia and collisions of electrons with the neutral background gas. The model also shows that at low pressures electron inertia is the cause of the observed field reversal.

[1]Funded by the DFG through SFB591 and GRK1051 and the Hungarian Scientific Research Fund.

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Date submitted: 13 Jun 2008 Electronic form version 1.4