Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Charge dynamics in electrically asymmetric dual frequency capacitive RF discharges[1] JULIAN SCHULZE, EDMUND SCHUENGEL, UWE CZARNETZKI, Ruhr-University Bochum, ZOLTAN DONKO, Hungarian Academy for Science — Charge dynamics in electrically asymmetric, geometrically symmetric dual frequency capacitively coupled RF discharges operated at 13.56 MHz and 27.12 MHz with variable phase shift between the driving voltage waveforms is investigated experimentally as well as by a PIC simulation and analytical models. Via the Electrical Asymmetry Effect a variable DC self bias is generated as a function of the phase shift. Differences between the DC self bias resulting from simulation/experiment and analytical/fluid models at small phase angles are explained by the charge dynamics within one low frequency RF period (not taken into account in the models). Depending on phase shift and pressure the excitation at the powered electrode is stronger or weaker compared to the grounded electrode (asymmetric excitation). The excitation dynamics is different at high (100 Pa) and low pressures (3 Pa): at low/high pressure the excitation is asymmetric at phase shifts of strong/weak DC self bias, respectively. This dynamics is understood in the frame of a simple analytical model.

[1]Funding: DFG (GRK1051) and Hungarian Fund for Scientific Research

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Date submitted: 12 Jun 2009 Electronic form version 1.4