Abstract Submitted
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Investigation of the temporal sheath dynamics in the intermediate RF regime[1] M. SHIHAB, A.T. ELGENDY, D. EREMIN, T. MUSSENBROCK, R.P. BRINKMANN, Inst. for Theoretical Electrical Engineering, Ruhr University Bochum, I. KOROLOV, A. DERZSI, Z. DONKO, Inst. for Solid State Physics and Optics, Wigner Research Centre for Physics, H.A.S., J. SCHULZE, Inst. for Plasma and Atomic Physics, Ruhr-University Bochum — The nonlinear dynamics of modulated RF plasma boundary sheaths is investigated employing a recently published model termed Ensemble In Spacetime (EST) and Particle In Cell (PIC) model. The EST enables a fast, and kinetically self-consistent simulation of all RF modulated plasma boundary sheaths in all technically relevant discharge regimes, (Shihab et al 2012 J. Phys. D: Appl. Phys. **45** 185202). A numerical experiment has been done using PIC approach with an electrically and geometrically symmetric capacitively coupled plasma. Using the resulting ion flux to the sheath and the sheath potential as input parameters, the sheath dynamics is simulated with EST as well. The results of EST are in excellent agreement with the PIC results. A huge reduction in the simulation time is achieved using EST. The ion dynamics in the intermediate regime (i.e., the ion transit time is of the order of the RF period) causes a temporal asymmetry for the sheath dynamics. The memory effects due to the ion inertia is supposed to give rise to a phase difference between the expansion and the contraction phases of the plasma sheath and consequently to a hysteresis of the sheath charge voltage relation.

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