NUMERICAL SIMULATION OF THE ELECTRODE IMPEDANCE EFFECT IN CAPACITIVE RADIO FREQUENCY DISCHARGES

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The heating of electrons in asymmetrically driven capacitive rf discharges is directly connected to the phenomenon of excitation of the plasma series resonance.[1;2] It has been shown by means of careful measurements that the resonant increase of harmonics in the plasma current (even in the case of strongly sinusoidal driving voltage) leads to an increase of the electron density.[3] It has been also shown that the external circuit of the system, i.e., the matching unit, stray capacitance, and cable inductance, significantly influence the resonant behavior of the system. Therefore, it is possible to increase the electron density by detuning the resonances using an additional external circuit (under constant conditions). That is what is called the "electrode impedance effect".[4] In this contribution we present results from a self-consistant numerical simulation.

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