Abstract Submitted
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Separate control of ion flux and energy in capacitively coupled RF discharges via the Electrical Asymmetry Effect[1] JULIAN SCHULZE, Ruhr University Bochum, ZOLTAN DONKO, Hungarian Academy for Science, BRIAN HEIL, UWE CZARNETZKI, Ruhr University Bochum — Recently a novel approach towards achieving separate control of ion flux and energy in capacitively coupled RF discharges based on the Electrical Asymmetry Effect (EAE) was proposed using fluid models. If the applied voltage waveform contains an even harmonic of its fundamental frequency, the sheaths will not be electrically symmetric. In order to balance electron and ion fluxes at each electrode a DC self bias develops. The self bias and, consequently, the ion energy can be controlled by tuning the phase between the two applied voltages. This technique works in geometrically symmetric and asymmetric discharges. Here the EAE is verified using a PIC simulation of a geometrically symmetric discharge. The self bias is found to be a nearly linear function of the phase angle. If the phase is changed, the ion flux stays constant within 5%, while the self bias reaches values of up to 80% of the applied voltage amplitude and the ion energy is changed by a factor of three. The EAE is investigated at different pressures and electrode gaps with focus on separate control of ion flux and energy.

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