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Effect of driving frequency on the electron-sheath interaction and electron energy distribution function in a low pressure capacitively coupled plasmas SARVESHWAR SHARMA, Institute for Plasma Research, Gandhinagar, Gujarat, NISHANT SIRSE, School of Physical Sciences and NCPST, Dublin City University, Dublin 9, Ireland, PREDHIMAN KAW, Institute for Plasma Research, Gandhinagar, Gujarat, MILES TURNER, ALBERT R. ELLINGBOE, School of Physical Sciences and NCPST, Dublin City University, Dublin 9, Ireland, INSTITUTE FOR PLASMA RESEARCH, GANDHINAGAR, GUJARAT TEAM, SCHOOL OF PHYSICAL SCIENCES AND NCPST, DUBLIN CITY UNIVERSITY, DUBLIN 9, IRELAND COLLABORATION — The effect of driving frequency (27.12-70 MHz) on the electron-sheath interaction and electron energy distribution function (EEDF) is investigated in a low pressure capacitive discharges using a self-consistent particle-in-cell simulation. At a fixed discharge voltage the EEDF evolves from a strongly bi-Maxwellian at low frequency, 27.12 MHz, to a convex type distribution at an intermediate frequency, 50 MHz, and finally becomes a weak biMaxwellian above 50 MHz. The EEDF evolution leads to a two-fold increase in the effective electron temperature up to 50 MHz, whereas the electron density remains constant in this range. After 50MHz, the electron density increases rapidly and the electron temperature decreases. The transition is caused by the transient electric field excited by bursts of high energy electrons interacting strongly with the sheath edge. Above the transition frequency, high energy electrons are confined between two sheaths which increase the ionization probability and thus the plasma density increases.

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