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Simulation study of collisionless heating in single-frequency capacitively coupled discharges[1] SARVESHWAR SHARMA, MILES TURNER, NCPST, Dublin City University, Ireland — Stochastic heating is an important phenomenon in low-pressure rf capacitive discharge. Recent theoretical work on this problem using several different approaches has produced results that are broadly in agreement insofar as scaling with the discharge parameters is concerned, but there remains some disagreement in detail concerning the absolute size of the effect. Here we report a simulation study that has two main aims. One is to investigate the limitations of the scaling law, especially in the case of high frequency where resonant circuit effects occur, and where plasma wave emission may be observed at the sheath edge. This relatively extensive set of simulation data may be used to validate theories over a wide range of parameters. The second aim is to study wave emission from the sheath with a frequency near ω_{pe}. This is the result of a progressive failure of quasi-neutrality near the electron sheath edge. There is a possibility for this wave energy to be transferred to electron thermal energy by Landau damping or a related process, and this mechanism may contribute significantly to electron heating. The emission of waves is associated with a field reversal during the expanding phase of the sheath. Trapping of electrons near this reverse field region is observed.

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