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**Secondary electrons in dual-frequency capacitive discharges**

MILES M. TURNER, Dublin City University, Ireland — Phase resolved optical emission spectroscopy has offered deep insight into the behaviour of electrons in plasma discharges, nowhere more so than in the case of dual-frequency discharges, where the presence of the two frequencies leads to complicated electron dynamics. An open question in the physics of these discharges is the importance of secondary electrons, emitted from electrodes by such processes as ion impact and photo-emission. Because the electrode surface state is poorly known, it is difficult to say anything a priori about the significance of these processes. In this paper we will present particle-in-cell simulations of dual-frequency discharges under conditions approximating those of the experiments, and we will attempt to draw conclusions concerning the importance of secondary electron effects, based both on the observed spatio-temporal pattern of optical emission, and on measurements of the plasma density carried out using hair-pin probes. The conclusion of this investigation is that secondary electron phenomena cannot be neglected under these conditions.

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