Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

The influence of confining walls on 2D electron dynamics in radio frequency driven atmospheric pressure plasmas COLM O'NEILL, JOCHEN WASKOENIG, TIMO GANS, Centre for Plasma Physics, Queens University Belfast, BT7 1NN Belfast, Northern Ireland, UK — Radio-frequency driven atmospheric pressure plasmas (RF-APPs) can provide high concentrations of various radicals at a low gas temperature particularly for modification of sensitive surfaces, such as in biomedicine or for surface coatings. Ionization, excitation and dissociation are governed by the detailed electron dynamics within the plasma. Here, we present 2D numerical simulations of an RF-APP with an electrode spacing of 1 mm, confined by quartz surfaces forming a 1x1 mm^2 cross section. The used fluid model, with semi-kinetic treatment of electrons, has been benchmarked by phase resolved optical emission spectroscopy measurements. Surface charges at the quartz surfaces lead to electric fields parallel to the electrodes. Since the charge carrier density decreases towards the confining walls, even relatively weak electric fields can lead to sufficient power coupling per electron. Hence an increased electron impact excitation and ionization close to the quartz surfaces is observed. This results in off centered maxima of the electron density shifted towards the confining quartz walls.

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Date submitted: 12 Jun 2010 Electronic form version 1.4