Abstract Submitted
for the GEC07 Meeting of
The American Physical Society

Electron heating and ionization mechanisms in capacitively coupled dual frequency plasmas EGMONT SEMMLER, DEBORAH O'CONNELL, Ruhr-University Bochum, TIMO GANS, Queens University Belfast, PETER AWAKOWICZ, ACHIM VON KEUDELL, Ruhr-University Bochum — Capacitively coupled dual-frequency plasmas are increasingly used in various technological applications. They have been motivated for their separate control of plasma density and ion bombardment energy. It is known that the plasma density is mainly controlled by the high frequency component in the plasma current, whereas the ion bombardment energy can be tuned by the low frequency component. However the nonlinear nature of the plasma boundary sheath is the cause for critical frequency coupling effects that occur in these devices. Recent measurements by Langmuir probe,VI-probe and a rf-current sensor reveal strong resonant behavior at integer driving frequency ratios capable of enhancing the plasma production by a factor of two compared to non-integer ratios. This can be explained by indirectly heating the electrons at the plasma series resonance frequency. Additional measurements of ionisation mechanisms through energetic electrons by means of phase resolved optical emission spectroscopy (PROES) have unveiled complex coupling effects between the low and high frequency component.

Egmont Semmler
Ruhr-University Bochum

Date submitted: 15 Jun 2007 Electronic form version 1.4