

Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Mode transitions in radio-frequency plasmas¹ DEBORAH O'CONNELL, KARI NIEMI, TIMO GANS, BILL GRAHAM, Queens University Belfast — Inductively coupled radio-frequency plasmas can be operated in two distinct modes. At low power and comparatively low plasma densities the plasma is sustained in capacitive or so-called E-mode. As the plasma density increases a transition to inductive H-mode is observed. This transition region is of particular interest and governed by non-linear dynamics and under certain conditions can result in structure formation with strong spatial gradients in the light emission. The two modes show pronounced differences in various measurable quantities e.g. electron densities, electron energy distribution functions, ion energy distribution functions, dynamics of optical light emission. Thus, the synergy of employing various diagnostics simultaneously yields improved understanding of the non-linear dynamics during the mode transition. The electron and ion energy distribution functions exhibit different characteristic shapes in each mode. The two distinct operation modes can be identified through the higher harmonic components of both the current and optical light emission.

¹Supported by: EU (FP7), EPSRC and Impedans Ltd.

Deborah O'Connell
Queens University Belfast

Date submitted: 16 Jun 2008

Electronic form version 1.4