Abstract Submitted
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**Investigations of the E-H transition in an inductively coupled plasma using phase resolved optical emission spectroscopy**[1] DEBORAH O'CONNELL, TIMO GANS, UWE CZARNETZKI, Institute for Plasma and Atomic Physics, Ruhr University Bochum, Germany — Inductively coupled plasmas (ICPs) can be operated in capacitive mode (E-mode) or inductive mode (H-mode) depending on the RF power. At relatively low powers the electron density is not sufficient to sustain H-mode operation and the RF antenna acts as an electrode, therefore the discharge operates in E-mode. Phase resolved optical emission spectroscopy (PROES) can be used to distinguish between E- and H-mode. In pure H-mode the emission is modulated sinusoidally with twice the RF frequency while in E-mode the various excitation mechanisms are non- sinusoidal with one emission maximum per RF cycle. A Fourier analysis of the phase resolved emission, therefore, allows us to distinguish different power coupling mechanisms. Measurements in a pulsed ICP show that the discharge ignites in E-mode before turning to stable H-mode. In the transition from E- to H-mode instabilities can occur. In this instability regime strong plasma inhomogeneities, so called plasmoids, are also investigated.

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