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Spatio-temporal studies of argon metastables at the mode transition in an inductively coupled plasma[1] A.M. DALTRINI, S.A. MOSHKALEV, Universidade Estadual de Campinas- Unicamp, Campinas, Brazil, T.J. MORGAN, Department of Physics, Wesleyan University, Middletown, USA, R.B. PIEJAK, W.G. GRAHAM, Centre for Plasma Physics, Queens University Belfast, Northern Ireland — Time and space resolved images of emission at 750.4 nm, 425.9 nm and 425 nm from an argon inductively coupled plasma in a GEC reference cell are reported. From line intensity ratio's information about the dynamic behaviour of the argon metastables atoms can be derived. Laser induced fluorescence has been used to determine the metastable atom densities. Maximum metastable densities are observed close to the coil and in the centre of the discharge and in the vicinity of transitions between low density (E, capacitively coupled) and high density (H, inductively coupled) modes. A rapid increase in the Ar metastable density with decreasing power was observed near the H to E mode transition. Electron temperature measurements based on line ratio measurements and Langmuir probe measurements, coupled to a model which incorporates metastable diffusion, are used to demonstrate how the spatio-temporal behaviour of the Ar metastable population influences the E-H mode transition.

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