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Electrical Modeling of the Inductively Coupled Plasma Discharges WILLIAM GRAHAM, Queen's University of Belfast, ROBSON VIEIRA, STANISLAV MOSHKALEV, State University of Campinas, SERGEY BALASHOV, Center of Technology for Information Renato Archer — The classical electrical model of an ICP discharge is based on the transformer formalism. The primary side is the external coil and the secondary side is the plasma system inside the chamber. Some lumped elements are included in the model to simulate the internal impedances of an ICP discharge. In the steady state, the power absorbed by the resistors in model (PABS) is equal to the power dissipated (PDIS). The exact operation point is intersection of PDIS and PABS (evaluated for a given electron density). Note that this approach is not able to get the dynamics of the E- to H-mode transition. The temporal response could be reached using an approach developed in this work. Experimental results show that for discharges in Ar, the role of Ar metastables in the transition can be important. Then, additionally to the electrical model, the kinetic equations below should be considered. Next step is to link the kinetic balance equations with the electrical model. The main goal of the work is to evaluate the role of metastables on the transition characteristic times, that can be measured directly in the experiment.

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