Abstract Submitted
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Fluid modeling of a microwave micro-plasma at atmospheric pressure[1] J. GREGORIO, IPFN/IST, Lisbon, Portugal, C. BOISSE-LAPORTE, LPGP/UPS, Orsay, France, L.L. ALVES, IPFN/IST, Lisbon, Portugal — This paper presents the modeling of an argon micro-plasma produced by microwaves (2.45 GHz) at atmospheric pressure. The study uses a 1D stationary fluid-type code that solves the transport equations for electrons, positive ions, and the electron mean energy, together with Poisson's equation for the space-charge electrostatic field, Maxwell's equations for the electromagnetic excitation field and the gas thermal energy equation (ions are assumed to be in thermal equilibrium with the neutral gas). The model uses a simple kinetic scheme for Ar that includes the ground state, a lumped Ar(4s) excited state, and the Ar^+ and Ar_2^+ ionization states. The main features are: (i) the existence of combined kinetic-transport features, affecting the populations of both ions species (with similar densities); (ii) a strong decrease in the near-wall values of the electron mean energy, leading to a reduction in the production / destruction rates of Ar(4s) by electron impact, and causing its main production channel, near the wall, to become the electron dissociative recombination of Ar_2^+; (iii) a self-consistent profile of the gas temperature with a small axis-to-wall variation ($\sim$70K).

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