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Microwave micro-discharges at atmospheric pressure: experiments and simulations[1] J. GREGÓRIO, O. LEROY, P. LEPRINCE, C. BOISSE-LAPORTE, LPGP/UPS, Orsay, France, L.L. ALVES, IPFN-LA/IST, Lisboa, Portugal — We present a microwave (2.45 GHz) source based on a planar transmission line configuration, which uses a continuous excitation (1-50 W) to produce stable micro-plasmas at atmospheric pressure in air, Ar and He (plasmas are produced within the 50-200 μm gap created between two metal electrodes). The source is studied using both experiments [1] and simulations [2]. Experiments (i) measure the return loss of the source (hence its quality factor); (ii) use OES diagnostics to obtain the plasma (ro-vibrational and excitation) temperatures and the electron density; and (iii) check the plasma expansion by resorting to an imagery analysis. Simulations (i) describe the electromagnetic behavior of the source using the numerical code CST ® and an analytical transmission line model; and (ii) characterize the plasmas produced, using a 1D self-consistent stationary hybrid code for Ar, that solves the fluid-type transport equations coupled with the kinetic electron Boltzmann equation. The system exhibit power densities of 1-5 kW cm^{-3} for electron densities of $\sim 10^{13}$-10^{14}cm^{-3}. [1] J. Gregório et al, these proceedings; [2] L.L. Alves et al, these proceedings.

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J. Gregório
LPGP/UPS, Orsay, France

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