Abstract Submitted
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Microwave micro-plasma sources at atmospheric pressure[1] J. GREGORIO, O. LEROY, P. LEPRINCE, C. BOISSE-LAPORTE, LPGP/UPS, Orsay, France, L.L. ALVES, IPFN/IST, Lisboa, Portugal — This paper studies two linear resonator sources, which use a continuous 2.45 GHz microwave excitation to produce stable micro-plasmas, in air and in argon, at atmospheric pressure. In both sources, "large" volume micro-plasmas ($\sim 10^{-4}$-10^{-2} cm^3) are produced and sustained within the 50-200 μm gap delimited by two metal electrodes (with either 6 mm or 14 mm in length), placed at the open-end of a microstrip-like planar transmission line. The excitation can use "high" powers ($\sim$50 W), for long periods, without visible damages of the electrodes, even in air discharges. Particular attention is given to the design and optimization of the sources (in terms of frequency tuning and power coupling), using both simulations and experiments. OES diagnostics allow deducing the rotational, vibrational and excitation gas temperatures, and the electron density (using Stark broadening measurements of the H_β line-emission profile). Both sources have similar quality factors ($\sim$15), yielding high-density ($\sim 10^{14}$ cm^{-3}), non-equilibrium micro-plasmas, with rotational temperatures ($\sim$600-1500 K) much lower than vibrational and excitation temperatures ($\sim$4500-6000 K).

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