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Microwave micro-plasma sources based on microstrip-like transmission lines[1] J. GREGÓRIO, O. LEROY, P. LEPRINCE, C. BOISSE-LAPORTE, LPGP/UPS, Orsay, France, L.L. ALVES, IPFN-LA/IST, Lisboa, Portugal — We study three sources based on a planar transmission line configuration, corresponding to linear resonators, which use a 2.45 GHz (1-50 W) continuous excitation to produce stable micro-plasmas at atmospheric pressure in air, Ar and He. In all sources, micro-plasmas are produced within the 50-200 μm gap created between two metal electrodes placed at the open-end of a microstrip-like transmission line. The sources design and optimization uses the numerical tool CST Microwave Studio® and an analytical model of the transmission line, in a complementary approach that also measures the return loss. Plasma diagnostics, based on optical emission spectroscopy measurements, enable to obtain (i) the rotational temperature (T_{rot}) and the vibrational temperature (T_{vib}), using the N_2 (in air) and the OH (in Ar and He) rovibrational spectra; (ii) the excitation temperature (T_{exc}) and the electron density (n_e) in Ar, using atomic line transitions and the Stark broadening of H_β, respectively. Typically, we obtain T_{rot} $\sim$1000 K in air, $\sim$600 K in Ar and $\sim$400 K in He; T_{vib} $\sim$5000 K in air; T_{exc} $\sim$6000 K in Ar and $\sim$4000 K in He; and n_e $\sim 10^{14}$ cm^{-3} in Ar.

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