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**Microwave Plasma Torches Driven by Surface Waves** JULIO HENRIQUES, ELENA TATAROVA, EDGAR FELIZARDO, FRANCISCO DIAS, CARLOS FERREIRA, CENTRO DE FISICA DOS PLASMAS, INSTITUTO SUPERIOR TECNICO, 1049-001 LISBOA CODEX. TEAM — Plasma torches driven by surface waves at atmospheric pressure were studied by optical emission spectroscopy. The relative intensity of OH rotational bands and the broadening of H Balmer lines were measured. The microwave (2.45 GHz) plasma torches were created in a cylindrical fused silica tube (R = 7.5 mm) in air and $N_2$-Ar, with powers in the range 200-2000 W and flows of 500-10000 sccm. Due to the axial gas flow an afterglow is formed beyond the discharge zone. The measured SW wave number and attenuation coefficient axial changes follow the SW dispersion law. The small variation of the gas temperature along the main part of the plasma column (4000-3000 K) is followed by a sharp drop (down to 1000 K) in the afterglow. The large difference between the gas and the wall temperatures ($T_W \sim 500$ K) is indicative of strong radial variations in the plasma quantities. "Hot" O atoms (with $\sim 1.7$ eV) were detected in the air torch. Acknowledgment: This study was funded by FCT/FEDER in the framework of the project "Ecological Plasma Engineering Laboratory" POCI/FIS/61679/2004.

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