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Model of a small surface wave plasma source at atmospheric pressure J. HENRIQUES, A. IVANOV, ZH. KISS'OVSKI, E. TATAROVA, C.M. FERREIRA, IPFN - IST, 1049-001 LISBON, PORTUGAL TEAM, FACULTY OF PHYSICS, SOFIA UNIVERSITY TEAM — Environmental and industrial applications of microwave discharges at atmospheric pressure such as detoxification of hazardous gases, surface activation and air monitoring require the development of new plasma sources with specific qualities [1]. This study presents a two-dimensional model of a small portable Ar microwave plasma source [1] based on a surface wave sustained discharge at 2.45 GHz. This novel source creates a dense plasma in a high permittivity ceramic capillary with stable parameters at atmospheric pressure both in continuous and pulsed regimes. The self-consistent model includes the dispersion relation of the azimuthally symmetric surface mode propagating along a non-contracted cylindrical plasma column in a ceramic tube (inner diameter of 1 mm) surrounded by air and a metal screen. Furthermore, the electron Boltzmann equation under the local approximation is solved together with the heavy particle balance equations. The gas temperature as experimentally obtained is taken into account. The radial and axial distributions of the mean electron energy and plasma density are obtained and compared with results obtained by probe diagnostics and optical emission spectroscopy.
[1] Kiss'ovski Zh, Kolev M, Ivanov A, Lishev St, Koleva I 2009 *J Phys. D: Appl. Phys*., **42,** 182 004

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