UV Radiation from Hydrogen Containing Microwave Plasmas

E. FELIZARDO, E. TATAROVA, J. HENRIQUES, F.M. DIAS, C.M. FERREIRA, IPFN-IST, B. GORDIETS, Lebedev Phys. Inst., IPFN - IST, LISBOA TEAM, LEBEDEV PHYSICAL INSTITUTE, MOSCOW TEAM — Extreme ultraviolet (EUV) light sources are of great importance in many applications, ranging from photochemistry to astrophysics. In this work, EUV emissions from He and H₂ surface wave produced plasmas operating at low-pressures (0.1–2 mbar) are investigated. This surface wave source is created using a waveguide surfatron-based setup, the microwave power being provided by a 2.45 GHz generator. The discharge takes place inside a quartz tube with internal/external radii of 3/5mm, under laminar flow conditions (20 to 100 sccm). The EUV end-on emission has been detected by a Horiba Jobin-Yvon Plane Grating Monochromator working in the 8 - 125 nm range. The variations of the ultraviolet spectrum in the range 10 - 120 nm with changes in pressure and power delivered to the launcher have been investigated. The results are interpreted in the framework of a theoretical model based on a self-consistent treatment of particle kinetics, gas dynamics and wave electrodynamics.

1This work was funded by the Foundation for Science and Technology, Portuguese Ministry of Science, Technology and Higher Education, under the research contract PTDC/FIS/108411/2008.