Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Wave Driven Ar–N_2–H_2 Plasma J. HENRIQUES, F.M. DIAS, E. TATAROVA, C.M. FERREIRA, IPFN, INSTITUTO SUPERIOR TECNICO, 1049-001 LISBOA, PORTUGAL TEAM — An experimental investigation of the spatial structure of an Ar–N_2–H_2 plasma torch is presented. A surface wave induced microwave (2.45 GHz) plasma torch is created using a conventional, surfaguide based set-up. A cylindrical, fused quartz discharge tube (with internal and external radii R_1=7.5 mm and R_2=9.0 mm, respectively) is filled by an Ar(78%)–N_2(20%)–H_2(2%) gas mixture at atmospheric pressure. A spectroscopic imaging system able to couple the plasma-emitted radiation into a SPEX 1250M spectrometer, equipped with a nitrogen cooled CCD camera, was used to measure 2D(r,z) profiles of emission intensities and line profiles. Abel inversion has been applied to derive the radial profiles from the side-on measurements. The H_β line profiles have been measured to determine the corresponding Doppler temperature and the electron density. The measurements are well fitted by Voigt profiles, whose Gaussian and Lorenzian components have been deconvoluted. In this way, hyperthermal hydrogen atoms have been detected. The measured Doppler temperatures (5,000–8,000 K) are higher than the rotational temperature by a factor of about 2. The 2D map of the electron density ($5x10^{12}$–$5x10^{13}$ cm^{-3}) was also obtained. Acknowledgement- This work was supported by the Fundação para a Ciência e a Tecnologia, Ministério da Ciência, Tecnologia e Ensino Superior, Portugal

J. Henriques
IPFN, Instituto Superior Tecnico, 1049-001 Lisboa

Date submitted: 21 Jul 2009 Electronic form version 1.4