Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

UV/VUV photon fluxes from cylindrical ICPs at 1 MHz in hydrogen. URSEL FANTZ, DAVID RAUNER, Max-Planck-Institut fuer Plasmaphysik, STEFAN BRIEFI, Universitt Augsburg, DIRK WUENDERLICH, Max-Planck-Institut fuer Plasmaphysik — The photon fluxes of molecular hydrogen bands and atomic hydrogen lines in the wavelength range from 120 nm to 300 nm in a cylindrical ICP are quantified by means of VUV emission spectroscopy. The molecular analysis is supported by ro-vibrationally resolved corona models taking into account cascading as well. The latter is of particular importance for the interpretation of the ro-vibrational population of the first electronic state (B-state) in the singlet system resulting in the resonant Lyman band (B-X transition). For the analysis of the atomic lines a collisional radiative model is used in which opacity effects are considered. Optical emission spectroscopy is applied as well, allowing for the comparison of the UV/VUV radiation with the VIS radiation. The latter is also used to deduce the plasma parameters such as the electron density and temperature, the degree of dissociation and the atomic particle flux. Langmuir probe measurements yield spatially resolved measurements and allow for quantification of the ion fluxes. The pressure range from 0.3 Pa to 10 Pa for RF powers up to 1 kW is investigated, revealing that the photon fluxes are comparable to the ion fluxes, both of them about two orders of magnitude smaller than the atomic flux.

Ursel Fantz
Max-Planck-Institut fuer Plasmaphysik

Date submitted: 05 Jun 2016 Electronic form version 1.4