Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Optical emission spectroscopy of argon and hydrogen-containing plasmas[1] SARAH SIEPA, Institute for Experimental Physics II, Ruhr-University Bochum, Germany, STEPHAN DANKO, Robert Bosch GmbH, Germany, TSANKO V. TSANKOV, Institute for Experimental Physics V, Ruhr-University Bochum, Germany, THOMAS MUSSENBROCK, Institute of Theoretical Electrical Engineering, Ruhr-University Bochum, Germany, UWE CZARNETZKI, Institute for Experimental Physics V, Ruhr-University Bochum, Germany — Optical emission spectroscopy (OES) on neutral argon is applied to investigate argon, hydrogen and hydrogen-silane plasmas. The spectra are analyzed using an extensive collisional-radiative model (CRM), from which the electron density and the electron temperature (or mean energy) can be calculated. The CRM also yields insight into the importance of different excited species and kinetic processes. The OES measurements are performed on pure argon plasmas at intermediate pressure. Besides, hydrogen and hydrogen-silane plasmas are investigated using argon as a trace gas. Especially for the gas mixture discharges, CRMs for low and high pressure differ substantially. The commonly used line-ratio technique is found to lose its sensitivity for gas mixture discharges at higher pressure. A solution using absolutely calibrated line intensities is proposed. The effect of radiation trapping and the shape of the electron energy distribution function on the results are discussed in detail, as they have been found to significantly influence the results. (S. Siepa et al., J. Phys. D: Appl. Phys. 47 (2014) 445201)

[1]This work was supported by the Ruhr University Research School PLUS, funded by Germany's Excellence Initiative [DFG GSC 98/3].

Sarah Siepa
Institute for Experimental Physics II, Ruhr-University Bochum, Germany

Date submitted: 17 Jun 2015 Electronic form version 1.4