# P 23: Low Pressure Plasmas IV

Time: Friday 11:00–11:30 Location: KH 01.012

P 23.1 Fri 11:00 KH 01.012

**Double probe calibration in different plasma regimes using microwave cavity resonance spectroscopy** — •Andreas Petersen[1], Johanna Vogt[2], Jens Oberrath[2], Julian Held[3], and Franko Greiner[1,4] — [1]Institute of Experimental and Applied Physics, Kiel University, Kiel, Germany — [2]South Westphalia University of Applied Sciences, Soest, Germany — [3]Eindhoven University of Technology, Eindhoven, Netherlands — [4]KiNSIS, Kiel, Germany

Probe-based diagnostics remain a cornerstone of plasma characterization, offering spatially resolved measurements through precise positioning of the exposed probe tip. But factors like RF compensation and surface contamination can complicate matters. Also, the correct ion current model must be selected: while the ABR theory assumes collisionless, non-orbiting ions, the BRL framework incorporates ion orbiting and weak collisionality. For strongly collisional regimes the modified Talbot-Chou model is an option. This makes model selection nontrivial. We present a comparative study of simultaneous double-probe and microwave cavity resonance spectroscopy (MCRS) measurements, because MCRS is very sensitive and can detect changes in electron density of the order of $10^{10}\mathrm{m}^{-3}$. These results pave the way for future applications in nanodusty and electronegative plasma systems.

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P 23.2 Fri 11:15 KH 01.012

**Numerical studies on extreme-ultraviolet-induced low density hydrogen plasmas** — •Adelind Elshani[1], Ahmet Aksoy[1], Linus Nagel[1], Sascha Brose[1,2], Rolf Wester[2], Annika Bonhoff[1], and Carlo Holly[1,2] — [1]RWTH Aachen University TOS, Aachen — [2]Fraunhofer Institute for Laser Technology ILT, Aachen

The interaction of extreme-ultraviolet (EUV) radiation with low-pressure hydrogen gas induces a low-density hydrogen plasma. Understanding the underlying chemical and dynamic processes is essential but complicated due to plasma formation complexity and correlated influencing factors during experiments. Dedicated stand-alone setups using discharge-produced plasma EUV radiation sources allow for reduction of experimental complexity and simplified setups. In addition, experimental parameters can be systematically varied and adjusted leading to controllable boundary conditions. As a result, fundamental dependencies with mostly unbiased parameters can be experimentally investigated, covering intensity or power optimized exposures at 13.5 nm, with narrow to broadband spectral distributions in hydrogen gas atmospheres. An according modeling framework, adaptable to these setups is developed to link the experimental data with theoretical models. The combination of experiment and simulation enables an in-depth understanding of the EUV-induced hydrogen plasma formation. The presentation covers the key components of the modeling framework based on a kinetic approach, along with an analysis of the electron dynamics for high-intensity EUV exposure configurations.