Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

**Electric Field Measurement by Fluorescence-Dip Spectroscopy in Krypton**[1] TOBIAS KAMPSCHULTE, DIRK LUGGENHOELSCHER, JULIAN SCHULZE, UWE CZARNETZKI, Institute for Plasma and Atomic Physics, CPST, Ruhr-University Bochum, Germany, MARC BOWDEN, Dept. of Physics and Astronomy, The Open University, Milton Keynes, UK — The electric field in the boundary sheath of discharges is a key parameter for understanding the structure and dynamics of both electrons and ions. Knowledge of the field allows the determination of e.g. voltages, charge densities and currents. Electric fields can be measured directly by Fluorescence-Dip Spectroscopy (FDS). This technique is a combination of two-photon laser induced fluorescence and absorption spectroscopy using the Stark effect of Rydberg-states. It is non-invasive and provides high field sensitivity combined with excellent temporal and spatial resolution. Here the technique is applied for the first time to krypton as a probe gas. Rydberg-states up to n = 50 can be excited. Calibration measurements with known electric fields are performed and fields as low as 50 V/cm can be measured. In addition, the Stark-splitting has been calculated ab initio. Experimental and theoretical results agree very well. First measurements in the sheath of a capacitively coupled discharge in pure krypton are presented.

[1]Funding by: SFB 591

Julian Schulze
Institute for Plasma and Atomic Physics, CPST,
Ruhr-University Bochum, Germany

Date submitted: 16 Jun 2006 Electronic form version 1.4