Abstract Submitted
for the GEC13 Meeting of
The American Physical Society

**Laser-spectroscopic electric field measurements in a ns-pulsed microplasma in nitrogen**[1] PATRICK BOEHM, DIRK LUGGENHOELSCHER, UWE CZARNETZKI, Ruhr-University Bochum, FOR 1123 RESEARCH GROUP COLLABORATION — In this work for the first time ns-pulsed discharges in nitrogen at near atmospheric pressures are investigated by laser-spectroscopic electric field measurements, ultra-fast optical emission spectroscopy, current and voltage measurements. The discharge is operated with kV-pulses of about 150 ns duration between two parallel plate electrodes with a 1.2 mm gap. The laser technique for electric field measurement is based on a four-wave mixing process similar to Coherent anti-Stokes Raman Scattering (CARS). Here the static electric field acts effectively as the third wave with a zero frequency. The frequency of the generated anti-Stokes wave is in the IR regime and the amplitude is proportional to the electric field strength. By measuring the intensity of the IR- and anti-Stokes-signal it is now possible to determine the static electric field. Due to the short pulse-length of the lasers a temporal resolution in the ns range and a typical sensitivity of 50 - 100 V/mm in pure nitrogen is achieved (p >50 mbar). Field-measurements are accompanied by emission measurements using a streak-camera with sub-ns resolutions. Further, current and voltage measurements combined with the electric field measurements allow determination of the plasma density.

[1]Funding by DFG through FOR 1123

Patrick Boehm
Ruhr-University Bochum

Date submitted: 14 Jun 2013 Electronic form version 1.4