Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Sensitivity analysis and uncertainty quantification for the electric field determination in air from FNS and SPS ratio[1] ZDENEK BONAVENTURA, PETR BILEK, ADAM OBRUSNIK, TOMAS HODER, Masaryk University, Fac. Sci., Dept. Phys. Electronics., Czech Republic, MILAN SIMEK, Dept. Pulse Plasma Systems, IPP, The Czech Academy of Sciences, Czech Republic — Frequently used method for the determination of the electric field in discharges in air is based on the measurement of the ratio of luminous intensities emitted by radiative states of $N_2(C^3\Pi_u)$ (second positive system) and $N_2^+(B^2\Sigma_u)$ (first negative system This method is used for wide range of pressures from ground pressures, where it is applied for example to investigation of dielectric barrier discharge, up to ionospheric altitudes for remote sensing of Transient Luminous Events, e.g., lightnings, sprites and blue jets. It is well know that quenching rates of $N_2(C^3\Pi_u)$ and $N_2^+(B^2\Sigma_u)$ determined by various experimental methods exhibit serious discrepancies. Therefore we aim to investigate the impact of uncertainties in values of these rates on the electric field determined from FNS/SPS ratio. We present uncertainty quantification and sensitivity analysis for the kinetic scheme for resulting ratio of the FNS and the SPS. This analysis is based on the Elementary Effects (EEs) method invented by Morris. Uncertainty quantification based on Monte Carlo methods will be applied.

[1]This research has been supported by the Czech Science Foundation research project 15-04023S.

Zdenek Bonaventura
Masaryk University

Date submitted: 29 May 2017 Electronic form version 1.4