

Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Streamer development in barrier discharge in air: spectral signatures and electric field¹ TOMAS HODER, Masaryk University, DPE, Brno, Czech Republic, MILAN SIMEK, Czech Academy of Sciences, IPP, Prague, Czech Republic, ZDENEK BONAVENTURA, Masaryk University, DPE, Brno, Czech Republic, VACLAV PRUKNER, Czech Academy of Sciences, IPP, Prague, Czech Republic — Electrical breakdown in the upper atmosphere takes form of so called Transient Luminous Events (TLE). Down to the certain pressure limit, the first phases of the TLE-phenomena are controlled by the streamer mechanism. In order to understand the development of these events, streamers in 10 torr air were generated in volume barrier discharge. Stability and reproducibility of generated streamers were secured by proper electrode geometry and specific applied voltage waveform. In this work, spectrally resolved measurements of the streamer head emission with high spatial and temporal resolution are presented. Precise recordings of the emission of the second positive and first negative systems of molecular nitrogen allowed the determination of the spatio-temporal development of the reduced electric field in the streamer head. This unique experimental result reveals in more details the early stages of the streamer development and gives, besides values for streamer velocity and its diameter, quantitative information on the magnitude of the electric field.

¹T.H. was financed through the ESF Programme TEA-IS (grant no. 4219), M.S. and V.P. by the AVCR under collaborative project M100431201 and Z.B. acknowledges the support of grant of Czech Science Foundation GA15-04023S.

Tomas Hoder
Masaryk University, DPE, Brno, Czech Republic

Date submitted: 19 Jun 2015

Electronic form version 1.4