Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Effect of runaway electrons on discharge breakdown in air at atmospheric pressure: simulation study[1] ZDENEK BONAVENTURA, Masaryk University, Fac. Sci., Dept. Phys. Electronics, Brno, Czech Republic., OLIVIER CHANRION, Technical University of Denmark, National Space Institute (DTU Space), Kgs. Lyngby, Denmark, ANNE BOURDON, LPP, CNRS, Ecole polytechnique, Palaiseau, France, TORSTEN NEUBERT, Technical University of Denmark, National Space Institute (DTU Space), Kgs. Lyngby, Denmark — Thanks to development of both power supplies and diagnostic techniques, a number of experiments have been performed to study the discharges obtained using high voltage pulses with sub-nanosecond rise fronts. We use a 2D axisymmetric beam-bulk hybrid model, which describes cold electrons with a fluid model and high energy electrons with a particle model, to study discharge breakdown appearing in a negative point-to-plane gap submitted to very high voltage pulse. The results show the effect of high energy electrons on discharge development. While overtaking the discharge front, the high energy electrons pre-ionize the gas ahead and leave a trace of secondary seed electrons that in turn facilitate discharge propagation. Characteristics of fast electrons generated in the region of enhanced electric field ahead of the discharge propagating front are studied in detail.

[1]This work has been done partially within the LABEX Plas@par project and Agence Nationale de la Recherche project ANR-11-IDEX-0004-02. ZB acknowledges support from the Czech Science Foundation research project 15-04023S.

Zdenek Bonaventura
Masaryk University, Brno, Czech Republic.

Date submitted: 13 Jun 2017 Electronic form version 1.4