

Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Negative corona current pulse modelling in air at atmospheric pressure DELPHINE BESSIÈRES, JEAN PAILLOL, Laboratoire de Génie Electrique - Equipe Décharges Electriques et Modélisation, Université de Pau et des Pays de l'Adour — When a sufficiently high negative voltage is applied to the point of a point - plane electrode system in air at atmospheric pressure, current pulses are observed in the external circuit. These pulses are mainly discerned by a very short rise time of 1.5 ns. The negative corona ignition and development take place in the vicinity of the cathode and electron emission plays a crucial role : an accurate numerical description of a sharp cathode which is able to take electron emission into account is a real challenge. This paper proposed a numerical technique based on non-orthogonal meshing which enables to cope with these two problems. A discussion is proposed about the different emission mechanisms able to ignite and to sustain the discharge. Photo-emission and positive ion bombardment are introduced in the calculations as well as field emission. A satisfactory agreement is obtained when compared to experimental data already published by the authors. The paper focuses on the modelling of the first negative corona current pulse, and more precisely, on the mechanisms influencing the rise time of this pulse. The paper aims at giving a contribution to solve the theoretical problem of the mechanism of negative corona ignition in interesting conditions for applications.

Delphine Bessières
Laboratoire de Génie Electrique-Equipe Décharges Electriques
et Modélisation, Université de Pau et des Pays de l'Adour

Date submitted: 13 Jun 2010

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