Abstract Submitted
for the GEC19 Meeting of
The American Physical Society

Simulating long streamers in air with different reaction sets[1]
ANDY MARTINEZ, JANNIS TEUNISSEN, Centrum Wiskunde Informatica (CWI), UTE EBERT, Centrum Wiskunde Informatica (CWI), Technische Universiteit Eindhoven (TUe) — Large scale streamer discharges in air are observed in a variety of environments: high voltage laboratory experiments, lightning discharges, sprites above thunderclouds, etc. However, most simulation studies have thus far only considered relatively short cm-scale streamers. For long streamers, additional chemical reactions have to be considered that affect the streamer's conductivity and thereby also its propagation. In this study we investigate which chemical reactions (positive and negative ion conversion, electron recombination, ion recombination, etc.) play an important role for metre-scale streamers in STP air and how big the influence of these reactions is on the streamer properties (velocity, radius, electric field at the tip). An axisymmetric streamer model with adaptive mesh refinement and parallelization is used to perform the simulations.

[1]This project has received funding from the European Unions Horizon 2020 research and innovation program under project ID 722337 (SAINT).

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Date submitted: 03 Jun 2019 Electronic form version 1.4