Geophysical Research Abstracts
Vol. 17, EGU2015-11241, 2015
EGU General Assembly 2015

Influence of the angular scattering on the thermal runaway acceleration mechanism.

Olivier Chanrion (1), Zdenek Bonaventura (2), Anne Bourdon (3), and Torsten Neubert (1)

(1) Technical University of Denmark, National Space Institute (DTU Space), Kgs. Lyngby, Denmark (chanrion@space.dtu.dk), (2) Department of Physical Electronics, Faculty of Science, Masaryk University, Brno, Czech Republic , (3) Laboratoire de Physique des Plasmas, CNRS, Ecole Polytechnique, Palaiseau, France

The runaway electron acceleration mechanism is of great importance for the understanding of the generation of X- and Gamma-rays in atmospheric discharges. Recently, Terrestrial Gamma-ray Flashes (TGFs) were discovered by the Compton Gamma-ray Observatory in 1991. Those emissions are bremsstrahlung from high energy electrons which run away in electric fields associated with thunderstorms. In this presentation we focus on the theory of acceleration of thermal electrons to the runaway regime and discuss the influence of the scattering for electron energy close to the runaway threshold. We compare the outcome of different models with increasing complexity in the description of the scattering. The results show that the inclusion of the scattering in the model reduces the runaway production by allowing some electrons to diffuse out of the runaway regime before they reach energy high enough to justify a forward scattering model. The outcome of the present work emphasizes the importance of the set of cross section or model used to describe the angular scattering in electron-neutral collision when studying the runaway acceleration mechanism.