



## **Modelling the production of gamma-ray flashes from encountering leaders**

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Recent measurements by the Atmosphere-Space Interactions Monitor (ASIM) indicate that the production of energetic electrons and bremsstrahlung gamma-rays occur immediately prior to intracloud lightning breakdown. Inspired by this finding, we model the acceleration of electrons and the subsequent production of energetic photons in the electric field of two leaders of opposite polarity and separated by 100 m. Applying a particle Monte Carlo code, we initiate an electron current of approx. 1-2 kA from the negative leader tip and explore the process at different cloud altitudes. The code traces electrons and photons from sub-eV to tens of MeV and takes into account the self-consistent electric field resulting from ionization and charge separation of electrons and ions. We present the temporal evolution of the electron and photon densities, energies and spectra, and discuss the role of the electric field of the encountering leaders and the perturbation to the field by the induced space charge densities. Finally, we relate our results to consolidated ASIM measurements and discuss the relation between measurements and simulations.