

Converging sprite streamers

Lightning, one of the most experienced and most severe phenomena on Earth, is capable of initiating so-called sprite streamers, luminous discharges consisting of several channels of approx. 10-20 km length at 60-80 km altitude above thunderclouds.

Recently, a group of such sprite streamers were observed which consists of two spatially separated groups of luminous discharge filaments propagating towards each other [Z. Gomez Kuri et al., 2021. Converging Luminosity in Column-Sprite Filaments. *Geophys. Res. Lett.*, vol. 48, e2020GL090364], similar to the collision of two discharge channels, see [C. Köhn et al., 2017. Electron acceleration during streamer collisions in air. *Geophys. Res. Lett.*, vol. 44, pp. 2604–2613].

The purpose of this master project is to understand the exact mechanism how such two separated groups of luminous channels form and what makes them propagate towards each other on the relevant length and time scales.

The project consists of literature study about the nature of streamers and sprites, developing the necessary codes to simulate the emergence and propagation of luminous discharge channels, performing numerical simulations and conclusively post-processing of simulation results. The main goal of the master project is to entangle the enigma of the converging sprite streamers.

We at the Physics Department of TU Dortmund study various phenomena related to lightning ranging from the very early microscopic conditions to macroscopic manifestations.

If we have caught your attention, please contact christoph.koehn@tu-dortmund.de to obtain more information.