



Simulating streamers in atmospheric air

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Streamers are rapidly growing plasma filaments that can penetrate into non-ionized regions due to the electric field enhancement at their tips. They play an important role in creating the paths of sparks and lightning in nature, and are also widely used in industrial applications. We have developed a number of computer simulation codes with the ability of modeling problems in plasma-technology, in high voltage engineering as well as in lightning-related processes. In the talk, a new 3D particle code will be discussed in detail, which takes adaptive grid refinement, adaptive particle management and parallelization into account. We show some novel insights of streamer discharges from our particle simulations, i.e., overlapping avalanches in an overvolted gap, splitting of positive streamers induced by external background ionization or magnetic field. Other selected results of streamers will be represented as well.

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