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Particle based 3D modeling of streamer discharges JANNIS TEUNISSEN, ANBANG SUN, CHAO LI, Centrum Wiskunde & Informatica, UTE EBERT, Centrum Wiskunde & Informatica, Eindhoven University of Technology —
Streamers are rapidly growing plasma channels surrounded by a thin space-charge layer. They pave the way for sparks and lightning leaders, and they have many applications in plasma technology. There are fundamental open questions concerning streamers: Under what conditions do they emerge from electrodes? What determines properties like radius and velocity? When do they start to branch? To help answer these questions we have developed a 3D particle simulation with adaptive mesh refinement and dynamic particle control. This allows us to explore the full physics of streamer formation and initial propagation. We explain the modeling technique, present simulation results and discuss their implications.

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