Physics > Plasma Physics

Density models for streamer discharges: beyond cylindrical symmetry and homogeneous media

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Streamer electrical discharges are often investigated with computer simulations of density models (also called drift-diffusion-reaction models). We review these models, detailing their physical foundations, their range of validity and the most relevant numerical algorithms employed in solving them. We focus particularly on schemes of adaptive refinement, used to resolve the multiple length scales in a streamer discharge without a high computational cost. We then report recent results from these models, emphasizing developments that go beyond cylindrically symmetrical streamers propagating in homogeneous media.

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