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## Simulation of streamer initiation using a Particle in Cell code with Monte Carlo Collisions : Application to Sprite ignition.

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A particle code designed to simulate electrical breakdown of air is presented.

By the use of 2D axisymetrical coordinates, the code can simulate 3D development of an electron avalanche, its transition into a streamer and the beginning of the streamer propagation. A model of photoionization enables to have positive streamer propagation as well as negative one.

The method employed is a classical Particle in Cell method plus Monte Carlo treatment of collisions. The particles are followed inside a Cartesian mesh, collision processes are performed randomly accordingly cross sections and the self-consistent electric field is calculated.

The use of a particle method gives us a kinetic description of the electron population; in particular we can obtain the electronic distribution function in the head of the streamer where the electric field varies strongly.

Some results of streamer development and optical emissions from it under atmospheric condition of sprite ignition are presented.