

STREAMERS AND NANOSECOND PULSED DISCHARGES: THEORY AND EXPERIMENTS

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In this talk I will review our recent work on streamer discharges, with an emphasis on discharges in air. Based on experiments, theory and simulations on multiple scales in space and time, our understanding is now becoming more and more quantitative.

Given the broad attention on scientific plagiarism in the Dutch media, I will not give partial results away here, and republish them later in the international reviewed journals.

Results that I will discuss will include

1. Microscopic particle modelling of pulsed electric breakdown above and below the breakdown field in air [1,2],
2. Macroscopic corona models with large streamer numbers in so-called dielectric breakdown models, but now with finite streamer conductivity and consistent charge transport [3],
3. Experiments on the dependence of the morphology of positive streamers on repetition rate, gas composition and radioactivity [4,5], accompanied by theoretical understanding,
4. Experiments on metre long positive and negative discharges, showing a large streamer corona with transition to leader, and strong X-ray pulses within a particular stage of the discharge [6,7].

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