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Simulations of positive streamers with highly accurate transport data SASA DUJKO, GIDEON WORMEESTER, UTE EBERT, Centrum Wiskunde and Informatica, PO Box 94097, 1090 GB Amsterdam, The Netherlands — Streamers are the first mode of electric breakdown of non-ionized matter exposed to strong electric fields. Growing streamer filaments can emerge in a wide variety of gases and pressures. Previous experiments and numerical simulations have shown that streamer properties such as velocity and diameter are remarkably insensitive to changes in gas composition. In our numerical simulations, we use a fluid model to compute the densities of charged particles, obeying drift-diffusion-reaction equations. Previously, we used a constant, empirical value for the diffusion and mobility coefficients in these simulations. Using a multi term theory for solving the Boltzmann equation, we now have highly accurate transport data, which we have used to simulate streamers in N_2:O_2 mixtures to compare with our previous results. It is found that the simulated streamers are more sensitive to the transport data than they are to the gas composition.

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