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Simulations of streamers in N_2:O_2 and N_2:CO_2 mixtures using highly accurate transport data SASA DUJKO, Institute of Physics, University of Belgrade, PO Box 68, Zemun 11080, Belgrade, Serbia, GIDEON WORMEESTER, Centrum Wiskunde & Informatica (CWI), P.O.Box 94079, 1090 GB Amsterdam, The Netherlands, RON WHITE, ARC Centre for Antimatter-Matter Studies, School of Engineering and Physical Sciences, James Cook University, Townsville 4810, Australia, ZORAN PETROVIC, Institute of Physics, University of Belgrade, PO Box 68, Zemun 11080, Belgrade, Serbia, UTE EBERT, Centrum Wiskunde & Informatica (CWI), P.O.Box 94079, 1090 GB Amsterdam, The Netherlands — Streamers are growing filaments of weakly-ionized non-stationary plasma produced by an ionization front that moves through non-ionized matter. They 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 have 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 and N_2:CO_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.

Sasa Dujko
Institute of Physics, University of Belgrade,
PO Box 68, Zemun 11080, Belgrade, Serbia

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