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Electron transport coefficients in N_2-O_2 magnetized streamer discharges SASA DUJKO, UTE EBERT, GIDEON WORMEESTER, Centrum Wiskunde and Informatica (CWI), PO Box 94097, 1090 GB Amsterdam, The Netherlands, RONALD WHITE, ARC Centre for Antimatter-Matter Studies, James Cook University, Townsville 4810, Australia, ZORAN PETROVIC, Institute of Physics, University of Belgrade, P.O. Box 68, 11080 Zemun, Belgrade, Serbia —
There are three fundamental issues for streamers in magnetic fields: (1) how do magnetic fields affect the development of an electron avalanche and its transition into a streamer, (2) how do these effects depend on streamer polarity, and (3) how do magnetic fields affect streamer branching and morphology, if streamers emerge at all. The first step to resolve these issues requires careful consideration of electron transport in electric and magnetic fields. The required electron transport coefficients in mixtures of N_2 and O_2 are calculated from solving the non-conservative Boltzmann equation. Values and general trends of the mean energy, drift velocity vector, diffusion tensor elements, rate coefficients and other transport properties as a function of electric and magnetic field strengths and their orientation are reported here. Emphasis is placed upon the explicit and implicit effects of non-conservative collisions, ionization and attachment on various transport coefficients when the transport is controlled by a magnetic field. The errors associated with the two-term approximation for solving the Boltzmann equation are highlighted.

Sasa Dujko
Centrum Wiskunde and Informatica (CWI),
PO Box 94097, 1090 GB Amsterdam

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