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Updates on the freeware electron Boltzmann equation solver BOLSIG+ G.J.M. HAGELAAR, L.C. PITCHFORD, LAPLACE, CNRS and University of Toulouse, France — In 2005, we released BOLSIG+, a user-friendly and free computer application solving the Boltzmann equation for electrons in uniform electric fields in order to obtain electron transport coefficients and rate coefficients from cross section data. The physical principles of BOLSIG+ were described in a journal article [Plasma Sources Sci. Technol. 14, 722-733 (2005)]. Since then BOLSIG+ has grown into a standard tool in research on collisional gas discharges. This paper discusses a number of BOLSIG+ extensions/improvements that were added over the years but were never published in the official literature, including anisotropic diffusion coefficients. We also show comparisons with Monte-Carlo calculations in order to evaluate possible errors due to the two-term approximation (of the angular dependence of the distribution function) used by BOLSIG+. These errors are smaller than is generally thought and are in fact insignificant over a wide range of conditions, provided that proper attention is paid to the consistency of the input data and the definition of the transport coefficients.

G.J.M. Hagelaar
LAPLACE, CNRS and University of Toulouse

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