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Interpretation of calculated transverse and longitudinal diffusion for electrons in gases A.V. PHELPS, JILA and National Inst. of Standards and Technology, G.J.M. HAGELAAR, LAPLACE, CNRS and Universite de Toulouse, France — Ratios of transverse D_T and longitudinal D_L diffusion coefficients to mobility μ and mean energies for electrons in gases are calculated for a wide range of E/N for He, Ar, Xe, H_2, N_2, and CO. These transport coefficients are determined from spatial-gradient expansion, two-term spherical harmonic theory[1,2] and from Monte Carlo simulations.[3,4] As predicted by simplified theory[5] applied to the heavier rare gases, e.g., Ar and Xe, the ratio D_T/D_L reaches 7 to 10 at mean electron energies for which the momentum transfer cross sections are rapidly rising functions of energy. Comparisons are made of simplified[6] and detailed predictions of D_L/D_T values for N_2 and CO at low electron energies where the effects of scattering by the quadrupole potential of N_2 versus the dipole/quadrupole potential of CO are expected to be observed.

[1]J. H. Parker and J. J. Lowke, Phys. Rev. **181**, 290 (1969).
[2]G. J. M. Hagelaar (unpublished codes, 2012).
[3]Ibid.
[4]S. F. Biagi, Nucl. Instr. and Meth. A **421**, 234 (1999).
[5]Parker, Lowke, Op. cit.
[6]Ibid.

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