Coherent set of electron cross sections for argon

L.L. ALVES, C.M. FERREIRA, IPFN/IST-UTL, Lisbon, Portugal — This paper presents a coherent set of electron impact cross sections for argon [1] (elastic momentum-transfer, inelastic for the excitation of 37 levels Ar(4s,4p,3d,5p,4d,6s) and ionization), which was recently uploaded onto the LXcat IST-Lisbon database [2]. The cross section set was validated by comparing calculated swarm parameters (electron mobility and characteristic energy) and rate coefficients (Townsend ionization coefficient and direct + cascade excitation coefficients to the 4s and 4p states) with available experimental data, for $E/N = 10^{-4} – 100$ Td and $T_g = 300, 77$ K. The validation procedure involves the solution to the homogeneous two-term electron Boltzmann equation, resorting to three different solvers: (i) IST-Lisbon’s; (ii) BOLSIG+ (v1.2) with LXcat; (iii) BOLSIG+ (v1.23) [3]. The results obtained with these solvers are compared to evidence the importance of certain numerical features related with both the energy-grid (number of points, grid-type and maximum energy value) and the interpolation scheme adopted for the cross sections. In particular, the latter can cause a 6% variation on the values of swarm parameters at intermediate $E/N$s. [1] A. Yanguas-Gil, J. Cotrino and L.L. Alves, J. Phys. D 38, 1588 (2005). [2] http://www.lxcat.laplace.univ-tlse.fr/ [3] G.J.M. Hagelaar and L.C. Pitchford, Plasma Sources Sci. Technol. 14, 722 (2005).