Uncertainty in Computed Electron Transport Coefficients[1] RHYS
DOYLE, MILES TURNER, Dublin City University — Calculation of electron transport parameters from cross section data is central to most approaches to low-temperature plasma modelling. These calculations depend on knowledge of electron-neutral scattering cross sections, which are typically determined by experiments. Such experiments always deliver uncertain results, and this uncertainty necessarily influences any computed transport parameters. A global interest in uncertainty quantification requires that we understand the relationship between uncertainty in cross sections and uncertainty in transport parameters. In this work, we quantify the influence of this uncertainty on computed transport parameters. In general, the uncertainty in any particular transport parameter is a function of the uncertainty in every relevant cross section, but the nature of this relationship is non-obvious. We here employ a screening procedure (the Morris Method) to associate the uncertainty in several particular transport parameters (mobility, diffusion coefficient, certain rate constants) with the uncertainty in cross section data, for the particular cases of helium and nitrogen.

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