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Electron swarms in water vapour: measurement, transport theory and cross-sections[1] RON WHITE, ARC Centre for Antimatter-Matter Studies, School of Engineering and Physical Sciences, James Cook University, K.F. NESS, ARC Centre for Antimatter-Matter Studies, School of Engine ering and Physical Sciences, James Cook University, R.E. ROBSON, ARC Centre for Antimatter-Matter Studies, School of Engineering and Physical Sciences, James Cook University, M.J. BRUNGER, ARC Centre for Antimatter-Matter Studies, School of Chemical and Physical Sciences, Flinders University — The determination of a comprehensive set of electron–water vapour cross-sections is fundamental to understanding electron induced processes arising in applications ranging from plasma discharges to astrophysics, planetary, terrestrial and cometary atmospheres and radiation damage modelling. Formulation of complete sets are generally based on a critical assessment of available experimental "beam" studies and theoretical calculations. Issues of completeness and accuracy of cross-section sets still remain and it is here that swarm experiments play a key role. In this presentation we assess the consistency of recent cross-section sets, particularly those including recent measurements for vibrational and electronic excitation. Comparison of calculated transport coefficients using an improved multi-term Boltzmann equation solution with the available experimental swarm measurements provides a discriminating test on consistency and accuracy of the cross-section sets. Issues associated with transport coefficient definition and experimental interpretation will be revisited and distilled.

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