Angle resolved ($e^- + H_2O$) measurements near 0°

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A fully electrostatic beam [1] characterized by a high angular discrimination (≈ 0.7°) has been used to measure the total (σ_T) and differential cross section of e^- scattering from water vapor. Measurements for σ_T have previously been carried out on the same equipment for $e^+ + H_2O$ [2].

Although cross sections for electron systems have been investigated since the early 20th century, discrepancies had remained among experimental and theoretical results at low energies until now e.g. [3, 4]. The new results for σ_T [5] are presented in figure 1, together with previous experimental and theoretical determinations. The effect of forward scattering has also been probed in the angular range 0 – 3.5° and measures of the average (rotationally and vibrationally summed) differential elastic cross sections for energies ≤ 12 eV have been obtained at a scattering angle ≈1° [5]. These measurements provide the first test of theoretical predictions in an angular region experimentally unexplored until now.

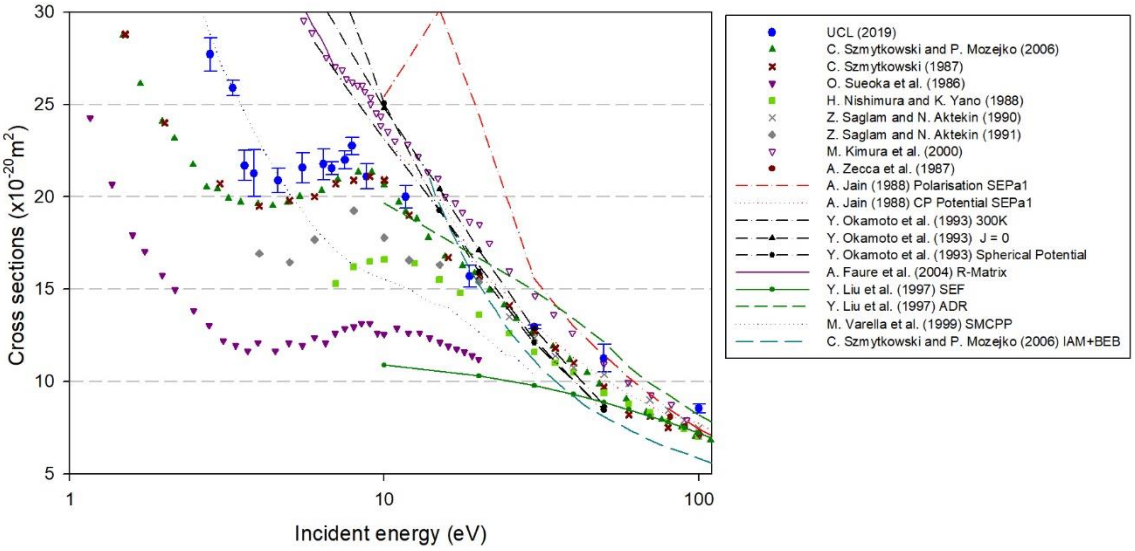

Figure 1 *Experimental and theoretical cross sections for electron scattering from H_2O. Solid symbols denote direct measurements, hollow symbols denote measurements corrected for forward angle elastic scattering and lines denote theories [5].*

References

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