

Ionization of water molecules by fast neutral H and He impact

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Synopsis We present theoretical calculation for total, simply, and double differential cross sections of single ionization of vapour water molecules by fast neutral H and He atoms impact.

Ionization of water molecules by multi-charged fast ions has been vastly studied in both the theoretical area as in the experimental one over the last years (*e.g.* [1-3]). This is not the same for the case of water molecules ionization by dressed or neutral projectiles impact where few experimental results are found in the bibliography, mainly for total cross sections [4-6]. Even less are the experiments that were performed in a way that electron emission from the water molecule target as well as from the ionic or atomic projectile can be distinguished. It is important to highlight that the study of electron emission from molecular targets by bare, partially-dressed, or neutral target is of main interest in many atomic and molecular physics as well as in plasma physics, and radiobiology.

With the intention of encouraging the scientific community to perform experiments where the target and projectile ionization can be distinguished, we present theoretical results regarding the ionization of vapour water molecules by neutral H and He atoms impact. A set of total, simply, and doubly differential cross sections is calculated within the first Born approximation with correct boundary conditions (CB1).

Comparison with the existing experimental results will be made in every possible case (see Figure 1).

Details on the calculations, results, and the theoretical model will be given during the conference.

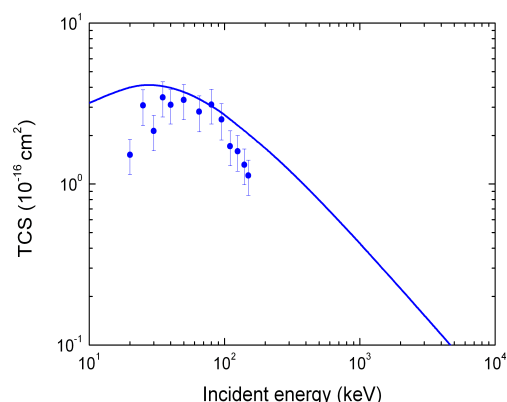


Figure 1. Total cross section for single ionization of water by neutral H impact. Theory: present results. Experiments: Gobet *et al.* [4].

References

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