**Electron- and photon-impact atomic ionisation**

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The past decade has seen extraordinary theoretical progress in the field of fully kinematically resolved atomic electron-impact ionisation, and its closely related field of double photoionisation. These processes were challenging to calculate due to formal and computational difficulties associated with break-up problems involving the longrange Coulomb potential. Presently, however, these processes can be calculated accurately for simple targets such as atomic hydrogen and helium, irrespective of the kinematics considered or the geometry of detectors. Collisions in the realm of atomic physics not only have many practical applications, but also form the testing ground for the underlying quantum collision theory, made possible by the wealth of available experimental data. Due to the long range nature of the Coulomb potential, charged particles continue to interact with each other even at infinite separation. For this reason the much-studied problem of electron-impact ionisation, and its very close relative of non-sequential double photoionisation, have lacked a proper formal foundation despite many successful computational implementations. In fact it was the success of the computational approaches to the problems that drove us to revisit the underlying formal theory. The purpose of this work is to review the recent progress in formal ionisation theory, and show how it relates to the successful computational techniques, which aim to fully solve the ionisation problems without resorting to approximations that limit the applicability of the methods. Such issues are best addressed using relatively simple targets such as atomic hydrogen and helium, where we can be very confident in the accuracy of the calculated target structure. Additionally, we restrict the detailed discussion to the lower energies, where high-energy approximations are inaccurate. We report on the computational progress, and how it has resulted in a deeper understanding of the formalism of Coulomb few-body problems.

The review paper was published in Physics Reports 520 (2012) 135–174. A.M. acknowledged the support by NSF and DOE grants.