Recent progress in convergent close-coupling approach to ion-atom collisions

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We review recent progress in applications of the wave-packet convergent close-coupling (WP-CCC) approach to ion-atom collisions relevant to the CRP on Data for Atomic Processes of Neutral Beams in Fusion Plasma. In particular, we will present

- A computationally more efficient one-centre approach to two-centre rearrangement collisions involving single and multielectron targets [1]. The method is tested on proton-hydrogen system and then applied to proton-lithium collisions.
- The angular differential cross sections of elastic scattering, excitation, and electron capture, as well as the ionisation cross sections singly differential in the ejected-electron angle, and in the ejected-electron energy [2] in proton-hydrogen collisions.
- The angular differential cross sections for direct scattering and electron capture [3], and various singly differential cross sections for ionisation [4] in proton-helium collisions.
- An effective single-electron treatment of ion collisions with multielectron targets that does not use the independent-event model [5]. The method is applied to calculate single-electron capture and single-ionisation cross sections for proton collisions with alkalis.
- We also report on calculations of the total and state-selective cross sections for bare beryllium ion collisions with hydrogen in its ground state [6], and update on the status of similar calculations for the excited states of hydrogen.

References

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