

Basis generator method calculations for ion-atom collision systems of indirect and direct relevance to neutral beams in fusion plasmas

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I will report on recent progress with two-center basis generator method (TC-BGM) calculations for collision systems that are of indirect and direct interest in the context of fusion-plasma research. In the *indirect* category we have studied low-impact-energy C^{6+} and O^{8+} collisions from hydrogen and krypton atoms [1]. The work was motivated by recent measurements of Lyman-line emissions after capture from krypton into those ions. Since krypton and hydrogen have very similar (first) ionization potentials it was argued that the krypton measurements may be compared with calculations for hydrogen targets. Our results for both targets and both ions suggest that this is in general not a terribly good idea [1].

More recently, and in the *direct* category, we started to look into the problem of target excitation, electron capture, and ionization in proton collisions from excited hydrogen atoms. Not surprisingly, larger basis sets than for ground-state target atoms are required to achieve reasonable convergence. Preliminary results will be presented and compared with recent wavepacket convergent close-coupling [2] and previous theoretical calculations.

[1] A. C. K. Leung and T. Kirchner, Phys. Rev. A **97**, 062705 (2018)

[2] I. B. Abdurakhmanov *et al.*, Plasma Phys. Control. Fusion **60**, 095009 (2018)