

# Basis generator method calculations for ion-atom collision systems of relevance to neutral beams in fusion plasmas: November 2021 update

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I will report on our recent progress with two-center basis generator method (TC-BGM) calculations for collision systems of interest in the context of fusion-plasma research. Two items have been addressed: (i) collisions of  $\text{Be}^{4+}$  ions with atomic hydrogen in ground and excited initial states, (ii) collisions of bare and partially-stripped triply charged ions ( $\text{Li}^{3+}$ ,  $\text{C}^{3+}$ ,  $\text{O}^{3+}$ ) with ground-state hydrogen.

In subproject (i) we have focused on the collision energies of 20, 100, and 500 keV/amu, as agreed upon in a previous meeting, and have calculated target excitation, electron capture, and total ionization cross sections. Reasonably well-converged results are obtained for H(1s) and H(2s) initial states, but not for H(2p).

For the triply-charged ions we have looked at collision energies from 1 to 100 keV/amu and have compared our calculations with previous work, where available. For the  $\text{C}^{3+}$  case we have checked that our cross-section results do not change dramatically if different effective potentials are used to represent the projectile. Moreover, our calculations do not indicate that the projectile electrons play an active role in the collision dynamics.