# Charge exchange cross sections for $Ar^{3+}$-H and $Ar^{2+}$-$H^+$ collisions with an atomic orbitals close coupling approach

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During the talk, I will first shortly describe the straight-line impact parameter method (IPM) which have been used to compute cross sections for electronic processes in $Ar^{3+}$-H and $Ar^{2+}$-$H^+$ collisions in the collision energy range going from 1 keV/u to 100 keV/u. In the IPM, one assumes that the relative motion of the projectile and target is described by a classical trajectory defined as $\vec{R}(t) = \vec{b} + \vec{v}t$ (see figure). In the collision energy range of interest this assumption is valid since the impact energy largely exceeds the energy loss from the inelastic electronic processes and the scattering diffusion angle is small. The IPM leads to the Time-Dependent Schrödinger Equation (TDSE) for the electron(s) in the moving field of the nuclei.

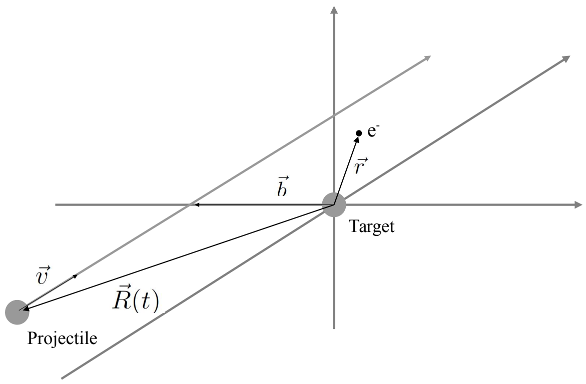


**Fig. 1** Collision geometry. The impact parameter $\vec{b}$ and the projectile velocity $\vec{v}$ define the collision plane. The position of the electron with respect to the target center is denoted $\vec{r}$.

After introducing the IPM, our implementation will be presented in details. In particular, I will discuss the use of model potentials and atomic orbitals to describe $Ar^{3+}$ and $Ar^{2+}$ states. Finally, I will show the results for $Ar^{3+}$-H and $Ar^{2+}$-$H^+$ collisions.