Three-Body Observables with Core Excitation

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Breakup reactions have shown the importance of continuum in the description of reactions involving halo nuclei. Generally, these processes are described by assuming a few-body model for the projectile with two or more inert clusters without considering additional degrees of freedom, as the excitation of the core.

Recent attempts to incorporate the effect of core excitation in both the structure and the dynamics of the collision have been proposed, like the extensions of the Distorted Wave Born Approximation (DWBA) [1] or the Continuum Discretized Coupled Channels (CDCC) methods [2].

In this work, the structure of the projectile is described in the weak–coupling limit, assuming a particle-rotor model. The eigenfunctions are obtained by diagonalizing the Hamiltonian in a square–integrable basis (pseudo–states). For the reaction dynamics, the extension of the CDCC method is adapted to be used along with the pseudo-states basis [3].

This approach is successfully applied to the breakup of ^{11}Be on different stable targets and the core momentum distributions in terms of the projectile energy are derived.

References

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