

# Influence of the projectile description on breakup calculations

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Breakup is one of the mostly used tools to study halo nuclei [1]. This technique is also used as an indirect method to measure cross sections of radiative capture reactions of astrophysical interest [2]. Various theories have been developed to analyse the experimental data [3]. These models usually rely on a two-body description of the projectile: a core, which contains most of the nucleons, to which a light fragment is loosely bound. The interaction between the core and the fragment is simulated by a potential whose parameters are adjusted to reproduce some levels of the projectile spectrum. However, this potential is not unique and the sensitivity of the calculations to the potential choice should be assessed.

Recently, the breakup of  $^{11}\text{Be}$  on lead at 69 MeV/nucleon has been remeasured at RIKEN [4]. From their analysis, the authors extracted a spectroscopic factor of 0.7 for the  $^{10}\text{Be}(0^+) \otimes 1s1/2$  configuration. In this talk, we analyse the accuracy of this figure by performing breakup calculations using different  $^{10}\text{Be-n}$  potentials within a time-dependent framework [5]. The results show a significant dependence of the cross section on the potential choice (about 30%). Our analysis indicates that both the asymptotic normalisation constant (ANC) of the ground state, and the phase shifts of the scattering states describing the unbound system play a role in this dependence. The Coulomb breakup of  $^{11}\text{Be}$  probes thus not only the ground-state structure of the projectile, but also the description of its continuum.

A similar analysis is performed for the breakup of  $^8\text{B}$  on Ni at 26 MeV using a CDCC technique [6]. Here also, the cross section is found to depend on the  $^7\text{Be-p}$  potential. However, due to the small variation of the phase shifts with the potential choice, only the ANC of the  $^8\text{B}$  ground state seems to play a significant role. This is probably due to the very small binding energy of the projectile.

These results suggest that breakup calculations are sensitive to the core-fragment potential chosen to simulate the projectile. Therefore the extraction of spectroscopic information from dissociation measurements should be performed cautiously, taking into account this dependence.

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