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Ab Initio NCSM/RGM for Three-Cluster Structure Systems[1]
CAROLINA ROMERO-REDONDO, TRIUMF, SOFIA QUAGLIONI, Lawrence Livermore Natl Lab, PETR NAVRÁTIL, TRIUMF, GUILLAUME HUPIN, Lawrence Livermore Natl Lab — The *ab initio* no-core shell model/resonating group method (NCSM/RGM) introduced in [1] is a technique able to describe both structure and reactions in light nuclear systems. This approach combines a microscopic cluster technique with the use of realistic inter-nucleon interactions and a consistent microscopic description of the nucleon clusters. In this work, we introduce the treatment of three-body cluster dynamics, making the approach suitable for the investigation of systems presenting such structure. We present results obtained for ^{6}He within a ^{4}He(g.s.)+n+n basis [2]. We find a bound state in the $J^\pi T = 0^+1$ channel, corresponding to the ^{6}He ground state. On the continuum, we obtained the experimentally well-known 2^+_1 resonance as well as the second low-lying 2^+_2 resonance recently measured at GANIL [3]. In addition, we predict low-lying resonances in $J^\pi = 1^+$, 2^-, and 0^- channels. We will present initial results including core excitations through the no-core shell model with continuum coupling and for the structure of ^{5}H within a ^{3}H+n+n basis.

[1] S.Quaglioni and P. Navrátil, PRL 101, 092501 (2008), [2] S. Quaglioni, C.Romero-Redondo, P. Navrátil, PRC 88, 034320 (2031), [3] X. Mougeot *et al*, Phys. Lett. B 718

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