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Ab initio no-core shell model and microscopic light-ion reactions SOFIA QUAGLIONI, PETR NAVRATIL, LLNL — We report on recent results of our work in the direction of building an *ab initio* method for low-energy light-ion reactions by augmenting the no-core shell model (NCSM)^{1,2} to include clustering and resonant and non-resonant continuum. For this purpose, we adapt the resonating group method³, a microscopic technique in which the many-body problem is mapped onto various channels of nucleon clusters and their relative motion. In our approach we use NCSM wave functions for the clusters involved, and NCSM effective interactions derived from realistic nucleon-nucleon and three-nucleon interactions. In particular, we will present our first results for the scattering of low-energy neutrons on ⁴He. This work was performed under the auspices of the U. S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48. Support from U.S. DOE/SC/NP (Work Proposal Number SCW0498) is acknowledged.

References

P. Navrátil et al, Phys. Rev. Lett. 84, 5728 (2000); Phys. Rev. C 62, 054311 (2000).

P. Navrátil and W. E. Ormand, Phys. Rev. Lett. 88, 152502 (2002); Phys. Rev. C 68, 034305 (2003).

3. K. Wildermuth and Y. C. Tang , A Unified Theory of the Nucleus., Vieweg, Braunschweig (1977).

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