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Benchmark result on the ^4He photoabsorbtion cross section
SOFIA QUAGLIONI, IONEL STETCU, BRUCE R. BARRETT, Univ. of Arizona, SONIA BACCA, Gesellschaft für Schwerionenforschung, PETR NAVRÁTIL, LLNL, WINFRIED LEIDEMANN, GIUSEPPINA ORLANDINI, Univ. of Trento, NIR BARNEA, Racah Institute of Physics, CALVIN W. JOHNSON, SDSU — We present the results of a benchmark calculation of the ^4He photoabsorbtion cross section via the Lorentz integral transform approach, using both the no-core shell model (NCSM) and the effective interaction hyperspherical harmonic (EIHH) expansion methods. The present study, which is fully microscopic in the treatment of the dynamics in both the initial and final states, uses a semirealistic nucleon-nucleon potential, with the goal to test the reliability of the NCSM for the description of such processes. We find that the results of both EIHH and NCSM agree, which opens the way for the use of two- and three-body forces obtained from EFT, and for applications to heavier nuclei by means of the NCSM. S.Q., I.S., and B.R.B acknowledge partial support by NFS grants PHY0070858 and PHY0244389. The work was performed in part 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. P.N. received support from LDRD contract 04-ERD-058. W.L. and G.O. acknowledge support by the grant COFIN03 of the Italian Ministry of University and Research. N.B. acknowledges support by the Israel Science Foundation (Grant No. 202/02). C.W.J. acknowledges USDOE grant No.DE-FG02-03ER41272.

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