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Operator evolution for *ab initio* electric dipole transitions of ^{4}He[1]
MICAH SCHUSTER, San Diego State Univ, SOFIA QUAGLIONI, LLNL, CALVIN JOHNSON, San Diego State Univ, ERIC JURGENSON, LLNL, PETR NAVRATIL, TRIUMF — A goal of nuclear theory is to make quantitative predictions of low-energy nuclear observables starting from accurate microscopicinternucleon forces. Modern effective interaction theory, applying unitary transformations to soften the nuclear Hamiltonian and hence accelerate the convergence of *ab initio* calculations as a function of the model space size, is a major element of such an effort. The consistent simultaneous transformation of external operators, however, has been overlooked in applications of the theory, particularly for non-scalar transitions. We study the evolution of the electric dipole operator in the framework of the similarity-renormalization group method and apply the renormalized matrix elements to the calculation of the ^{4}He total photo absorption cross section and electric dipole polarizability. All observables are calculated within the *ab initio* no-core shell model. We find that, although seemingly small, the effects of induced operators on the photo absorption cross section are comparable in magnitude to the correction produced by including the three-nucleon force and cannot be neglected.

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