

Abstract Submitted
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Non-Local Translationally Invariant *Ab Initio* One-Body Density Matrices¹ MATTHEW BURROWS, CHARLOTTE ELSTER, GABRIELA POPA, Dept. of Physics and Astronomy and INPP, Ohio Univ., Athens, OH 45701, USA, ANDREAS NOGGA, IAS-4, IKP-3, JHCP, and JARA-HPC, Forschungszentrum Jülich, D-52428 Jülich, GER, KRISTINA LAUNEY, Dept. of Physics and Astronomy, Louisiana State Univ., Baton Rouge, LA 70803, USA, PIETER MARIS, Dept. of Physics and Astronomy, Iowa State Univ., Ames, Iowa 50011, USA — A derivation of microscopic effective interactions (optical potentials) between nucleons and a nucleus requires in first order aside from the NN interaction a non-local *ab initio* one-body density matrix for the target nucleus which is translationally invariant. We obtained non-local one-body density matrices from no-core shell-model (NCSM) calculations based on the JISP16 NN interaction for ${}^4\text{He}$, ${}^6\text{He}$, and ${}^6\text{Li}$ as well as from a symmetry-adapted NCSM for ${}^{12}\text{C}$ using the same interaction. We present how the center-of-mass inherent in the NCSM calculation is removed exactly for non-local one-body density matrices. We further explore the nature of the non-locality and compare with commonly used approximations for this non-locality.

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