Abstract Submitted
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Binding energies and energy differences for p-shell nuclei from *ab initio* calculations with natural orbitals[1] PATRICK J. FASANO, MARK A. CAPRIO, University of Notre Dame, CHRYSOVALANTIS CONSTANTINOU, Yale University, PIETER MARIS, JAMES P. VARY, Iowa State University — *Ab initio* methods in nuclear theory strive to make quantitative predictions of nuclear observables, starting with the internucleon interaction. In the no-core configuration interaction (NCCI) approach, the nuclear many-body problem is solved in a basis of Slater determinants constructed from single-particle states. NCCI calculations are computationally limited by combinatorial explosion of the many-body basis size; as such, choice of basis greatly influences convergence. Natural orbitals, constructed by diagonalizing the one-body density matrix from an initial many-body calculation, maximize occupation of the lowest single-particle states and thereby reduce the importance of higher-lying many-body basis states. We use natural orbitals to explore energies and energy differences in p-shell nuclei.

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