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Ab Initio Calculations of Electroweak Transitions in A=8 Nuclei
MUSLEMA PERVIN, STEVEN PIEPER, ROBERT WIRINGA, Physics Division, Argonne National Laboratory — The variational Monte Carlo (VMC) and Green's function Monte Carlo (GFMC) techniques are powerful tools for calculating properties of light nuclei. These methods in combination with the Argonne v_{18} two-nucleon and Illinois-2 three-nucleon potentials, have recently been applied to calculate electroweak matrix elements in A=6, 7 nuclei with some success. We are now applying the GFMC method to additional off-diagonal matrix elements for nuclei with A= 8. The electroweak transitions for A=8 are more challenging because many involve transitions from a big component of an initial state to a small component of a final state. In addition some of the physical states have significant isospin mixing. Of particular interest are the weak decay processes ^{8}Li(β^-)^{8}Be* and ^{8}B(β^+)^{8}Be*. The many-body calculations were performed on the parallel computers of the Laboratory Computing Resource Center, Argonne National Laboratory. This work is supported by the U. S. Department of Energy, Office of Nuclear Physics, under contract No. DE-AC02-06CH11357.

Muslema Pervin
Physics Division, Argonne National Laboratory

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