

# Comparison between Variational Monte Carlo and Shell Model Calculations of Neutrinoless Double Beta Decay Matrix Elements in Light Nuclei

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Benchmark comparisons between many-body methods are performed to assess of the ingredients necessary for accurate calculation of neutrinoless double beta decay matrix elements.

Shell model and variational Monte Carlo (VMC) calculations are carried out for  $A = 10$  and  $12$  nuclei. Different variational wavefunctions are used to evaluate the uncertainties in the  $\{it ab initio\}$  theory, and fairly small difference is found between the VMC double beta decay matrix element predictions. For shell model calculations, the role of model space truncation, radial wavefunction choices, and short-range correlation are investigated and all found to be important. Based on the detailed comparisons between the VMC and shell model approaches, we conclude that accurate descriptions of neutrinoless double beta decay matrix elements require a proper treatment of both long-range and short-range correlations.

## Abstract Type

Talk

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