

SHELL-MODEL MONTE CARLO STUDIES OF NEUTRON-RICH NUCLEI IN THE 1s-0d,1p-0f SHELLS¹

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We demonstrate the feasibility of realistic shell-model Monte Carlo (SMMC) calculations spanning multiple major shells, using a realistic interaction whose bad saturation and shell properties have been corrected by a newly developed general prescription. Particular attention is paid to the approximate restoration of translational invariance. The model space consists of the full *sd-pf* shells. We include in the study some well-known $T=0$ nuclei and several unstable neutron-rich ones around $N = 20,28$. The results indicate that SMMC can reproduce binding energies, $B(E2)$ transitions, and other observables with an interaction that is practically parameter-free. Some interesting insight is gained on the nature of deep correlations. The validity of previous studies is confirmed.

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