

Analyzing the Ground State of Unstable Isotopes of $^{24-28}\text{Ne}$ in the Single Neutron-Knockout Reaction

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Abstract

In this study, the ground states of five non-stable isotopes ($^{24-28}\text{Ne}$) were analyzed using single-neutron-knockout reaction data. Initially, using the optical Glauber model, single-particle cross-sections are calculated in two steps. Then the spectroscopy factor of each single-particle state was extracted by the shell-model code OXBASH. The combination of these two quantities was compared with the experimental data. The percent abundance of ground states of the residual nucleus (fragment) A-1 is more than its excited states (more than 60%). The contribution of the break-up is more than the elastic scattering. The even isotopes show more agreement than the odd ones. Given the low variance of the single-particle cross-sections to energy (10 to 13%), a big portion of the disagreement may be assigned to the uncertainty of the nuclear density.

Keyword: unstable neon isotopes, optical Glauber model, single-neutron knockout reactions, spectroscopy factors

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