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Halo-EFT description of halo nuclei within one-neutron removal reactions

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Since their discovery, halo nuclei have challenged usual nuclear-structure models. These exotic nuclei exhibit a strongly clusterized structure, in which one or two loosely-bound nucleons have a high probability of presence far from the others, forming a diffuse halo around them. One-neutron removal reactions are often used to probe the single-particle structure of halo nuclei since they exhibit high counting statistics thanks to the loose binding of the halo to the rest of the nucleons. In this work, we reanalyze the one-neutron knockout measurements of ^{11}Be and ^{15}C on beryllium at about 60 MeV/nucleon, considering effective field theory (Halo-EFT) descriptions of ^{11}Be and ^{15}C. We show that constraining the parameters of the Halo-EFT with *ab initio* predictions leads to an excellent agreement with the experimental data. This shows that Halo-EFT can be reliably used to analyze one-neutron knockout reactions measured for halo nuclei and test predictions from state-of-the-art nuclear structure models on these experimental data.

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Topic

Theory

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