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Structure of extremely neutron-rich $^9,^{10}\text{He}$

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Nuclear resonant states far from the stability line provide a stringent test of nuclear forces at extreme isospin asymmetry. In this talk, I will report on the low-lying resonant states of extremely neutron-rich ^9He and ^{10}He populated via the (p, 2p) reaction from the 2n-halo nucleus ^{11}Li at ~ 250 MeV/nucleon. The obtained ^9He spectrum shows a clear peak at 1.2 MeV with a width of ~ 1 MeV, which is probably a p-wave resonance. The resonance parameters play a key role to understand the ^8He -neutron interactions. The ^{10}He spectrum was obtained from the three-body invariant mass of $^8\text{He}+2n$, with much higher statistics than previous measurements [1,2]. The spectrum was compared to the theoretical calculation that combines the coupled-channel three-body model of ^{11}Li [3] and the quasi-free knockout (p, 2p) reaction model [4,5]. Two low-lying 0^+ resonant states of ^{10}He were identified at ~ 1 MeV and at ~ 2 MeV, which have a $[s_{1/2} s_{1/2}]0^+$ configuration and a $[p_{1/2} p_{1/2}]0^+$ configuration, respectively.

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Collaboration

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