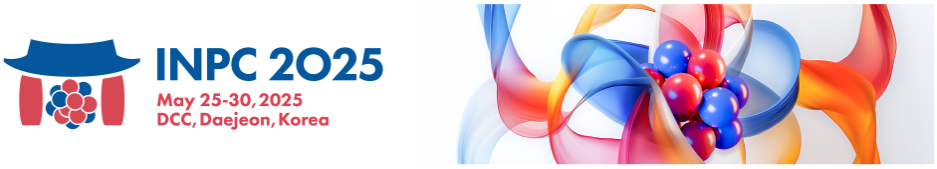

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Revealing the structures of extremely neutron-rich Helium-9 and Helium-10

Friday, 30 May 2025 09:55 (15 minutes)

Nuclear resonant states far from the stability line provide a stringent test of nuclear forces at extreme isospin asymmetry. Nowadays, it is possible to make ab initio nuclear-structure calculations for very light nuclei. In this talk, I will report on the low-lying resonant states of extremely neutron-rich 9He and 10He populated via the proton induced knockout reactions from 2n-halo nucleus 11Li at ~250 MeV/nucleon. The obtained 9He spectrum shows a clear peak at 1.3 MeV with a width of ~ 1 MeV, which is probably a p-wave resonance. The resonance parameters play a key role to understand the elusive 8He-neutron interactions. The 10He spectrum was obtained from the three-body invariant mass of 8He+2n, with much higher statistics and better sensitivities than previous measurements. The spectrum was compared to the theoretical calculation that combines the coupled-channel three-body model of 11Li and the quasi-free knockout (p, 2p) reaction model. Two low-lying 0+ resonant states of 10He were identified at ~ 1 MeV and at ~2 MeV, which have a [s1/2 s1/2]0+ configuration and a [p1/2 p1/2]0+ configuration, respectively. Unique features of these newly identified states will be discussed.

Primary author: SUN, Yelei (Beihang University)

Presenter: SUN, Yelei (Beihang University)

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