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Invariant-mass Spectroscopy of ^{10}He from $^{11}\text{Li}(p,2p)$ reaction at ~ 250 MeV/nucleon

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Starting from the pioneering work of Korshennikov *et al.* [1], several experiments have been carried out to study the resonance states in ^{10}He [1-5]. However, up to now, the energy of ^{10}He ground state resonance is still under debate. In this talk, I will report on the three-body invariant-mass spectroscopy of ^{10}He populated via the $(p,2p)$ reaction from $2n$ -halo nucleus ^{11}Li at ~ 250 MeV/nucleon. The obtained ^{10}He spectrum, with much higher statistics than previous two measurements [1,2], was compared to the theoretical calculation that combines the coupled-channel three-body model of ^{11}Li [6] and the quasi-free knockout (p, pN) reaction model [7,8]. Two low-lying 0^+ 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. The three body corrections in Jacobi T and Jacobi Y coordinates were also extracted and compared to the model predictions. Our study shed light into the long standing puzzle about the different ^{10}He ground state energy obtained from knockout and transfer reactions.

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Topic

Experiment

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