THE SPECTRUM OF UNSTABLE ISOTOPES ^{9}He AND ^{10}He

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The unbound nuclear system of ^{10}He has been studied many times both theoretically and experimentally. However, controversy in experimental results still exists. One can divide all obtained experimental results in two groups. The first one is population of ^{10}He in reactions with halo-nuclei. In particular, the ^{10}He was first time experimentally observed in 1994 in reaction of proton knockout from ^{11}Li [1]. A wide peak at energy about 1.2 MeV was observed in the experiment. Therefore, the decay energy of ^{10}He ground state 1.2 MeV was assigned. Such ^{10}He ground state prescription was confirmed in further experiments with beams of ^{11}Li and ^{14}Be. The second group of data is a population of ^{10}He in two-neutron transfer reaction. In an experiment conducted in FLNR at JINR the ^{3}H(^{8}He,p)^{10}He reaction was used to populate ^{10}He [2]. The obtained spectrum shows significantly different behavior: peak at decay energy about 1.2 MeV was not observed. Further analysis of inclusive spectrum in combination with correlation studies provided the decay energy of ^{10}He ground state at about 2.1 MeV.

We propose theoretical interpretation that explains behavior of all obtained experimental data and thus reconcile experimental situation [3]. The difference in the ^{10}He spectrum behavior can be explained by influence of initial state structure.

The properties of ^{10}He continuum are closely connected with properties of ^{9}He continuum. Existing experimental data about ^{9}He and the limitation on properties of ^{9}He states connected with the observed ^{10}He spectrum are also discussed.

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