

Broad states in the few-body systems: examples of ${}^5\text{H}$ and ${}^4\text{n}$

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In paper [1] the dynamical investigation of the extremely neutron rich ${}^5\text{H}$ nucleus was performed in a three-body ${}^3\text{H}+n+n$ continuum model. Since that time a new experimental information about the system became available [2, 3, 4]. It inspired us to revisit the issue and discuss the theoretical ideas in a more detailed way.

What makes things complicated with the studies of ${}^5\text{H}$ is the fact that the state is (probably) broad. We show that such broad states in the few-body systems could have features which are unusual for the nuclear resonances. Qualitative discussion of these features is provided. We also demonstrate that observed properties of the state should depend strongly on the reaction mechanism and it could be difficult to discuss this nucleus “by itself”, without reference to observation conditions.

Perspectives of observation of tetraneutron correlation ${}^4\text{n}$ are considered from the same point of view. Significant enhancement in the missing mass spectrum of four neutrons can be observed if initial configuration with featureless momentum distribution is populated in experiment.

References

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