

Study of short living isotopes of ${}^{5,7}\text{He}$ and ${}^7\text{H}$ emitted in the spontaneous ternary fission of ${}^{252}\text{Cf}$

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The ${}^7\text{H}$ nucleus is the most mysterious nuclear system in the nuclear chart which is hard to access in experiment. Therefore the experimental data are insufficient and sometimes are ambiguous. For now, there are evidences for relatively low energy of ${}^7\text{H}$ the ground state.

As well there are theoretical estimates of the energy of the ground state. The expected mode of the decay is the democratic decay ${}^7\text{H} \rightarrow {}^3\text{H} + 4n$ with simultaneous emission of four neutrons. The estimated lifetime of ${}^7\text{H}$ is about 1-100 KeV. It is shown in Ref.[1] that data on the ternary fission of ${}^{252}\text{Cf}$ give information on population of resonance states in ${}^5\text{He}$ and ${}^7\text{He}$, providing data on the decay widths. In this work it is shown that the predicted lifetime is in the region of availability of the method suggested in Ref. [1] and the ${}^7\text{He}$ state is actively populated in the ternary fission. We calculate the values of observables for different sets of the excitation energy E^* and width Γ for ${}^7\text{H}$. It is shown that one can expect the evidence of population of the long-living ${}^7\text{H}$ states in the low energy region of the ${}^3\text{H}$ spectra which is still unable for observation. Thus we suggest the way for studies of the decay characteristics of the ${}^7\text{H}$ ground state. The evidences of the ${}^7\text{H}$ decay might be observed both in the energy spectra of ${}^3\text{H}$ and the angular correlations of the neutrons accompanying the decay of ${}^7\text{H}$. Thus using this method it is possible to investigate population of ${}^7\text{H}$ hard accessible in the accelerated beam technique.

1. Yu. N. Kopatch et al., Phys.Rev. C 65(2002), 044614

Primary author: PARFENOVA, Yulia (Joint Institute for Nuclear Research, Flerov Laboratory of Nuclear Reactions)

Co-authors: Prof. GRIGORENKO, Leonid (Joint Institute for Nuclear Research); Dr SHAROV, Pavel (Joint Institute for Nuclear Research); Dr KOPATCH, Yury (Joint Institute for Nuclear Research, Frank Laboratory of Nuclear Physics)

Presenter: PARFENOVA, Yulia (Joint Institute for Nuclear Research, Flerov Laboratory of Nuclear Reactions)

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