

Search for rare cluster configuration in ^{14}C nucleus

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Search for rare cluster configuration in ^{14}C nucleus was carried out in the correlation measurements of stopped pion absorption reaction $\pi^- + ^{14}\text{C} \rightarrow \text{p} + \text{d} + \text{X}$. For our analysis we took the data obtained in the experiment on the LANL accelerator (Los Alamos, USA) using the multilayer semiconductor spectrometer [1]. The analysis of the reaction was made via previously used method for the search of rare cluster structures in ^9Be [2] and ^{11}B [3].

The study of the 2-dimensional energy distribution of the registered particles (p, d) allowed the extraction of two-body ($\pi^- + ^{14}\text{C} \rightarrow \text{p}(\text{d}) + ^{13}(^{12})\text{Be}$) and three-body ($\pi^- + ^{14}\text{C} \rightarrow \text{p} + \text{d} + ^{11}\text{Li}$) reaction mechanisms. In the three-body channel we have found the region corresponding to the pion absorption by the intranuclear 3p cluster: $\pi^- + 3\text{p} \rightarrow \text{p} + \text{d}$, in this case the residual ^{11}Li is a "spectator". The momentum of ^{11}Li in the mentioned region is about $p_{\text{Li}} \approx 150$ MeV, which is typical for the movement of an intranuclear cluster. Thus, we obtained the indication on the presence of rare exotic configuration $^{11}\text{Li} + 3\text{p}$ in ^{14}C nucleus.

1. M.G. Gornov et al., Nucl. Inst. and Meth. in Phys. Res. A. 2000. V. 446. P. 461.
2. Yu.B. Gurov et al., JETP Lett. 2006. V. 84. P. 1.
3. L.Yu. Korotkova et al., Bull. RAS Phys. 2014. V. 78. No. 5. P. 355

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