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Formation of the multi-neutron systems $2n$ and $3n$ in the reactions of stopped pion absorption

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The formation of the multi-neutron systems $2n$ and $3n$ was studied in the reactions of stopped pion absorption by ${}^9\text{Be}$ nuclei. Measurements were carried out at low energy pion channel of LANL using two-arm multilayer semiconductor spectrometer. The bound states of $2n$ and $3n$ have not been found. In the missing mass spectrum of the reaction ${}^9\text{Be}(\pi^-, t^4\text{He})$, a peak was observed near the threshold, which is due to the formation of the s-wave virtual state of the dineutron. Indications of the existence of two states of the $3n$ with resonant parameters ($E_r \approx 5$ MeV, $\Gamma < 3$ MeV and $E_r \approx 13$ MeV, $\Gamma < 3$ MeV) were first obtained in the reactions ${}^9\text{Be}(\pi^-, d^4\text{He})$ and ${}^9\text{Be}(\pi^-, t^3\text{He})$. Comparison with theoretical and experimental results obtained by other authors was performed.

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