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Structure of B-10 and C-11,12 nuclei in relativistic dissociation

In the framework of the BECQUEREL Project in JINR the nuclear track emulsion (NTE) technique allowed one to investigate clustering of the nuclei Li, Be, B, C and N in their relativistic dissociation. With an unsurpassed spatial resolution (about 0.5 μm) NTE provides a complete observation of tracks starting from fission fragments and down to relativistic particles. Fragment tracks observed in NTE is a "building blocks"the light nuclei include the lightest clusters having no excited states, namely, α-particles, tritons, 3^He nuclei, and deuterons. A pair and triples of protons and α-particles can constitute the unstable 8^Be and 9^B. Analysis of NTE exposed by 11,12^C and 10^B and investigation the role of unstable 8^Be and 9^B nuclei will be presented.

Summary

Contribution of the unstable nuclei 8^Be and 9^B into dissociation of relativistic nuclei 10B and 11,12^C is under study on the basis of the nuclear track emulsion exposed to secondary beams of the JINR Nuclotron. In a charge state distribution of fragments the share of the channel 10B ⟶ 2He + H is 77%.
On the basis of measurements of fragment emission angles it is determined that unstable nucleus 8^Be(g.s.) manifests itself with a probability of (25 ± 5)% where (14 ± 3)% of them occur in decays of the unstable nucleus 9^B. Channel Be + H appeared subdued accounting for about 2% of "white"stars. A probability ratio of the mirror channels 9^B + n and 9^Be + p is estimated to be 6 ± 1. 8^Be(g.s.) decays are presented in 24 ± 7% of 2He + 2H and 27 ± 11% of the 3He of the 11^C "white"stars. 9^B decays are identified in "white"stars 11C ⟶ 2He + 2H constituting 14% of the 11^C "white"stars.

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