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Unstable states in dissociation of relativistic nuclei

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Results are presented on the identification of the unstable nuclei 8Be and 9B and the Hoyle state (HS) in the relativistic dissociation of the isotopes 9Be, 10B, 10C, 11C, 12C, and 16O in a nuclear track emulsion (NTE). The main motivation for the study is the prospect of using these unstable states in the search for more complex unstable states that decay with their participation. The possibilities of the NTE method for studying the contribution of multiple ensembles of the lightest He and He nuclei to the fragmentation of relativistic nuclei are presented described in brief. It is shown that to identify relativistic decays 8Be and 9B and HS in NTE, it is sufficient to determine the invariant mass as a function of angles in pairs and triples of He and H fragments in the approximation of conservation of momentum per nucleon of the parent nucleus. The formation of HS in the dissociation 16O $\longrightarrow$ 4α is observed. According to the criteria established in this way, the contribution of the unstable states to the relativistic fragmentation of 28Si and 197Au nuclei was estimated. Promising applications of the NTE method in the study of nuclear fragmentation are discussed.

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