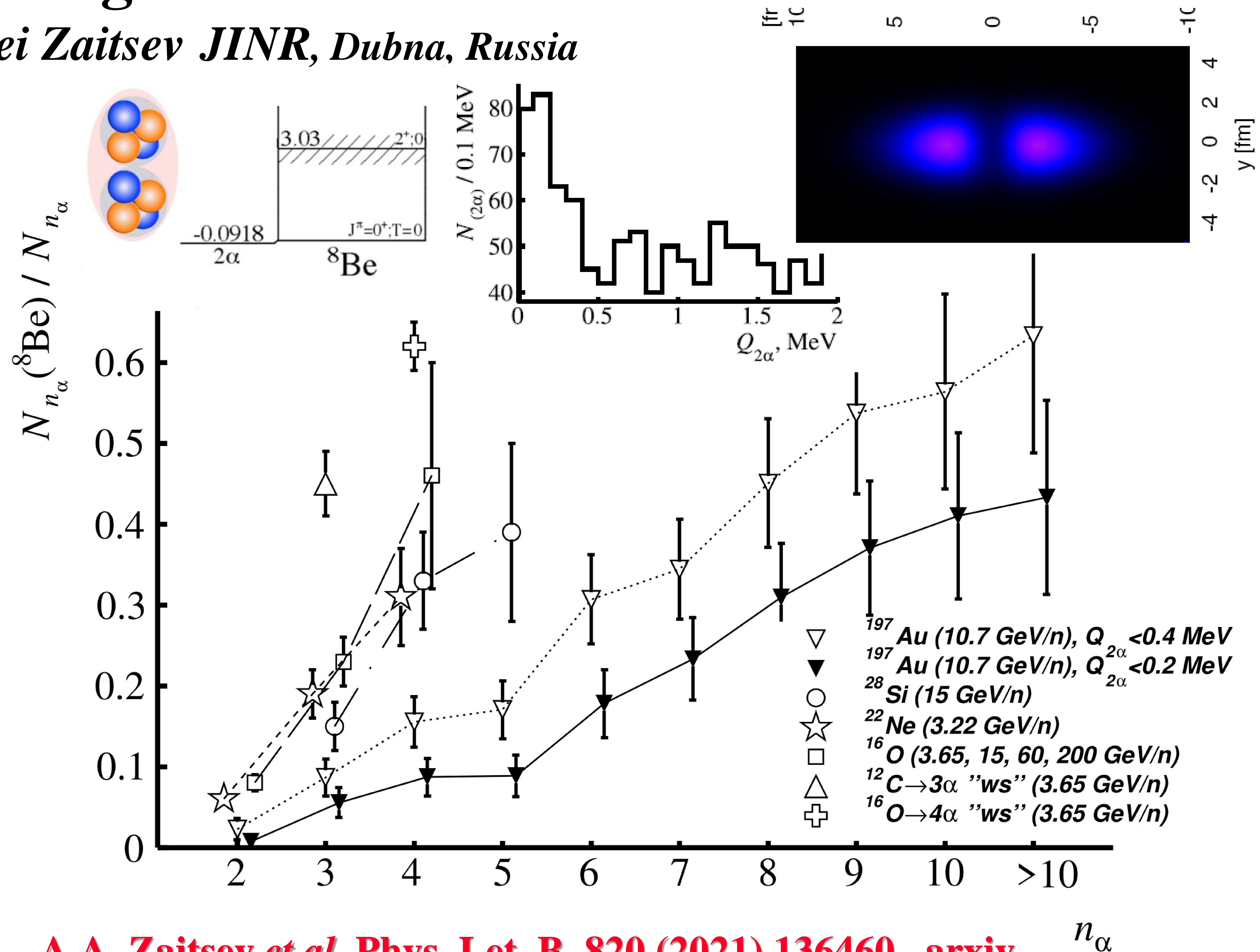


# Unstable states in fragmentation of relativistic nuclei

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In the events of peripheral dissociation of relativistic nuclei in the nuclear track emulsion, it is possible to study the emerging ensembles of He and H nuclei, including those from decays of the unstable  ${}^8\text{Be}$  and  ${}^9\text{B}$  nuclei, as well as the Hoyle state. These extremely short-lived states are identified by invariant masses calculated from the angles in  $2\alpha$ -pairs,  $2\alpha p$ - and  $3\alpha$ -triplets in the approximation of conservation of momentum per nucleon of the primary nucleus. In the same approach, it is possible to search for more complex states. This poster explores the correlation between the formation of  ${}^8\text{Be}$  nuclei and the multiplicity of accompanying  $\alpha$ -particles in the dissociation of relativistic  ${}^{16}\text{O}$ ,  ${}^{22}\text{Ne}$ ,  ${}^{28}\text{Si}$ , and  ${}^{197}\text{Au}$  nuclei. On this basis, estimates of such a correlation are presented for the unstable  ${}^9\text{B}$  nucleus and the Hoyle state. An enhancement in the  ${}^8\text{Be}$  contribution to dissociation with the  $\alpha$ -particle multiplicity is found. Decays of  ${}^9\text{B}$  nuclei and Hoyle states follow the same trend.



**[A.A. Zaitsev et al. Phys. Let. B, 820 \(2021\) 136460, arxiv](#)**

**[Microscope videos of relativistic nuclear collisions in emulsion](#)**