

XIV Polish Workshop on Relativistic Heavy-Ion Collisions: Interplay between soft and hard probes of heavy-ion collisions



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4He versus 4Li and production of light nuclei in relativistic heavy-ion collisions

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We propose to measure the yields of 4He and 4Li in relativistic heavy-ion collisions to clarify a mechanism of light nuclei production. Since the masses of 4He and 4Li are almost equal, the yield of 4Li predicted by the thermal model is five times bigger than that of 4He which reflects the different numbers of internal degrees of freedom of the two nuclides. Their internal structures are, however, very different: the alpha particle is well bound and compact while 4Li is weakly bound and loose. Within the coalescence model, the ratio of yields of 4Li to 4He is shown to be significantly smaller than that in the thermal model and the ratio decreases fast from central to peripheral collisions of relativistic heavy-ion collisions because the coalescence rate strongly depends on the nucleon source radius. Since the nuclide 4Li is unstable and it decays into 3He and p after roughly 30 fm/c, the yield of 4Li can be experimentally obtained through a measurement of the $3\text{He} - p$ correlation function.

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