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Light (anti)nuclei and (anti)hypernuclei production and characterization in Cu+Cu collisions at $\sqrt{s_{\rm NN}} = 200$GeV

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Production of light (anti)nuclei (d, $\overline{\rm d}$, ^{3}He, $^3\overline{\rm He}$, ^{4}He, and $^4\overline{\rm He}$) and (anti)hypertriton nuclei (^{3}H and $^{\ }_{\ }^3\overline{\rm H}$) are investigated using the dynamically constrained phase-space coalescence model based on the final-state hadrons generated by the PACIAE model in Cu+Cu collisions at $\sqrt{s_{\rm NN}}$ = 200GeV. The results show that there is a strong centrality dependence of yields of the light (anti)nuclei and (anti)hypernclei, i.e., their yields decrease rapidly with the increase of centrality, and the greater the mass is, the greater the dependence shows; whereas their ratios of antimatter to matter remain constant as the centrality increases. The coalescence parameter B_A lightly decreases with the increasing of N_{part}. In addition, the yields of (anti)nuclei are strongly dependent on the mass of the (anti)nuclei, indicating that the (anti)nuclei produced have mass scaling properties in high-energy heavy-ion collisions. ^{3}H and $^{\ }_{\ }^3\overline{\rm H}$ are compared with ^{3}H($^3\overline{\rm H}$) and ^{3}He($^3\overline{\rm He}$) nuclei. The strangeness population factor $S_3 = (^3{\rm H}/^3{\rm He})/(\ /{\rm p})$ was found to be close to unity, and was compatible with the STAR data and theoretical model calculation, suggesting that the phase-space population of strange quarks is similar with the ones of light quarks and the creation of deconfined high temperature quark matter in Cu+Cu collisions.

Abstract Type

Talk

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