Yield ratio of hypertriton to light nuclei in heavy-ion collisions from $\sqrt{s_{NN}}$ = 4.9 GeV to 2.76 TeV

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We have argued that both the ratio S_2 and the ratio S_2/B_2, where S_2 and B_2 are, respectively, the coalescence parameters for the production of hypertriton from Λ and a deuteron, and of a deuteron from a proton and a neutron, are more sensitive observables than the previously proposed ratio $S_3 = N_{{}^3_\Lambda He}/N_\Lambda/\left(N_{{}^3He}/N_\mathrm{p}\right)$ for studying the local baryon-strangeness correlation in the matter produced in relativistic heavy-ion collisions. This argument is substantiated by a study in the framework of baryon coalescence, which demonstrates that the correlation coefficient $\alpha_{\Lambda d}$ between Λ and deuteron density fluctuations extracted from measured S_2/B_2 shows a stronger dependence on the energy of heavy-ion collisions than the correlation coefficients $\alpha_{\Lambda p} + \alpha_{\Lambda n}$ between Λ and nucleon density fluctuations extracted from the measured S_3 as shown in Fig. 1. Although the results in the present study are obtained without including the feed-down contribution to nucleons from Δ resonances, they will not be qualitatively affected because of the low kinetic freeze-out temperature of about 100 MeV, which only contributes about 20% to the nucleon yield. Experimental measurements of the ratio S_2/B_2 are expected to provide a promising way to study the strangeness and baryon correlation in the matter produced from

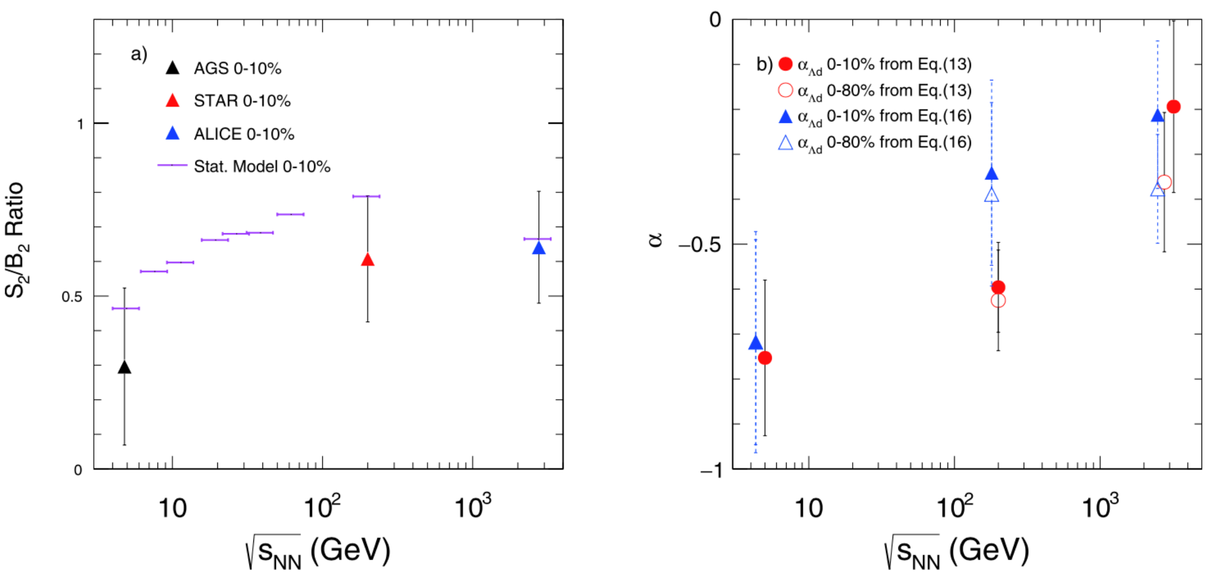

Fig. 1. Left: The S_2/B_2 ratio extracted from experimental data (solid triangles) and predicted by the statistical model (solid horizontal bars) for collision at the 0-10% centrality [2,3]. Right: Values of $\boldsymbol{\alpha_{\Lambda d}}$ extracted from experimental results on S_2 (Eq. (13)) and S_2/B_2 (Eq. (16)).

heavy-ion collisions as the collision energy or the baryon chemical potential of produced matter is varied, which in turn can shed light on the properties of the QGP to hadronic matter phase transition during the collisions.

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