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# Production of nuclei and hypernuclei in relativistic ion collisions

Production of nuclei and hypernuclei in relativistic ion collisions.

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We investigate the formation of light nuclei and hypernuclei in the rapidly expanding nuclear matter after relativistic nucleus-nucleus collisions. The primary hadronization phase including the strangeness production is described with UrQMD model. It is demonstrated that the nucleation process can be explained within the statistical approach by applying the local equilibrium concept. We subdivide the expanding nuclear system into several parts (clusters) consisting of nucleons and hyperons which are close in the phase space. The production of nuclei takes place inside these clusters, and it can be described as their statistical decay in the coexistence region of the nuclear phase transition. The local chemical equilibrium concept explain consistently many experimental data which was not possible with the statistical models under assumption of global chemical equilibrium [1,2]. This model was also successfully applied to describe experimental data on both normal nuclei and strange hypernuclei production in the GSI and RHIC-BES energy range [3,4]. We predict the production of double hypernuclei up to ${}^{4}_{\Lambda\Lambda}$H and further intermediate mass nuclei up to ${}^{8}$Be for Au+Au central collisions at $\sqrt{s_{NN}}$=3 GeV, recently explored by the STAR experiments [4]. The production of charmed nuclei is discussed too. These new nuclei can be identified by the measurement of the correlated particles.

[1] A. S. Botvina, N. Buyukcizmeci and M. Bleicher,
Phys. Rev. C {\bf 103}, 064602 (2021).

[2] A. S. Botvina, N. Buyukcizmeci and M. Bleicher,
Phys. Rev. C {\bf 106}, 014607 (2022).

[3] N. Buyukcizmeci, T. Reichert, A.S. Botvina, and M. Bleicher,
Phys. Rev. C {\bf 108}, 054904 (2023).

[4] N. Buyukcizmeci, T. Reichert, A.S. Botvina, and M. Bleicher,
arXiv: 2410.17449 (2024).

## Category

Theory

## Collaboration (if applicable)

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