



Contribution ID: 806

Type: Oral

Strangeness production in different collision systems and at different collision energies with the STAR experiment

Wednesday 9 April 2025 09:40 (20 minutes)

Strangeness production has been suggested as a sensitive probe to the early dynamics of the deconfined matter created in heavy-ion collisions.

There are significant discussions in the field about the initial conditions, including the colliding energy and the size of the system, needed to generate a quark-gluon plasma (QGP). It is expected that the threshold can be revealed by the measurements of the colliding energy and system size dependence of baryon-to-meson enhancement. Recent datasets collected by STAR in Au+Au collisions at $\sqrt{s_{NN}} = 7.7, 9.2, 11.5, 14.6, 17.3$ and 19.6 GeV from the Beam Energy Scan II program and in different collision systems at $\sqrt{s_{NN}} = 200$ GeV (d+Au, Au+Au, O+O, Zr+Zr, Ru+Ru) provide us a chance to look into the Ω/ϕ ratios and possibly locate the threshold of QGP production.

In addition, (multi)strange hadron to pion yield versus multiplicity in different collision systems at $\sqrt{s_{NN}} = 200$ GeV can be compared with the results from LHC, where an intriguingly smooth increase in these ratios was first reported.

Furthermore, rapidity density of (anti-)strange baryons may give insight into the baryon stopping mechanism.

In this talk, we will present new measurements of strange hadron (K_s^0 , Λ , $\bar{\Lambda}$, Ξ , $\bar{\Xi}$, Ω , $\bar{\Omega}$, ϕ) production in Au+Au collisions at $\sqrt{s_{NN}} = 7.7, 9.2, 11.5, 14.6, 17.3, 19.6, 200$ GeV and in d+Au, O+O, Zr+Zr and Ru+Ru collisions at $\sqrt{s_{NN}} = 200$ GeV, including transverse-momentum and rapidity spectra, nuclear modification factors, antibaryon-to-baryon ratios and baryon-to-meson ratios. In particular, precise measurements of the energy and centrality dependence of Ω/ϕ ratios in Au+Au collisions at different energies and in different collision systems at $\sqrt{s_{NN}} = 200$ GeV will be presented. In addition, (multi)strange hadron to pion yield versus multiplicity in different collision systems at $\sqrt{s_{NN}} = 200$ GeV will also be reported.

These results will be compared to theoretical calculations and physics implications will be discussed.

Category

Experiment

Collaboration (if applicable)

STAR

Author: YUAN, Weiguang (Tsinghua University)

Presenter: YUAN, Weiguang (Tsinghua University)

Session Classification: Parallel session 29

Track Classification: Light and strange flavor physics & nuclei