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Measurements of proton-Λ and proton-Ξ^- Correlation Functions in Au+Au Collisions from STAR Fixed-Target Experiment

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Two-particle correlation analyses are often used to study the spatial and temporal extents of the particle-emitting source in high-energy nuclear collisions. Information on the final state interactions amongst the particles under study can also be extracted from the measurement. For example, from the p-Λ and p-Ξ^- correlation functions, one could study the hyperon-nucleon (Y-N) interactions in such collisions. It is particularly interesting to study the dependence on the collision energy of the source size at the moment of freeze-out. The STAR fixed-target program from $\sqrt{s_{\mathrm{NN}}} = 3.0$ to 7.7 GeV has enabled us to investigate the high baryon density region from μ_{B} = 420 to 750 MeV.

In this poster, the first measurements of p-Λ and p-Ξ^- correlation functions in Au + Au collisions at $\sqrt{s_{\mathrm{NN}}} =$ 3.2, 3.5, and 3.9 GeV with the fixed-target mode from STAR will be presented. The results will be compared with the data from $\sqrt{s_{\mathrm{NN}}} = 3$ GeV Au + Au collisions (μ_{B} = 750 MeV) and the data from higher energies [1, 2], where μ_{B} is close to 0, along with model calculations generated via the UrQMD hadronic transport model and CRAB afterburner.

References

[1] STAR, Phys. Rev. C 74, 064001 (2006)

[2] ALICE, Nature 588, 232–238 (2020)

Category

Experiment

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RHIC STAR

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