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Scaling Properties of ϕ -Meson and Light Charged Hadron Production in Small and Large Systems at PHENIX

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Light hadrons are considerably produced in high-energy heavy-ion collisions and provide a wealth of information about properties of created QCD medium and reaction dynamics. These include, in particular, the implications of collective flow in small and large systems and the impact of recombination on baryon and strangeness enhancement. The system size dependence studies of different observable are crucial to investigate the properties of Quark Gluon Plasma and hadronization based on initial conditions of the collisions such as nuclear-overlap size, shape of nuclei, and nuclear modification of the parton-distribution functions.

In this talk, we will present recently finalized measurements by PHENIX on the nuclear modification and elliptic flow of ϕ -meson in Cu+Au, and U+U collisions, and production of identified light charged hadron in small and large system size, p+Al, p/d/3He/Cu+Au, and U+U collisions [1] at RHIC energies as a function of centrality and transverse momentum. The tests of various empirical scaling, and interpretation of the results with respect to the current theoretical model calculations are provided for better understanding of the underlying processes.

References:

[1] N.J. Abdulameer et al. (PHENIX Collaboration), arXiv:2312.09827 [nucl-ex]

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