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Multiplicity Dependence of Strange Hadron Production in Small Systems using the STAR detector

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Strangeness enhancement has long been considered a signature of the quark-gluon plasma formation in heavy-ion collisions. Recently, strangeness enhancement has also been observed in small systems at the LHC, but the underlying physics is not yet fully understood. This motivates studies of strange hadron production in small systems at RHIC, where the energy density of system is expected to be smaller than that at the LHC and therefore a hot and deconfined medium is less likely to be created. Investigating the multiplicity dependence of strange hadron production in small systems can naturally connect to peripheral heavy-ion collisions, and contribute to understanding the role of event multiplicity in strange hadron production. Furthermore, such studies will serve as a baseline for similar measurements in central heavy-ion collisions.

In this talk, we will present new measurements of (multi-)strange hadrons (${K_S}^0$, Λ) in d+Au and (${K_S}^0$, Λ, Ξ) in p+p collisions at 200 GeV, collected by STAR in 2015 and 2016 respectively. We will analyze the multiplicity dependence of strange hadron transverse momentum (p_{T}) spectra, p_{T}-integrated yield dN/dy, average transverse momentum, and yield ratios with pions. We also present nuclear modification factors and rapidity asymmetry (Y_{Asym}) for these particles in d+Au collisions. We will discuss implications of our measurements on the possible formation of a hot and deconfined medium
and the origin of strangeness enhancement in small systems.

Category

Experiment

Collaboration (if applicable)

STAR Collaboration

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