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Enhancement of $\bar{\Lambda}$ / $\bar{p}$ in central heavy-ion collisions and it's implication for strangeness enhancement at RHIC and SPS energies.

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Strangeness enhancement in central heavy-ion collisions (A+A) relative to proton-proton interactions (pp) has long been a well-recognized signature for QCD deconfinement or the formation of Quark Gluon Plasma (QGP). The energy scan program at the Relativistic Heavy Ion Collider (RHIC) in BNL or at CERNs' Super Proton Synchrotron (SPS) have presented evidence that are typical of the enhanced strangeness production via their measurements of kaon to pion ratios which exhibit a non-monotonic energy dependence. Similar indication was also observed in the baryon sector based on the measurements of anti-lambda to anti-proton ratio as a function of beam energy. Later it was thought to be a cleaner probe because their quark compositions have only anti-quarks, which are produced in the reaction and not transported. More-over their high mass resonance contributions are less. However, the final yields of both anti-lambda and anti-proton are sensitive to the baryon-antibaryon (B$\bar{B}$) annihilation in hadronic rescatterings phase. In this work, we present an investigation of the beam energy dependence of $\bar{\Lambda}$ over $\bar{p}$ ratio within a hadronic transport model, UrQMD and observe that the final state yields of $\bar{\Lambda}$ and $\bar{p}$ are strongly influenced by B$\bar{B}$ annihilation channel and has a significant impact of on the $\bar{\Lambda}$ to $\bar{p}$ ratio. In fact, the trend of $\bar{\Lambda}$ to $\bar{p}$ ratio enhancement in data can be qualitatively described within the UrQMD model because the spectral shapes of $\bar{\Lambda}$ and $\bar{p}$ are modified differently due to different annihilation cross sections of these two species. This suggests that the observed features of beam energy dependence of $\bar{\Lambda}$ to $\bar{p}$ ratio enhancement may not relate to the strangeness enhancement unambiguously.

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