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Simulation of heavy quarkonia modifications from small to large collision systems

Heavy quarkonia production is one of the substantial probes to study the properties of the quark-gluon plasma. The observation of the sequential suppression of heavy quarkonia yields in small and large collision systems intensely stimulates relevant theoretical developments. The SHINCHON, which stands for Simulation for Heavy IoN Collision with Heavy-quark and ONia, employs a theoretical baseline for the glue-dissociation and inelastic parton scattering to simulate the dissociation of heavy quarkonia. The simulation successes in providing qualitatively comparable modifications of Υ yields with experimental data in Pb–Pb collisions and calculates the modifications in p–Pb, pO, and OO collisions [1]. Recently, the unexpectedly strong suppression of $\Upsilon(1S)$ at RHIC energy has been reported by STAR, requiring further understanding of the suppression mechanism rather than medium effects. In this respect, the simulation framework is extended to calculate the modification in Au–Au collisions. It is found that the SHINCHON underestimates the suppression of $\Upsilon(1S)$ yields at RHIC energy and can be understood with additional nuclear absorption effects [2]. Furthermore, the simulation toolkit is under development to calculate the charmonium suppression, and relevant preliminary results for charmonia simulations are given in the presentation.

Category

Theory

Collaboration

SHINCHON

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