Measurement of system size and energy dependence of J/ψ production with the STAR experiment Aoke Zhang (for the STAR Collaboration) South China Normal University

In relativistic heavy-ion collisions, the production of J/ψ serves as an important probe for 5 studying the properties of quark-gluon plasma (QGP). However, interpreting the modi-6 fication of J/ψ yields is challenging due to the interplay of hot, such as dissociation and 7 regeneration, and cold nuclear matter effects. Measuring J/ψ production across various 8 collision systems and energies is therefore essential for gaining deeper insights into QGP 9 properties. 10 In this talk, we will present the nuclear modification factor (R_{AA}) of J/ψ as a function of 11 centrality and transverse momentum in O+O collisions at $\sqrt{s_{NN}} = 200$ GeV, as well as in 12 Au+Au collisions at $\sqrt{s_{NN}} = 14.6, 17.3, 19.6, \text{ and } 27 \text{ GeV}$. In particular, the O+O results 13 can be used to explore small-system dynamics and provide a baseline for comparisons with 14 larger systems, such as Au+Au or Pb+Pb collisions, thereby enriching our understanding 15 of nuclear matter behavior across different scales. Furthermore, we examine the energy 16 dependence of $J/\psi R_{AA}$ in central heavy-ion collisions, spanning RHIC to LHC energies, 17 and compare the results with theoretical model predictions. 18