中国高能核物理网络论坛
HIGH ENERGY NUCLEAR PHYSICS IN CHINA

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The 167th HENPIC seminar

Collectivity of J/ψ Mesons in Heavy Ion Collisions

Speaker: Prof. Min He, Nanjing Univ. of Sci. & Tech.

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ABSTRACT:

The production of J/ψ mesons in heavy-ion collisions at the Large Hadron Collider is believed to be dominated by the recombination of charm and anticharm quarks in a hot QCD medium. However, measurements of the elliptic flow (v2) of J/ψ mesons in these reactions are not well described by existing calculations of J/ψ recombination for transverse momenta $p_T \gtrsim 4$ GeV. We revisit these calculations in two main aspects. Employing the resonance recombination model, we implement distribution functions of charm quarks transported through the quark-gluon plasma using state-of-the-art Langevin simulations and account for the space-momentum correlations of the diffusing charm and anticharm quarks in a hydrodynamically expanding fireball. This extends the relevance of the recombination processes to substantially larger momenta than before. We also revisit the suppression of primordially produced J/ψ's by propagating them through the same hydrodynamic medium, leading to a marked increase of their v_2 over previous estimates. Combining these developments into a calculation of the p_T-dependent nuclear modification factor and v2 of inclusive J/ψ production in semicentral Pb-Pb collisions at the LHC, we find a good description of the experimental results by the ALICE Collaboration. Our results thus resolve the abovementioned v_2 puzzle and imply the relevance of recombination processes for p_T's of up to ~8 GeV.

[1] M. He, B. Wu, R. Rapp, arXiv:2111.13528

ABOUT THE SPEAKER:

Min He earned his PhD from Nanjing University and then moved to Texas A&M University as a postdoc. Now he is a faculty member at Nanjing University of Science & Technology. His research interest lies in the field of heavy quark and quarkonium physics in the quark-gluon plasma.

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