

In-Medium Bottomonium Production in Heavy-Ion Collisions

We study bottomonium production at RHIC and the LHC using a transport model including both suppression and regeneration mechanisms. The transport model utilizes a kinetic rate equation [1] to calculate the centrality dependence of the production yields, and a Boltzmann equation for transverse-momentum (p_T) spectra. It has been successful in describing and predicting charmonium data at SPS, RHIC and the LHC. The bottomonium dissociation rates are improved over previous work [2] by using in-medium binding energies from an in-medium T-matrix approach, which, in turn, require to account for both gluo-dissociation (dominant for large binding) and inelastic parton-induced break-up (dominant for weak binding) including interference effects [3]. We also update the equation of state for the bulk medium using lattice-QCD results. For the calculation of the p_T -spectra and elliptic flow of the regeneration contribution we use a coalescence model [4] where the input bottom-quark spectra are taken from Langevin transport simulations of bottom quarks [5] to account for their non-equilibrium distributions. We then conduct a systematic analysis of bottomonium observables for the nuclear modification factor as a function of N_{part} and p_T in comparison to ALICE, CMS and STAR data. The comparison suggests that the centrality dependence of the total yields is sensitive to different scenarios for the screening of binding energies. The off-equilibrium bottom-quark spectra are found to play an important role in both the bottomonium p_T spectra and their predicted elliptic, which helps to disentangle the role of regeneration contributions.

Reference:

- [1] X. Du, R. Rapp, J. Fox and M. He, in preparation
- [2] L. Grandchamp et al., Phys. Rev. C 73 (2006) 064906; A. Emerick, X. Zhao and R. Rapp, Eur. Phys. J. A48 (2012) 72.
- [3] M.Laine, O. Philipsen, P. Romatschke, M. Tassler, JHEP 0703 (2007) 054
- [4] V. Greco, C. M. Ko, P. Levai, Phs. Rev. C68 (2003) 034904
- [5] M. He, R.J. Fries and R. Rapp, Phys. Lett. B735 (2014) 445.

Preferred Track

Quarkonia

Collaboration

Not applicable

Author: DU, Xiaojian (Texas A&M University)

Co-author: RAPP, Ralf (Texas A&M University)

Presenter: DU, Xiaojian (Texas A&M University)

Session Classification: Poster Session