Measurement of the Υ production in heavy-ion collisions at $\sqrt{s_{NN}} = 200$ GeV with the STAR detector

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Quarkonia play a unique role in probing the properties of the quark-gluon plasma (QGP). 1 The dissociation of quarkonia due to color screening was proposed as a direct signature 2 of the QGP formation. On top of that, different states of quarkonium are expected to 3 dissociate at different temperatures depending on their binding energies. In addition, 4 dynamical dissociation, arising from inelastic scatterings between quarkonia and medium 5 constituents, can also lead to quarkonium breakup, whose impact becomes more profound 6 with increasing medium temperature and for quarkonia of larger sizes [1, 2, 3]. Compared 7 to charmonia, bottomonia provide a longer lever arm for investigating the QGP and are 8 considered cleaner probes since the regeneration contribution is expected to be smaller 9 due to the smaller production cross section of $b\bar{b}$ quarks. Therefore, measurement of the 10 expected sequential suppression for the three Υ states in heavy-ion collisions can be used 11 to study the modification of the QCD force in the medium and the QGP's thermodynamic 12 properties. 13 In this talk, we present Υ measurements in Au+Au and isobar (Ru+Ru and Zr+Zr) colli-14 sions at $\sqrt{s_{NN}} = 200$ GeV with the STAR experiment at RHIC. The nuclear modification 15

¹⁶ factors are presented as functions of centrality and transverse momentum. In addition, ¹⁷ these results are compared to those at the LHC and theoretical calculations. The physics

¹⁸ implications are discussed as well.

¹⁹ References

[1] Mikko Laine, Owe Philipsen, Marcus Tassler, and Paul Romatschke. Real-time static
potential in hot QCD. Journal of High Energy Physics, 2007(03):054, 2007.

[2] Yannis Burnier, Olaf Kaczmarek, and Alexander Rothkopf. Quarkonium at finite
temperature: Towards realistic phenomenology from first principles. Journal of High
Energy Physics, 2015(12):1–34, 2015.

[3] Shile Chen and Min He. Gluo-dissociation of heavy quarkonium in the quark-gluon
plasma reexamined. *Physical Review C*, 96(3):034901, 2017.