

What Have We Leant from Quarkonia Production in Relativistic Heavy Ion Collisions?

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Since the pioneering study by Matsui and Satz on J/ψ suppression by quark-gluon plasma formation in relativistic heavy ion collisions, there have been a large number of theoretical and experimental studies on this topic. These studies have significantly enhanced our understanding of the properties of J/ψ , its excited states, and other quarkonium states consisting of bottom quarks at finite temperature as well as of their production in heavy ion collisions. For example, some quarkonia are shown to survive in a quark-gluon plasma and can also be regenerated from heavy quarks at hadronization during heavy ion collisions. Using the hydrodynamic model for the dynamics of heavy ion collisions, many groups have found that to describe the experimental data on the nuclear modification factors and transverse momentum spectra of quarkonia measured at SPS, RHIC, and the LHC requires the inclusion of the in-medium properties and dissociation cross sections of quarkonia as well as their regeneration at hadronization. Studying quarkonia production in relativistic heavy ion collisions thus allows us to probe their in-medium properties.

E-mail

ko@comp.tamu.edu

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Primary author: Prof. KO, Che-Ming (Texas A&M University)

Presenter: Prof. KO, Che-Ming (Texas A&M University)

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