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Recent Heavy Quarkonia Results from PHENIX

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The idea of using heavy quarkonia production as a direct probe of the screening length in the quark gluon plasma (QGP) has been around for over two decades. Suppression of quarkonia production in heavy ion collisions has been measured at the SPS, RHIC, and the LHC, including new measurements of $\Upsilon(1S+2S+3S)$ production in Au+Au collisions by PHENIX. However, a full understanding of these results in terms of direct contributions from the QGP is still evolving. An incomplete knowledge of the baseline cold nuclear matter (CNM) effects, as well as the possibility of competing effects present in the QGP, such as recombination, has hindered a full understanding of the observed heavy ion results.

In order to quantify the CNM effects present at RHIC, PHENIX has measured both J/ψ and Υ production in $d+Au$ collisions over a wide range in rapidity with the inclusion of new measurements of $\Upsilon(1S + 2S + 3S)$ production at midrapidity. PHENIX finds a suppression relative to $p+p$ collisions which is greater at forward rapidity and similar between the J/ψ and Υ , leading to interesting implications of the RHIC heavy ion results. New measurements of the transverse momentum dependence of the J/ψ nuclear modification factor provide further constraints on CNM effects, as well as constraining the Cronin effect at RHIC energies. This talk will present recent heavy quarkonia results in $p+p$, $d+Au$ and Au+Au collisions from PHENIX, as well as the implications of the measured CNM effects on the heavy ion data.

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