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**QCD Factorization and large pT J/psi production** HONG ZHANG, Stony Brook University, YAN-QING MA, JIANWEI QIU, Brookhaven National Laboratory — Suppression of $J/\psi$ production in quark gluon plasma (QGP) formed in Au-Au collisions at RHIC has been considered potentially as a good probe of QGP. At the LHC, with larger center-of-mass energy, CMS collaboration has already observed $J/\psi$ with transverse momentum ($p_T$) as large as 30 GeV in Pb-Pb collisions, which is expected to be a good probe of QGP properties complimentary to $J/\psi$ total cross section. Unlike the total cross section, at large $p_T$, the scales for the production of the heavy quark pair and the pair's subsequent interaction with the medium are clearly separated and could provide more and cleaner information on QGP or in general the medium created during the collisions. All previous models for heavy quarkonium production at large $p_T$ in p-p collisions are, one way or another, unfortunately, proven to be inconsistent with experimental data. A new QCD factorization approach for evaluating heavy quarkonia production was proposed recently and proved perturbatively valid to both leading and next-to-leading power in $1/p^2$ expansion and all orders in powers of $\alpha_s$. In this talk, I will introduce this new QCD factorization formula and discuss its application to $J/\psi$ production in p-p and A-A collisions.

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