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Complete nonrelativistic-QCD prediction for prompt double J/ψ hadroproduction

Thursday 14 April 2016 11:00 (20 minutes)

We perform a complete study of prompt double J/ψ hadroproduction at leading order in the nonrelativistic-QCD factorization framework by including all possible pairings of the $c\bar{c}$ Fock states ${}^1S_0^{[8]}$, ${}^3S_1^{[1,8]}$, and ${}^3P_J^{[1,8]}$ with $J = 0, 1, 2$. We find that the ${}^1S_0^{[8]}$ and ${}^3P_J^{[8]}$ channels of J/ψ and ψ' production and the ${}^3P_J^{[1]}$ and ${}^3S_1^{[8]}$ channels of χ_{cJ} production, which have been overlooked so far, greatly dominate at large invariant masses and rapidity separations of the prompt J/ψ pair, and that their inclusion nearly fills the large gap between previous incomplete predictions within the color-singlet model and the recent measurement by the CMS Collaboration at the CERN LHC, leaving room for next-to-leading-order corrections of typical size.

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