

NNLO QCD corrections to J/ψ plus η_c production at the B factories

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In this work, we calculate the next-to-next-to-leading-order (NNLO) QCD corrections to $e^+e^- \rightarrow J/\psi + \eta_c$ at the B factories. After including the NNLO corrections, the cross section of $e^+e^- \rightarrow J/\psi + \eta_c$ is enhanced by about 17%, and the perturbative series of the prediction shows the convergent behavior. It is also found that the contributions from bottom quark starts at the α_s^3 -order, which is about 2.4% of the total prediction. The renormalization scale μ_R dependence of the cross section is reduced at the NNLO level, but the prediction is sensitive to the charm quark mass m_c . By considering the uncertainties caused by renormalization scale μ_R , charm quark mass m_c and the NRQCD factorization scale μ_Λ , our prediction shows agreement with the BaBar and Belle measurements within errors.

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