



J/psi production in NLO NRQCD: A global analysis of yield and polarization

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We present a rigorous next-to-leading order analysis of J/psi yield and polarization within the factorization theorem of nonrelativistic QCD (NRQCD). To the orders considered, this framework depends on the values of three color-octet long-distance matrix elements (LDMEs), which are predicted to be process-independent. We extract their values in a global fit to inclusive J/psi production yield data from various hadroproduction, photoproduction, two-photon scattering and electron-positron annihilation experiments. We show that this fit is constrained and stable and describes all data sufficiently well. We then use these values to predict the J/psi polarization in photo- and hadroproduction and compare to the currently available data. As for photoproduction, HERA data is not precise enough to draw definite conclusions. But as for hadroproduction, CDF data measured at Tevatron run II is in strong conflict with NRQCD predictions, a feature familiar from the previous Born analyses. With early ALICE data being however compatible with NRQCD, the future, more precise polarization measurements at the LHC will thus have the potential to clearly confirm or dismiss the universality of the LDMEs.

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