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Double Parton Studies at D0: Measurements of the prompt single J/ψ and double J/ψ production cross section and studies of photon + 3 jets events and photon + b/c + 2 jet events

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We present measurements of the production cross section of prompt J/ψ mesons, as well as the cross section of simultaneous production of two prompt J/ψ mesons, in proton-antiproton collisions at $\sqrt{s}=1.96$ TeV using 8.1 fb^{-1} of Tevatron data collected by the D0 experiment. The latter cross section is separated into contributions due to single parton and double parton (DP) scatterings. Using these measurements, the effective cross section, a parameter characterizing an effective spatial area of parton-parton interaction and tightly related to the parton spatial density inside the nucleon, is also measured.

We have also used a sample of photon + 3 jets as well as photon + b/c + 2 jet events collected by the D0 experiment with an integrated luminosity of 8.7 fb^{-1} to determine the fraction of events with hard DP scattering in a single proton-antiproton collision. The DP fraction and effective cross section are measured in three different kinematic regions.

Summary

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