

Soft-gluon resummation for squark and gluino hadroproduction

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We consider the resummation of soft gluon emission for squark and gluino hadroproduction at next-to-leading-logarithmic accuracy in the framework of the minimal supersymmetric standard model. We present predictions for all squark and gluino pair-production processes at the Tevatron and at the LHC. The size of the soft-gluon corrections and the reduction in the scale uncertainty are most significant for processes involving gluino production. At the LHC, where the sensitivity to squark and gluino masses ranges up to 3 TeV, the corrections due to NLL resummation over and above the NLO predictions can be as high as 35% in the case of gluino-pair production, whereas at the Tevatron, the NLL corrections are close to 40% for squark-gluino final states with sparticle masses around 500 GeV. Moreover we present predictions for the production of top and bottom squarks at the Tevatron and the LHC, including next-to-leading order corrections in supersymmetric QCD and the resummation of soft gluon emission at next-to-leading-logarithmic accuracy. We discuss the impact of the higher-order corrections on total cross sections and transverse-momentum distributions, and provide an estimate of the theoretical uncertainty due to scale variation and the parton distribution functions.

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