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NNLL soft and Coulomb threshold resummation for squark and gluino production at the LHC

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In this talk I will present improved predictions for the production cross sections of squark and gluino pairs at the LHC at 13 and 14 TeV. Our results incorporate a combined resummation of soft logarithms and Coulomb singularities at NNLL order, including bound-state corrections and also annihilation contributions that were first reported on in arXiv:1312.6279 for top pair production, and extended in our work to squark and gluino production. The corrections dominate the threshold region of the partonic cross section and are resummed directly in momentum space using an effective-theory framework based on SCET and pNRQCD. The combined resummation of soft and Coulomb corrections lead to enhancements of up to 80% compared to the fixed-order NLO result at 13/14 TeV for gluino-gluino production, and 10-40% for squark-antisquark, squark-squark and squark-gluino production. The theoretical uncertainty of the cross sections is typically reduced to about \pm 5-10% for all four processes. The finite widths of the squarks and gluinos have a small, negligible effect on the soft and Coulomb corrections of the total SUSY production cross section.

Summary

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