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NNLL Threshold Resummation for Squark and Gluino Production Cross Sections at the LHC

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The search for supersymmetry is an ongoing quest during the future runs of the LHC. Coloured supersymmetric particles are expected to be produced in large quantities due to the high production cross sections, should supersymmetry be realised in nature. Precise theoretical predictions are therefore needed to improve the search for these yet undiscovered particles. A way to increase precision, and to deal with problematic terms occurring in fixed-order calculations, is to take into account threshold resummation corrections, which are known to have a significant impact on the predictions for total cross sections.

In this talk, the latest results on the inclusive squark and gluino production cross sections including threshold resummation corrections up to next-to-next-to-leading logarithmic (NNLL) precision, calculated in the Mellin-space formalism, are reported. Included are corrections due to hard-matching coefficients up to first and Coulomb coefficients up to second order. The corrections enhance the production cross sections by a substantial amount, and they lead to a reduction of the theoretical uncertainty for almost all processes of squark and gluino production. An outlook for future proton-proton colliders with higher center-of-mass energies is given.

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