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NNLL-fast 2.0: Updated Predictions for Squark and Gluino Production at the LHC with $\sqrt{S} = 13.6$ TeV

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Coloured sparticles are expected to be produced copiously at the LHC. As no squarks or gluinos have been found so far, their lower mass limits are in the TeV range, and they would therefore always be produced close to their production threshold. In this kinematical limit, potentially dangerous large logarithms can be summed systematically to all orders by means of threshold resummation techniques, restoring the predictive power of perturbation theory.

In my talk, I will present updated results on precision calculations for squark and gluino production at the LHC Run 3 with a centre-of-mass energy of $\sqrt{S} = 13.6$ TeV, using the latest available PDF4LHC21 sets. The theoretical predictions consist of total cross sections and theoretical uncertainty estimates, calculated at an approximated NNLO and including the resummation of soft and Coulomb gluons up to NNLL accuracy in the Mellin-moment space approach. The additional contributions lead to an enhancement of the production cross sections, and generally reduce the theoretical uncertainty, improving the theoretical accuracy for experimental SUSY searches. The results are implemented in the publicly available package NNLL-fast 2.0.

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