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NLL soft and Coulomb resummation for squark and gluino production at the LHC

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We present predictions of the total production cross sections of pairs of squarks and gluinos at the LHC, which incorporate a combined resummation of soft logarithms and Coulomb singularities, including bound-state contributions. These terms 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. This differs from the more conventional approach where soft logarithms are exponentiated in Mellin-moment space. The combined resummation of soft and Coulomb corrections can lead to much bigger effects than soft resummation alone, with corrections of up to 150% to the fixed-order NLO result for gluino-gluino production at 8 TeV, and smaller (but still sizeable) effects for the other production processes. The theoretical uncertainty of the cross sections is typically reduced to about \pm 10%. 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.

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