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SUSY-QCD corrections to squark annihilation into gluons and light quarks

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We discuss the one-loop SUSY-QCD corrections to the neutralino relic density for pMSSM scenarios with light stops where we focus on stop annihilation into gluons and light quarks including Sommerfeld enhancement effects. These corrections are important as stop (co)-annihilation becomes the dominant contribution to the relic density for scenarios with a small mass difference between the neutralino and the stop which are favored by current LHC searches and consistent with the observation of a 125 GeV Higgs boson.

To allow for the efficient analytic cancellation of infrared divergences between the real and the virtual corrections, we extend the dipole formalism by Catani and Seymour to massive initial states and verify our results through comparison with the phase space slicing approach.

The corrections have been implemented in the dark matter precision tool DM@NLO and the impact of the one-loop corrections on the cosmologically favored parameter region for relevant scenarios is analyzed.

Author: WIGGERING, Luca Paolo (University of Münster)

Presenter: WIGGERING, Luca Paolo (University of Münster)

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