

Impact of QCD and SUSY-QCD corrections on the neutralino dark matter relic density

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A powerful method to constrain the parameter space of theories beyond the Standard Model is to compare the predicted dark matter relic density with data from cosmological precision measurements, in particular from the WMAP and in future also from the PLANCK satellite.

On the particle physics side, the main uncertainty in the relic density calculation arises from the (co-)annihilation cross sections of the dark matter particle. While dedicated public tools like DarkSUSY and micrOMEGAs compute the relic abundance using an effective tree-level calculation, it is, however, crucial to take into account higher order corrections in order to meet the future experimental precision.

We will present the numerical package DM@NLO, which allows to compute the (co-)annihilation cross sections of the neutralino including the full one-loop QCD and SUSY-QCD corrections. We will show recent results illustrating the significant impact of the one-loop corrections on the neutralino (co-)annihilation cross-section and, in consequence, on the dark matter relic density.

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