

# Neutralino relic density with Next to Leading Order (co)annihilation cross-section

*mardi 15 mai 2012 10:10 (25)*

The relic density of Dark Matter in the Universe imposes today one of the most stringent constraints on new physics models such as the Minimal Supersymmetric Standard Model (MSSM). The most recent analysis of the WMAP collaboration has already reached an accuracy of 3%, and the upcoming results obtained with the Planck satellite will be even more precise. It is therefore mandatory for the theoretical predictions to match this impressive experimental precision. An important contribution to the theoretical uncertainty of the relic density comes from higher-order corrections to the Dark Matter annihilation and coannihilation cross sections.

The DM@NLO ("Dark Matter at Next to Leading Order") project aims at providing a numerical code to compute these cross sections for the lightest neutralino at NLO in the strong coupling. All relevant corrections to the annihilation of two neutralinos into quark-antiquark pairs have already been included and have been shown to modify significantly the predicted relic density. Neutralino-chargino and neutralino-squark coannihilation processes are in progress.

In this presentation I will first recall the motivations for a high-precision calculation of the relic density and show typical numerical results

for neutralino annihilation into quarks. I will then give a general overview of the DM@NLO project and discuss in some detail the specific case of neutralino-squark coannihilation.

## Summary

**Primary author(s) :** M. LE BOULC'H, Quentin (LPSC)

**Presenter(s) :** M. LE BOULC'H, Quentin (LPSC)

**Classification par session :** Astroparticle physics and cosmology