

High Energy Physics - Phenomenology

Global fits of the cMSSM including the first LHC and XENON100 data

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We present updated global fits of the constrained Minimal Supersymmetric Standard Model (cMSSM), including the most recent constraints from the ATLAS and CMS detectors at the LHC, as well as the most recent results of the XENON100 experiment. Our robust analysis takes into account both astrophysical and hadronic uncertainties that enter in the calculation of the rate of WIMP-induced recoils in direct detection experiment. We study the consequences for neutralino Dark Matter, and show that current direct detection data already allow to robustly rule out the so-called Focus Point region, therefore demonstrating the importance of particle astrophysics experiments in constraining extensions of the Standard Model of Particle Physics. We also observe an increased compatibility between results obtained from a Bayesian and a Frequentist statistical perspective. We find that upcoming ton-scale direct detection experiments will probe essentially the entire currently favoured region (at the 99% level), almost independently of the statistical approach used. Prospects for indirect detection of the cMSSM are further reduced.

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