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Constraining Supersymmetry with Global Fits

While no evidence for Supersymmetry (SUSY) has been found in any of the direct searches that have been conducted so far, SUSY is still a viable candidate for physics beyond the Standard Model. Even in highly constrained models like the Constrained Minimal Supersymmetric Standard Model (CMSSM) a considerable part of the parameter space cannot be probed by recent direct searches.

The results of direct searches for SUSY can however be used in combination with other observables to further constrain the parameters of supersymmetric models in global fits.

We perform such fits of the parameters of the CMSSM and two related non-universal Higgs Mass Models (NUHM) with Fittino, using a set of flavour observables, the anomalous magnetic moment of the muon, the dark matter relic density as well as results from direct and indirect dark matter searches. The limits set by the LHC searches in final states with jets and missing transverse energy and the signal strength and mass measurements of the recently discovered new state in LHC Higgs searches are as well taken into account.

The agreement between model predictions and measurements is quantified by calculating a χ^2 at each point in the parameter space. For the first time, the validity of a model is eventually assessed by the calculation of a p-value, which in the presence of potentially non-gaussian uncertainties is performed using pseudo experiments.