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Higgs-aware scan of m0-m1/2 plain of cMSSM at 8TeV and tan(beta)=30

the parameters of the cMSSM

For this scan, the following values for the parameters were selected :

* tan(beta) = 30

* sign(μ) = +1

* the common trilinear coupling was set to A_0 = -2 max(m0, m1/2), as suggested in http://arxiv.org/pdf/1204.5977v2.pdf⧉, in order to obtain a maximal stop mixing that would result in a more appropriate mass for the higgs in the small-m0 region

* for the m0 and m1/2 parameters a grid of 664 points was chosen to be scanned. Out of those points, 58 were excluded because they corresponded to stau (with pdg code 1000015) being the LSP (as shown in the figure below)
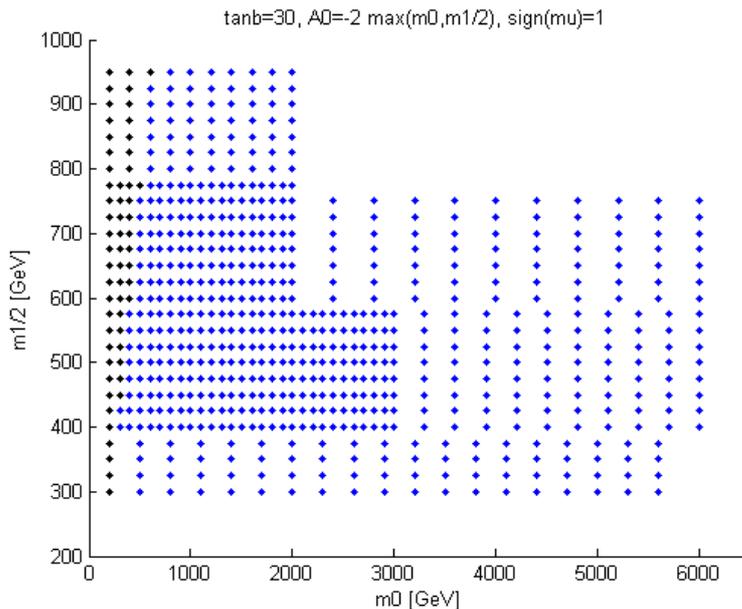
the standard model inputs

The following selection of values was made :

top mass = 172.5 GeV

tau mass = 1.777 GeV</noautolink>

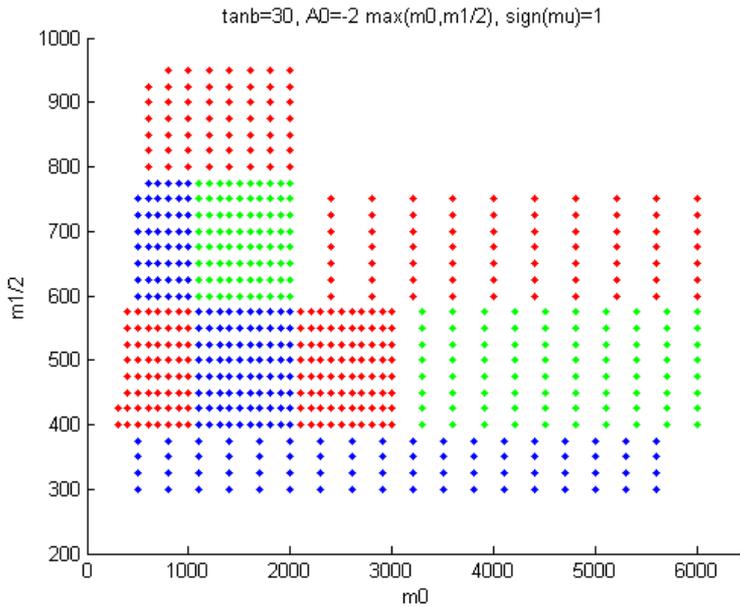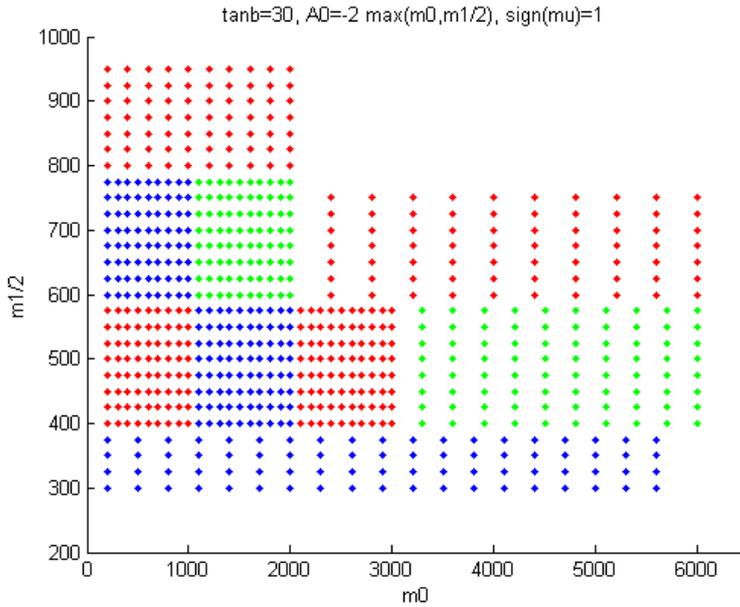Z mass = 91.1876 <noautolink>GeV</noautolink>

mb(mb)^MSbar = 4.2

alpha_em^-1(M_Z)^MSbar = 127.934

G_F [GeV^-2] = 1.16637 E-05

alpha_S(M_Z)^MSbar = 0.1184

the scanned grid

The scan includes 606 points placed on a multi-rectangular grid which is divided into 9 regions (as shown in the figures below)

As it is apparent, each of the 9 regions has one out of 4 possible steps for m0. This diversification for the step of m0 was chosen in order to optimally concentrate in the interesting region near the origin of the plain, since for large m0 the rejection lines are expected to be parallel to the m0 axis, and thus a bigger step can be chosen.

the spectrum, decay rates, cross sections and the events

For each selected point, the mass spectrum was calculated using SOFTSUSY, and the decay rates using SUSYHIT. That information was stored in slha files based on which 150,000 events per point were produced with Pythia at 8 <noautolink>TeV</noautolink>.

The cross sections were calculated at NLO using prospino.

This topic: Sandbox > CMSSM
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