



FIG. 3: Likelihood distributions of masses in mSUGRA. The graphs show the likelihood distributions marginalised down to 2d. The likelihood (relative to the likelihood in the highest bin) is displayed by reference to the bar on the right hand side of each plot. The contours show the 68% and 95% confidence level limits.

TABLE IV: Likelihood of being in a certain region of mSUGRA parameter space.

Region	likelihood
h^0 pole	0.02 ± 0.01
A^0 pole	0.41 ± 0.03
$\tilde{\tau}$ co-annihilation	0.27 ± 0.04
\tilde{t} co-annihilation	$(2.1 \pm 4.8) \times 10^{-4}$

Stop co-annihilation requires a broader definition: it is defined such that $m_{\chi_1^0}$ is within 30% of $m_{\tilde{t}_1}$, since the annihilation is so much more efficient [23–25] than in the other regions. A better defined procedure might perhaps be to determine regions on the basis of the *dominant* annihilation mechanism, but since we are only looking for a rough indication of the region involved, the procedure adopted here will suffice. Points that fall in between any of the sharp definitions are either from the bulk region or in the smaller tails of the likelihood distribution.

The likelihoods of these regions are shown in Table IV. We estimate the uncertainty by calculating the standard

deviation on the 9 independent Markov chain samples. The quoted error thus reflects an uncertainty due not to experimental errors, but to a finite simulation time of the Markov chain. We see that the h^0 -pole region has a relatively low likelihood whereas for the A^0 -pole and τ co-annihilation regions the likelihood is larger. From the table, we see that the \tilde{t} -co-annihilation region, although uncertain due to the low statistics, is negligible, and we now investigate why this is the case.

The suppression of the stop-co-annihilation region comes from essentially two effects: firstly, as already apparent from Ref. [25], finding a suitable stop co-annihilation region which is compatible with *both* the $(g-2)_\mu$ and $BR[b \rightarrow s\gamma]$ measurements is problematic. Secondly, the central value of m_t has come down since ref. [25]. The dominant radiative corrections to m_{h^0} are highly correlated with m_t [51], with the consequence that the lower predicted Higgs mass now rules out more of the stop co-annihilation region. We illustrate these points in Fig. 5 along the m_0 direction for given values of the other mSUGRA parameters (stated in the caption). In Fig. 5a, we plot the fractional stop-neutralino mass splitting Δ