

Origin of LHC signal:

“Benchmark Models...” GK, Lykken, Mrenna, Nelson, L-T Wang, T.Wang, hep-ph/0209061

- Weakly coupled heterotic string
- Dilaton stabilized by non-perturbative contribution to Kahler potential, using Shenker form, vacuum energy set to zero

(Gaillard, Binetruy, Wu, Nelson, Giedt...)

- 3 families etc
- *Tree level* gaugino masses and A terms universal but suppressed, one-loop terms non-universal and not negligible compared to suppressed tree level
- tree level gauge couplings not suppressed so their loop corrections small
- “anomaly mediated” and “gravity mediated” contributions comparable

- Specify model by 6 parameters (at high scale, 2×10^{16} GeV), μ , b , $y_{t,b}$, $m_{3/2}$, R (parameterizes Kahler)

$$M_a = \sqrt{3} m_{3/2} R - b_a g_a^2 m_{3/2}$$

- Input top and bottom masses, EWSB with numerical value of $M(Z) \rightarrow 3$ parameters fixed, 3 to choose -- specify model here

$$m_{3/2} = 4300, R = 1/61, y_t = 0.5$$

- Choose sign so M_3 reduced
- b_a is the beta function coefficient of the gauge group

→ High scale soft terms (GeV), all real

$$M_1 = 215 \quad M_2 = 137 \quad M_3 = 82$$

$$m_{H_u} \approx m_{H_d} = 4300$$

$$M_Q \approx M_U \approx M_D \approx M_L \approx M_E \approx 4315$$

$$A_u = 185 \quad A_d = 234 \quad A_e = 189$$

Which gives

Low scale parameters (GeV):

$$M_{\tilde{g}} = 328 \quad \mu = 412 \quad m_h = 115.4 \quad \tan \beta = 5.9$$

$$M_{\tilde{N}_1} = 89 \quad M_{\tilde{N}_2} = 110.5 \quad M_{\tilde{C}_1} = 109.3$$

$$M_{\tilde{t}_1} = 2625 \quad M_{\tilde{t}_2} = 3618 \quad M_{\tilde{b}_1} = 3615$$

$$A_t = -94 \quad A_b = -21$$

$$\Omega_{LSP} h^2 = 0.26, \quad bino = 93\%, \quad wino = 4.5\%$$