

NMSSM Group - Minutes: March 7, 2018

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S2: Experimentalists can put more info on HEP data, rather than exact functional forms. Most of the time there is no functional form for the observed data, and theory experts can use the data points to extract a functional form if it better suits their work.

S4: The pNMSSM parameter space is not a subset of pMSSM although they have some overlaps. In principle the NMSSM is a superset of MSSM due to being more general.

Shoaib Munir - Mass-degenerate Higgs bosons

S15: Can the rate of the Higgs boson increase assuming other degenerate states? There are scenarios with other degenerate states fulfilling the current Higgs rates, which presumably is what is considered here. Putting other measurements than di-gamma in the game can clarify the picture.

S20: Degenerate mass states will be difficult because photon mass resolution is very good, but the tau mass resolution is poor $\sim O(10\%)$. In general, about 200-300 MeV mass resolution for photons should work.

Sven Heinemeyer - Benchmark planes

S2: Can show with or without dark matter constraints. For example, successive plots with requirements of dark matter showing incremental benefit from each additional requirement. Can consider additional variants where the singlet is very light.

S4: Fix $(m_A, \tan \beta)$: then explore (μ, M_2) .

SUSY background calculations are difficult.

Prefer plane in terms of masses which are directly measurable and less sensitive to radiative corrections, rather than derived parameters. Too difficult to have one universal plane with all channels, due to too many parameters. Color code could be useful for additional dimensions like cross-section. Maybe could also slice, but may be difficult.

S5: Cascades of neutralinos, charginos via $h(125)$ or ϕ .

S6: Should understand what input parameters affect the two parameters of plane the most, and how to produce the data points, e.g. scattered plot with what underlying model? Careful about distinction/connection between input quantities and (relevant) derived parameters. Having the tool and expertise, people can make choices working together.

Action: When theorists publish papers, please also try to produce example plane plots that illustrate some benchmarks.

*Wim De Boer - Scanning of Correlations in NMSSM"

S4: Left plot is χ^2 (z-axis label cut off).

Third region with mixed effects between purely MSSM and NMSSM enhancement terms could be added, but already illustrated by those two regions separately.

S8: W & Z curves turn over at right edge of plot — purely plotting artifact from faulty extrapolation since the scan ends there. In reality should rise up to WW and ZZ mass thresholds.

S10: “region 1” in statement should be “region 2” (typo).

S11: NMSSM couplings are 0.7, but MSSM couplings are larger at 1.3. Both could be viable.