pMSSM scan updates

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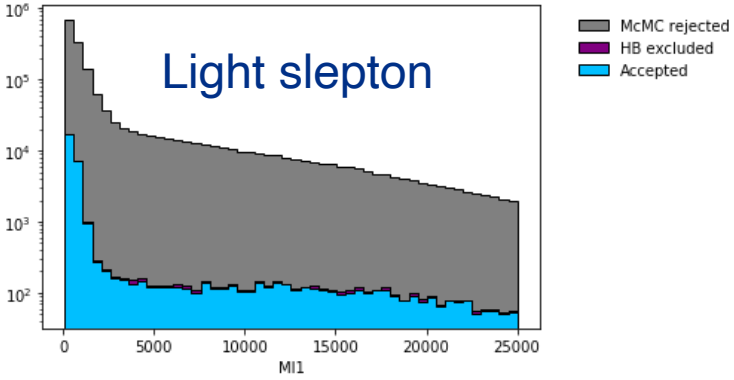
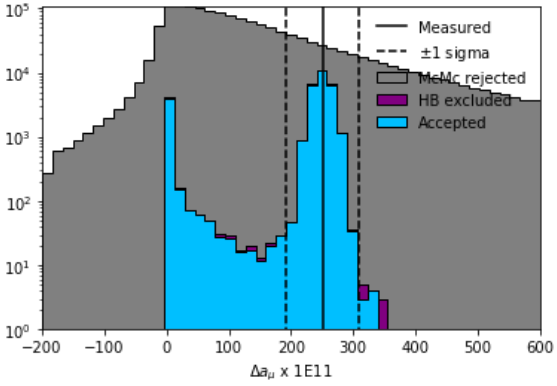
October 13, 2021

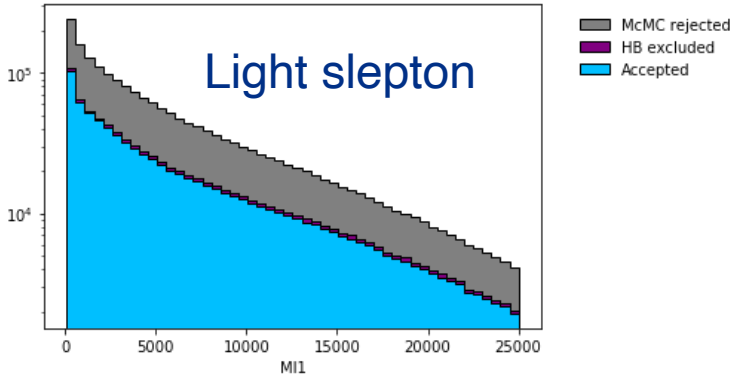
Including a_μ in the likelihood

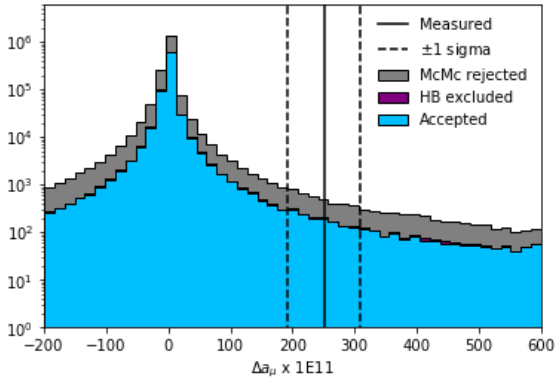
With a_μ
Unc = measured difference from SM
Efficiency = 1.9%



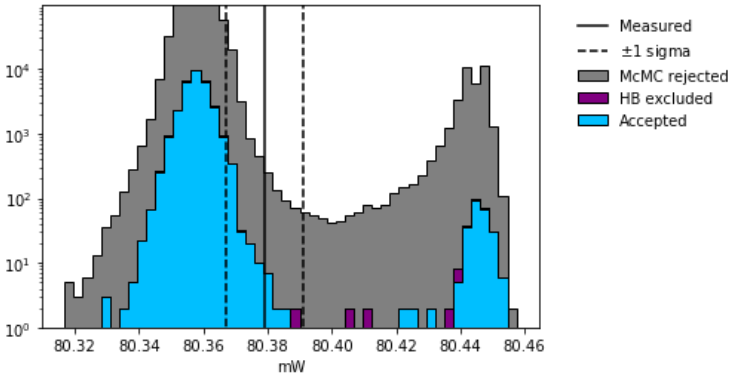


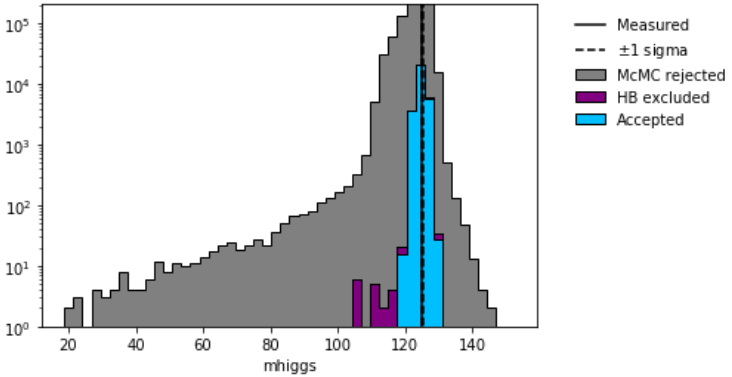
Without a_μ
Unconstrained
Efficiency = 43%



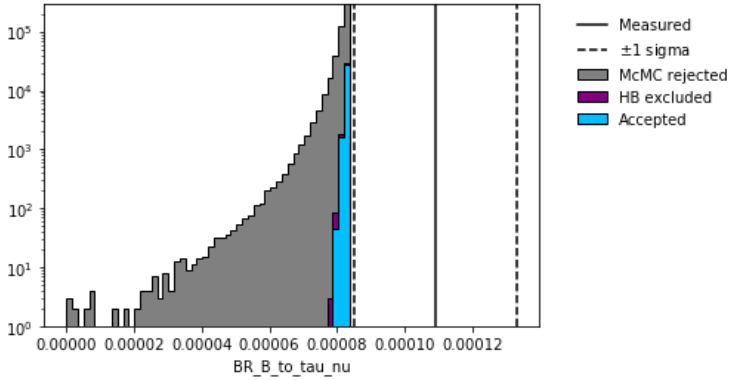


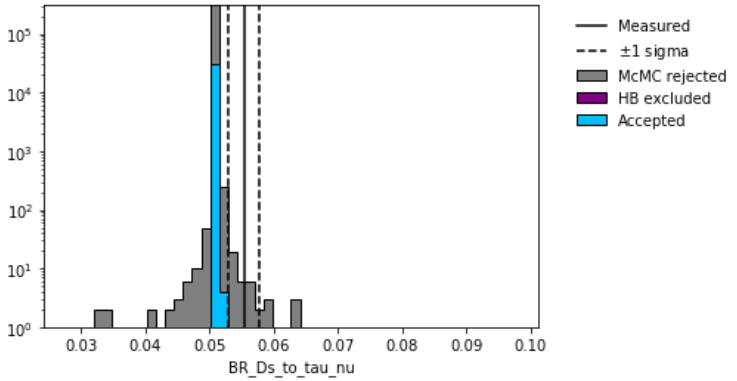
Observables

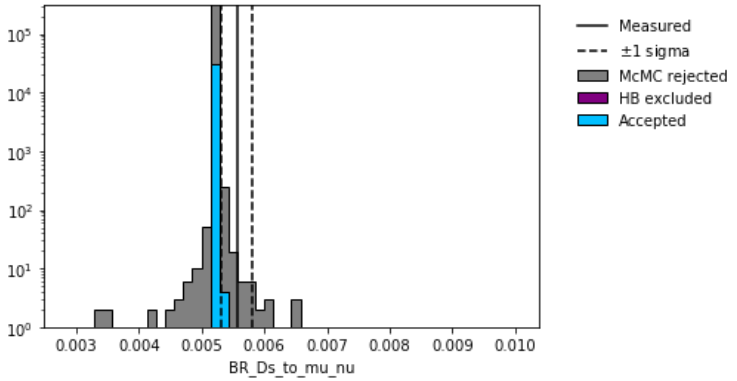




Also checked, look fine:
m_b, m_t, α_S,







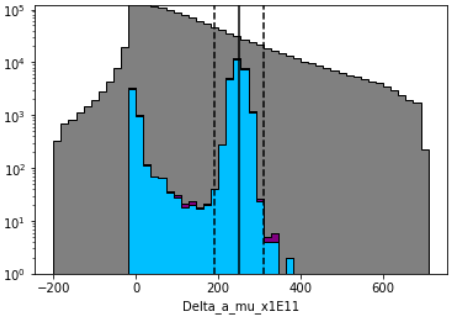
Fermilab

Width of Gaussian

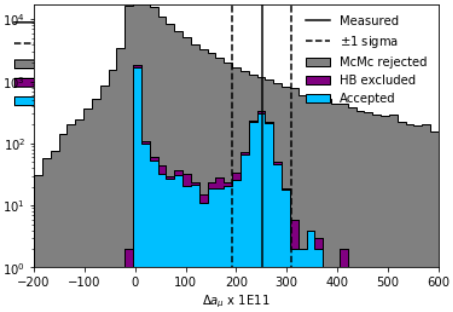
- Studies done with a_μ in the likelihood

Log base	Gaus. step width (as fraction of range)	N(points)	Total efficiency	Fraction of accepted points with lightest squark mass > 10 TeV
e	5%	1624883	1.9%	0.45%
e	10%	200100	1.6%	0.98%
e	20%	190799	0.77%	2.6%
e	30%	162693	0.6%	2.8%

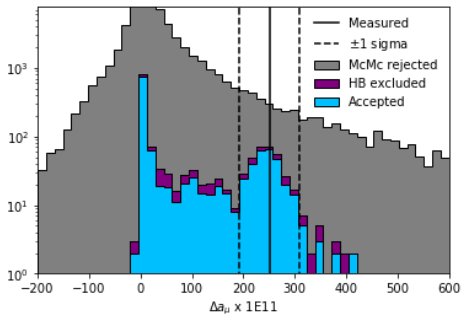
5%



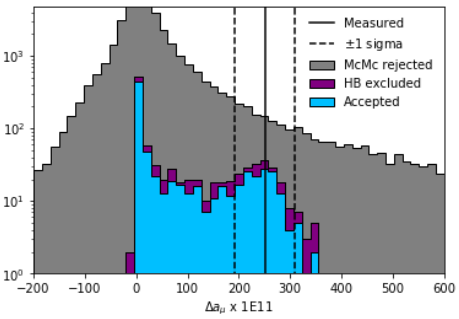
10%



20%



30%



Setting up the final configuration

- Update to Spheno 4.0.5
- Decide on the Gaussian step width
- Include a_μ in the likelihood
  - With uncertainty = measured difference from SM
- Remove rejected points from output to save space

Post-processing

- Micromegas is fully implemented
- SModelS should also be run here
  - Now fully implemented in docker container (thanks Sabine and Wolfgang for helping)
  - Looking for volunteers to write interface

Data sharing

- We have common space on Snowmass21 Connect:
  - Slack channel for support
- Data for all tests I showed today are here:
  - /collab/project/snowmass21/data/pMSSM/spheno-4.0.4
  - Includes: csv files with parameter/observable values, tarballs of SLHA files for accepted points
  - Plotting script is here on github
- Feel free to start playing with the outputs!