Kinematic Fits in the Leptonic Channel

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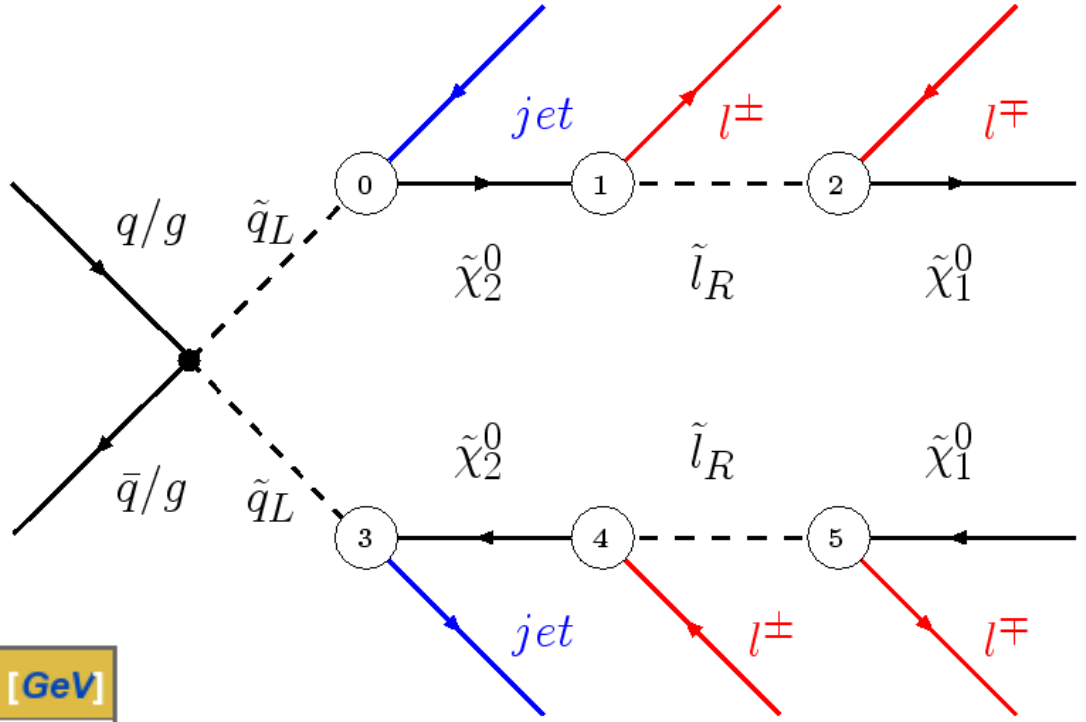
Benchmarkpoint & Cascade

mSUGRA Parameters

	SPS1a
m_0	100 *GeV*
$m_{1/2}$	250 *GeV*
A_0	-100 *GeV*
$\tan(\beta)$	10
μ	>0

Particle	Mass [*GeV*]	ΔM to next [*GeV*]
$\tilde{g}$	606	39 / 44
$\tilde{q}_L$	567 (ud) / 562 (cs)	387 / 382
$\tilde{\chi}_2^0$	180	37
$\tilde{l}_R^{\pm}$	143	46
$\tilde{\chi}_1^0$	97	

X-section: ~36 pb @ 14 TeV



Leptonic Cascade

- 2 jets + 2x2 OSSF leptons
- 16/32 possible combinations
- BR = $1.7*10^{-3}$

Signal Selection

- Using generator info to pick the correct cascade
- Only accept generated events passing cuts after smearing with detector resolution (Toy MC)

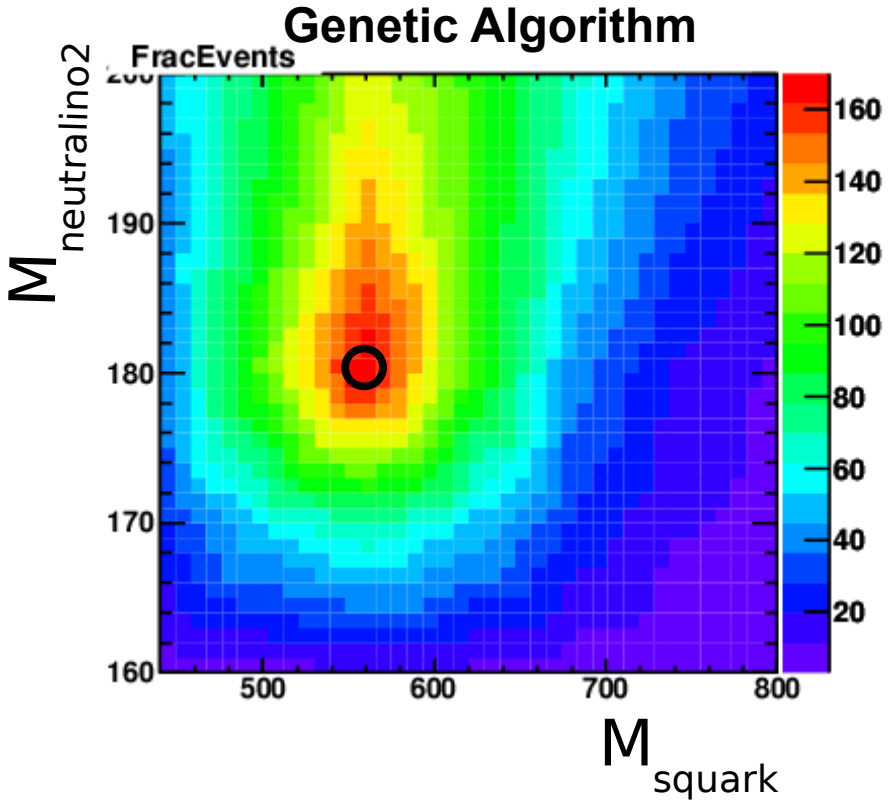
Jets			Leptons		
N	p_T	$\|\eta\|$	N	p_T	$\|\eta\|$
4	>30 *GeV*	<3.5	2x2OSSF	>10 *GeV*	<2.5

- Using muons and electrons

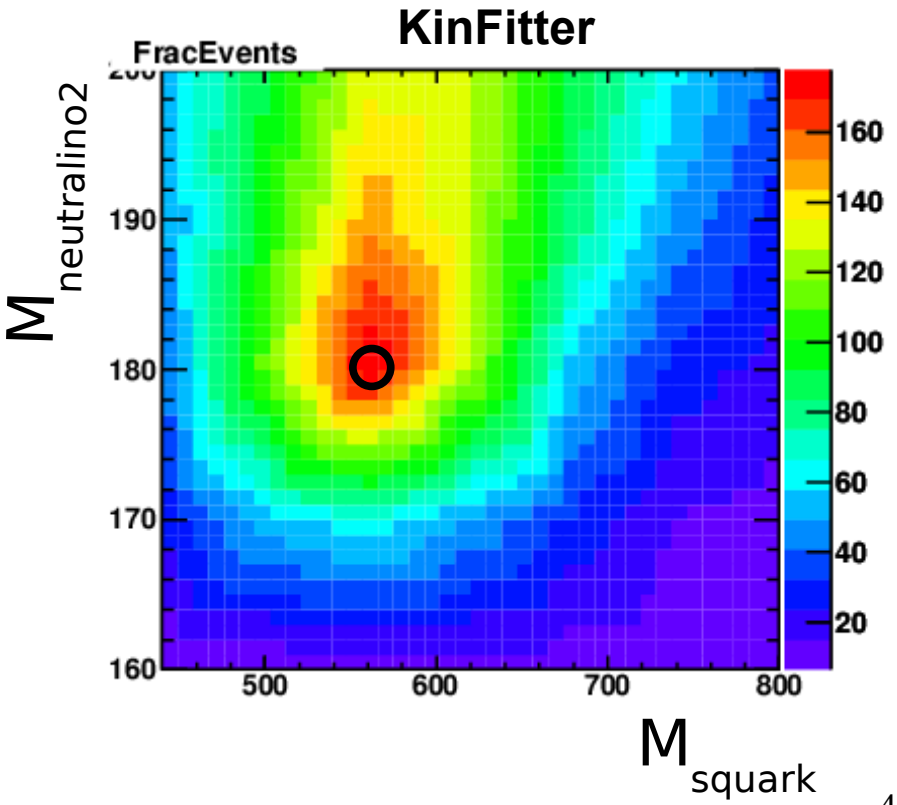
- Selection Efficiency: 45%
- Fake Rate (if not using generator selection): 51%

Scan in Mass Plane I

- First little scan
  - Varied M_{squark},$M_{neutralino2}$, $M_{slepton}$
  - Fixed LSP mass
- Signal + SUSY Background

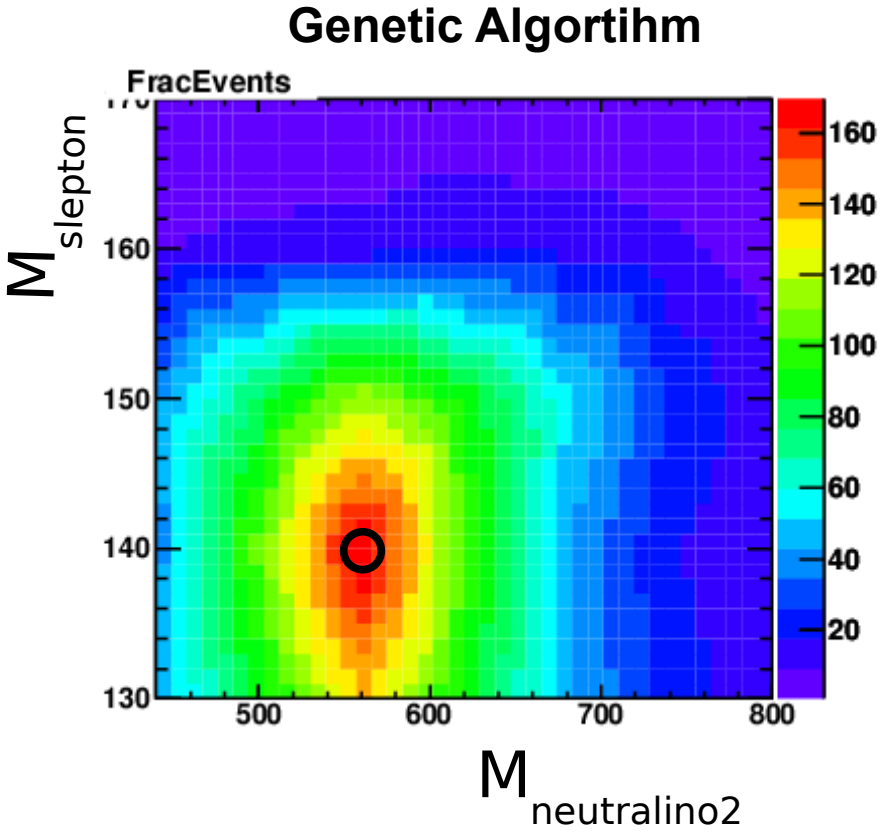


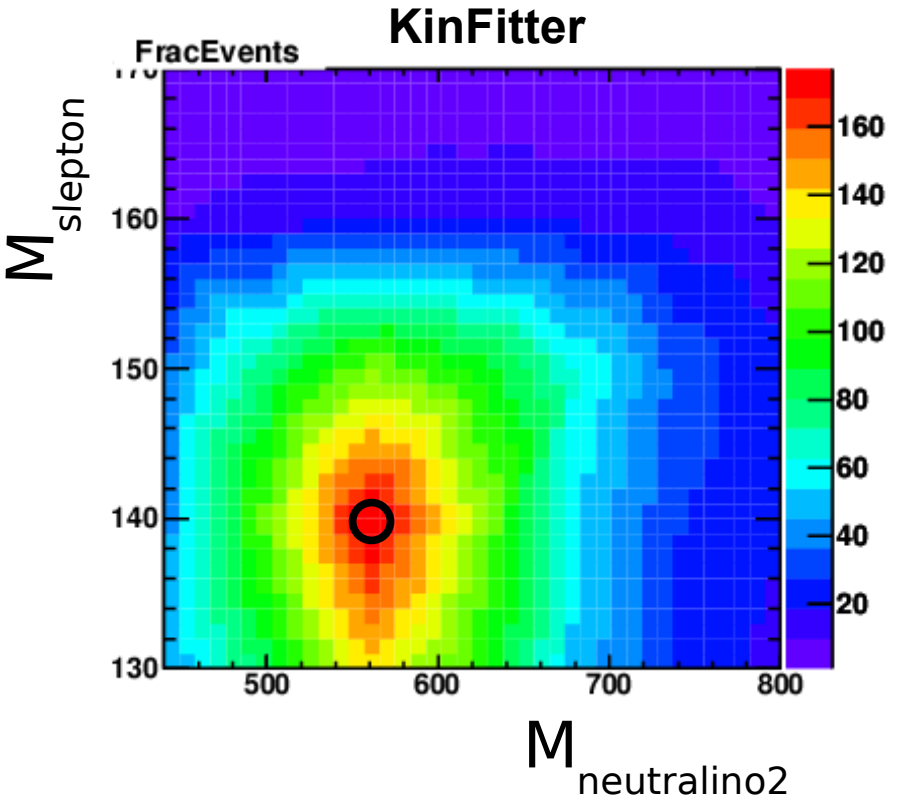
- Ran GA and KF for each hypothesis and all events
- Plots: Sum of fit probabilities
  - KF: all converged events
  - GA: all events with P>0.02



Scan II

- True values preferred by both fit methods
  - Similar performance
- Quite narrow peak esp. for neutralino & slepton masses





Scan III

- Regions with constant mass difference preferred by the fit.
- True values lie at the edge of the maximum