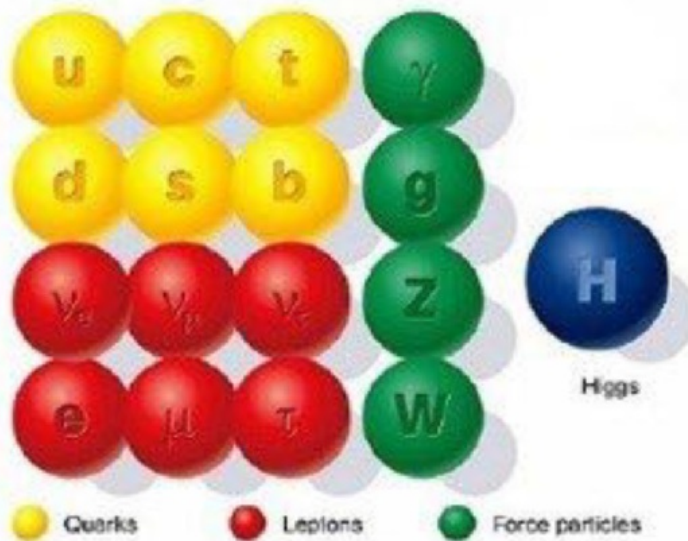


Top Corridor Analysis

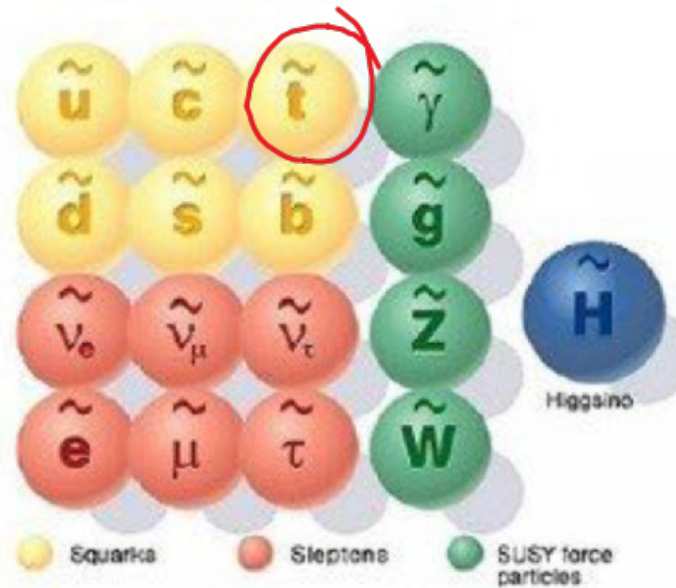
Emily Jiang, Hannsjörg Weber

Supersymmetry

SUPERSYMMETRY



Standard particles



SUSY particles

Why Supersymmetry?



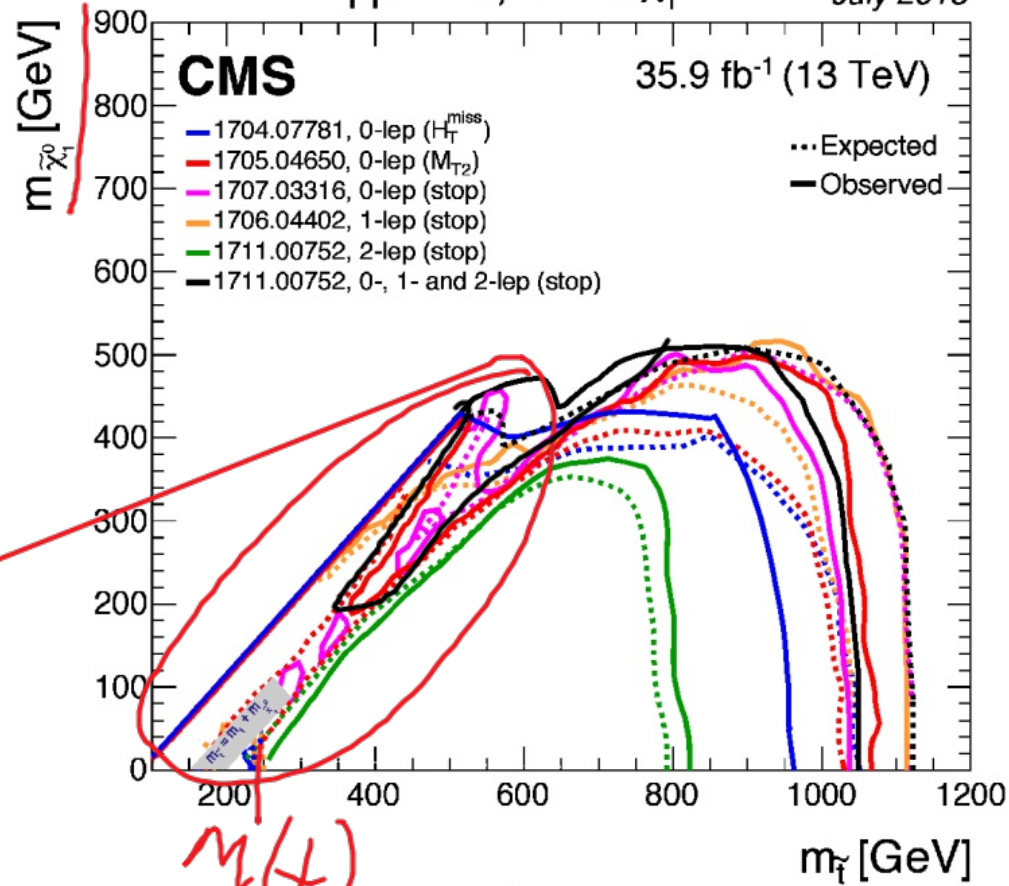
- Hierarchy problem
- Dark matter candidate
- Force unification, etc.

$M(t, \tilde{\chi}_1^0) \approx$
 $M(t)$

Top Corridor

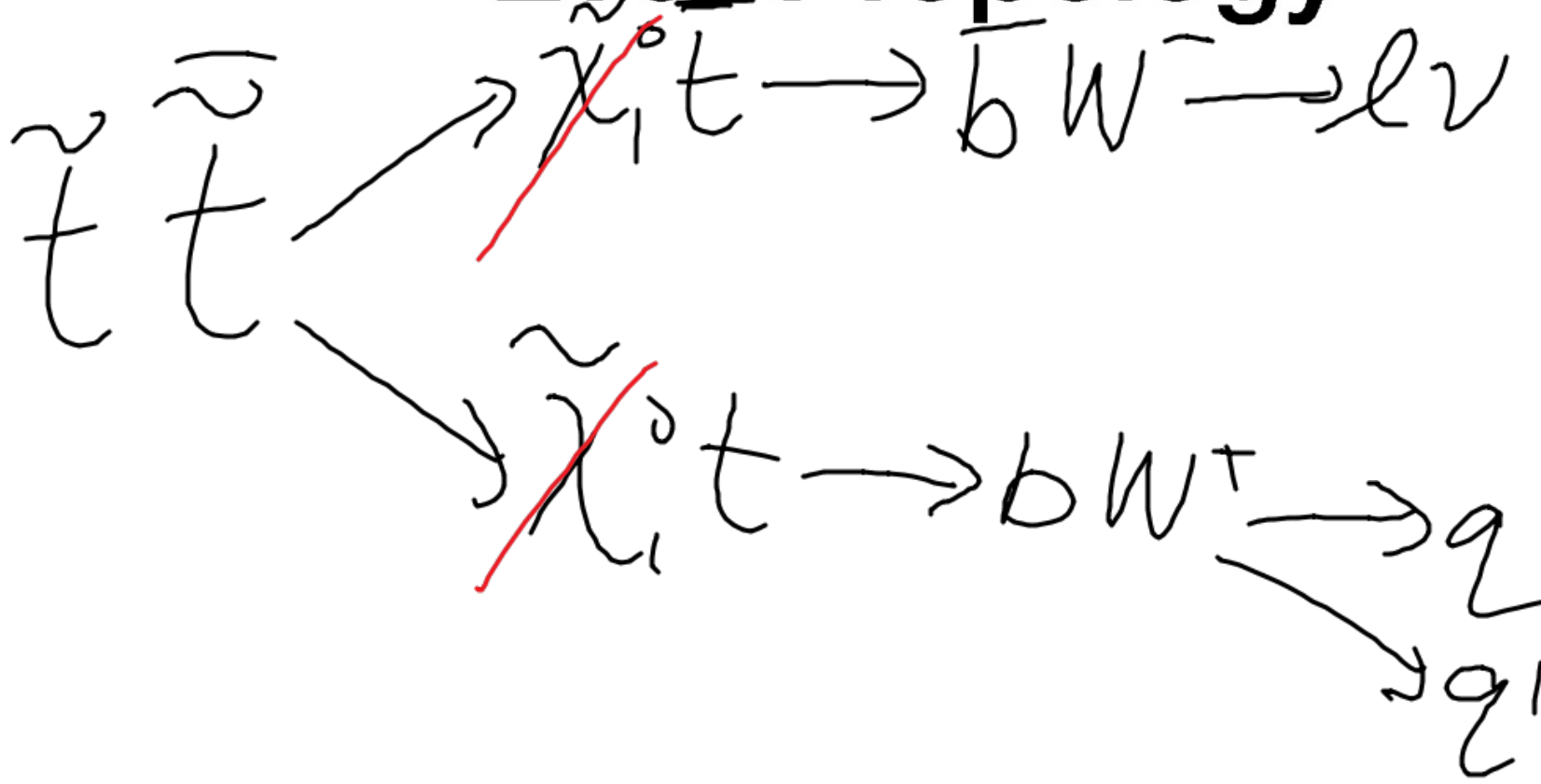
$pp \rightarrow \tilde{t}\tilde{t}^*, \tilde{t} \rightarrow t \tilde{\chi}_1^0$

July 2018

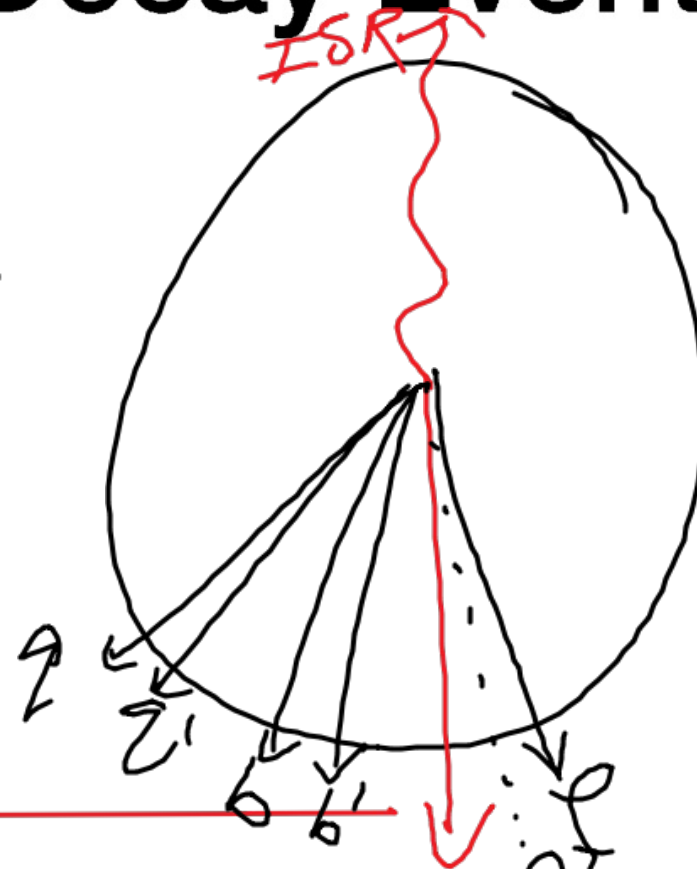
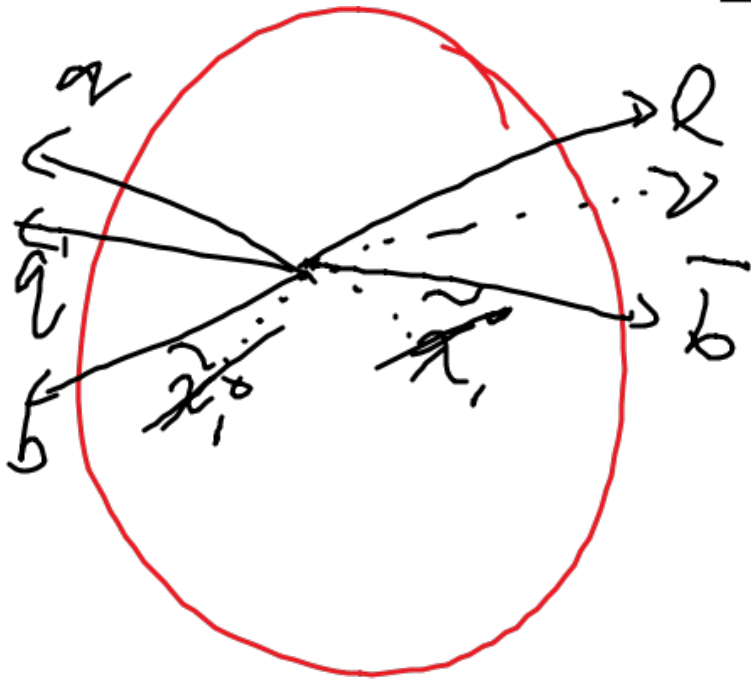


$M(t)$

Event Topology

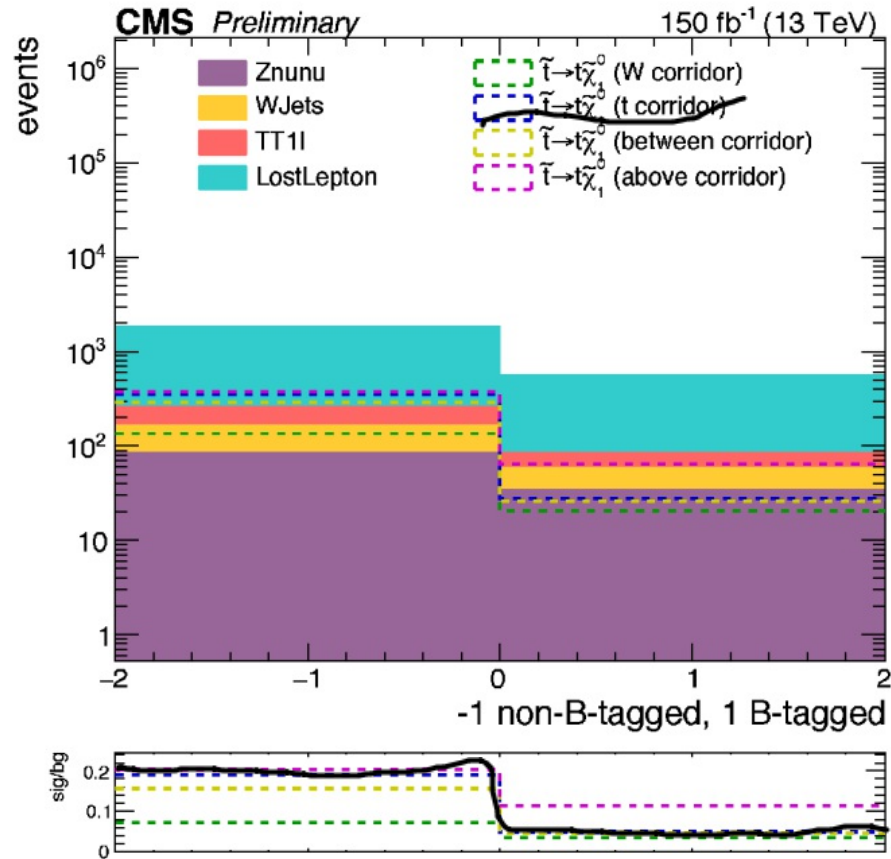


Decay Event



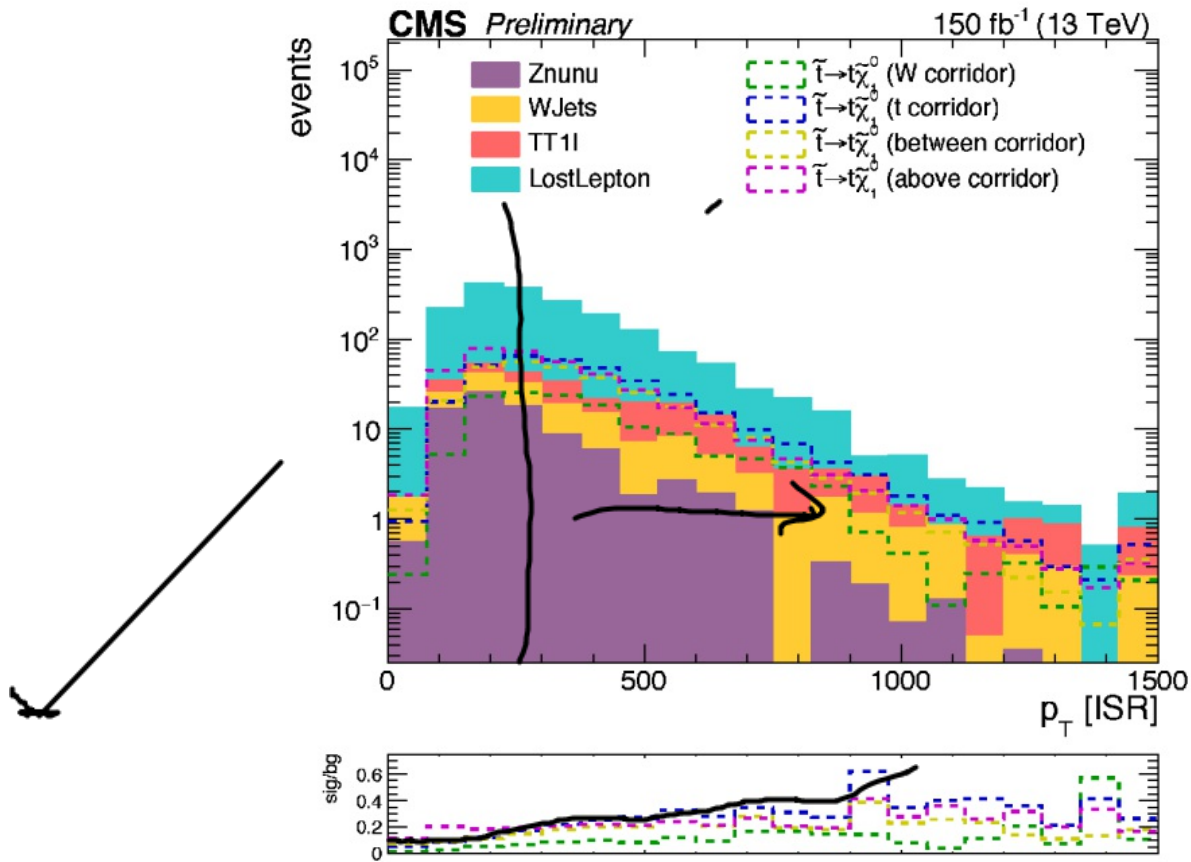
$$p_{miss}^T \rightarrow p_{\gamma}^T + p_{\gamma_0}^T + p_{\gamma_1}^T$$

ISR Jet B-Tagged?

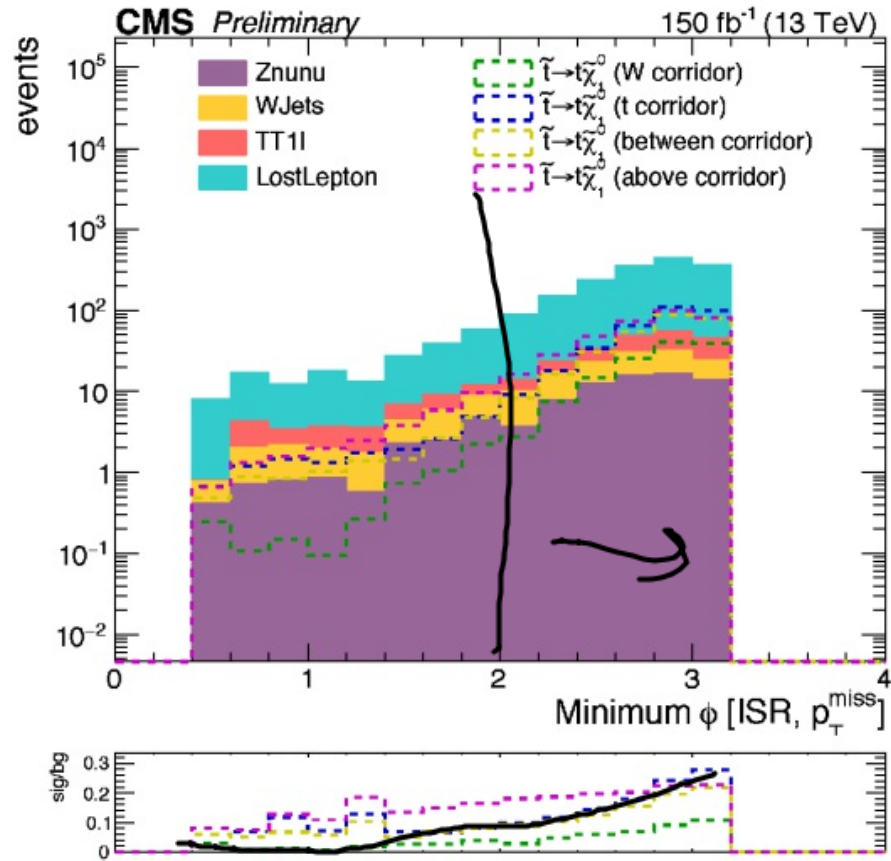
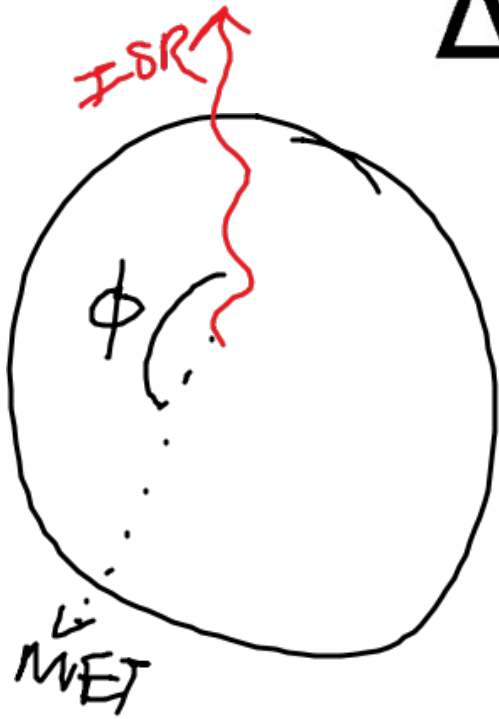


S/B

$p_T^{\text{ISR}} > 250 \text{ GeV}$



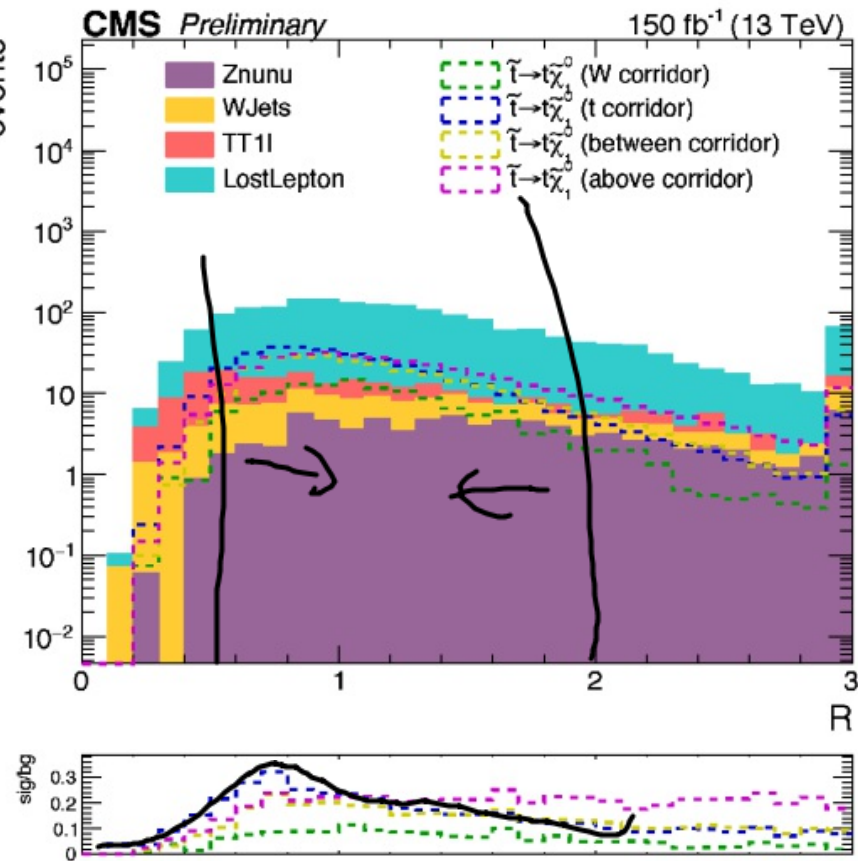
$\Delta\Phi$ (ISR Jet, MET) > 2



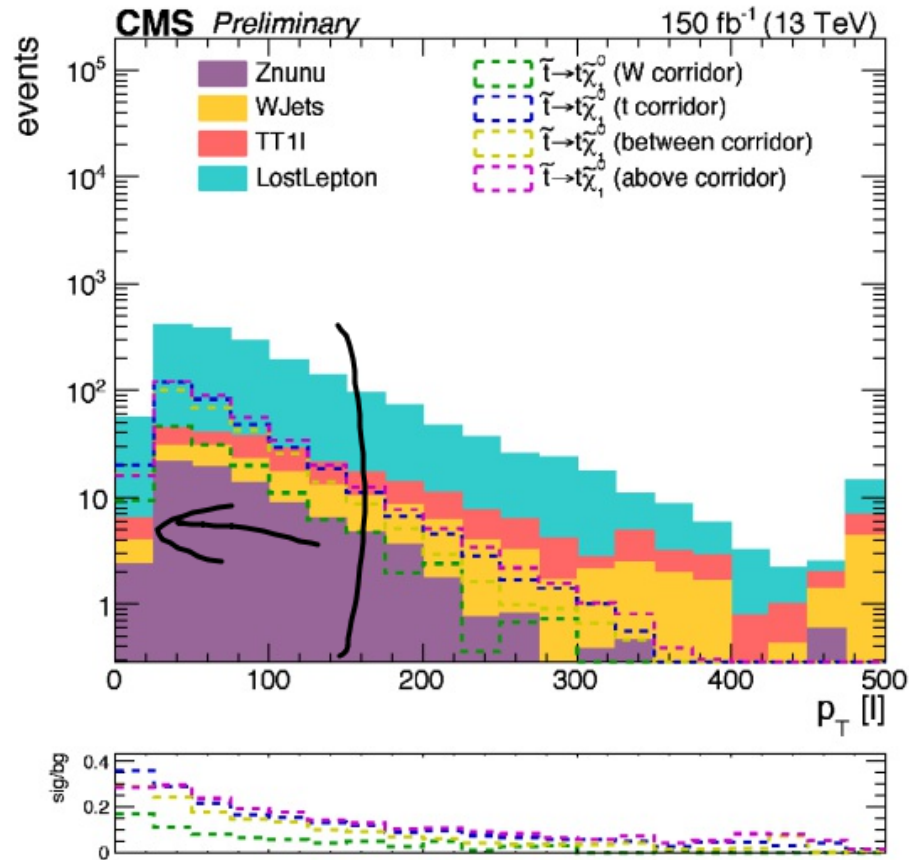
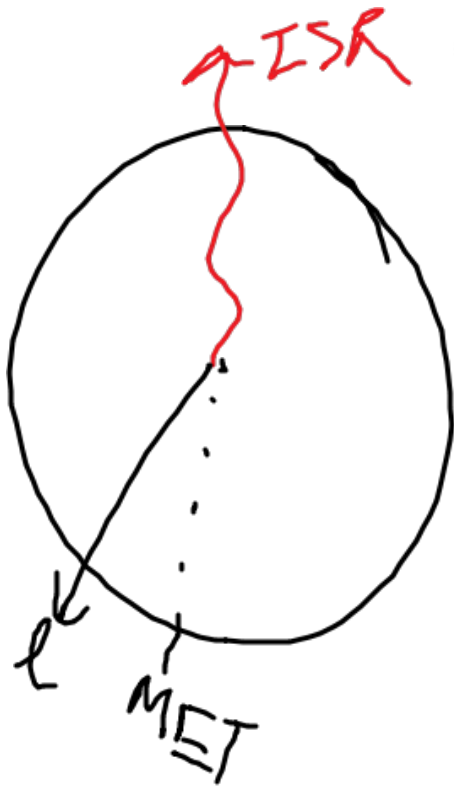
$$R = \frac{F_{\text{miss}}^{\tau}}{P_{\text{ISR}}^{\tau}} \text{ events}$$

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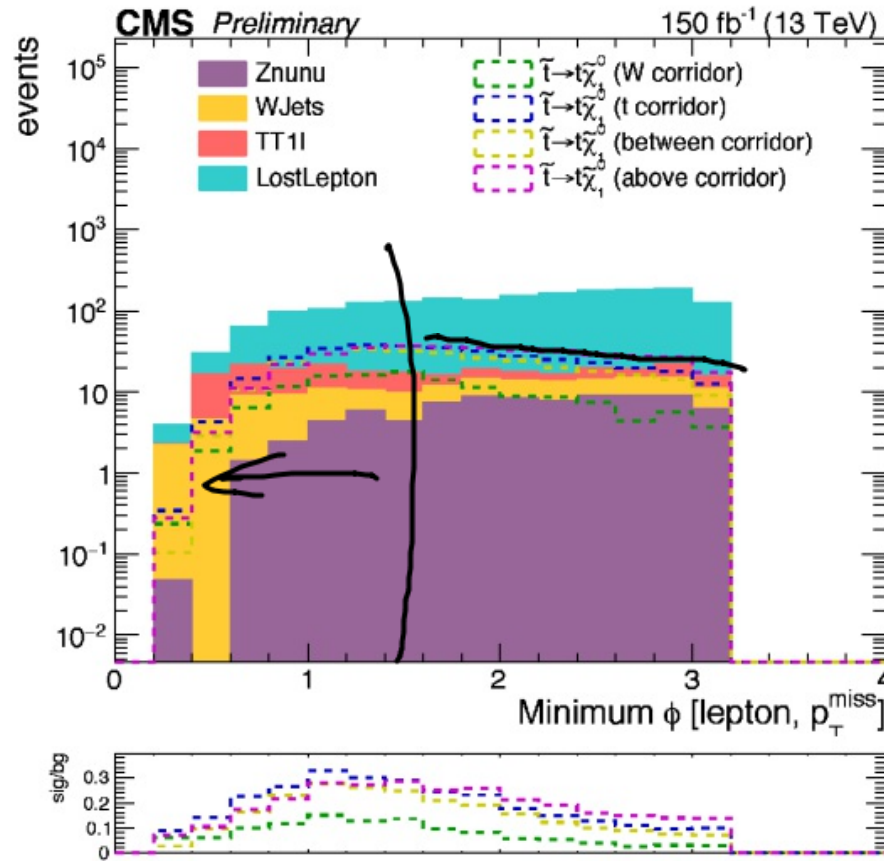
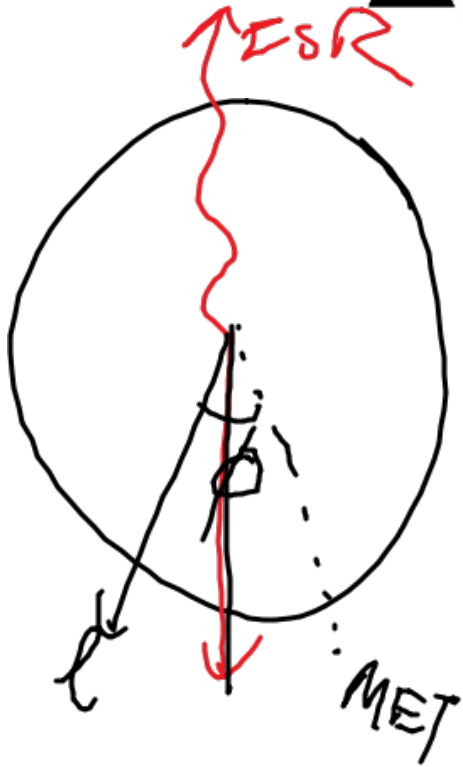
0.5 < R < 2



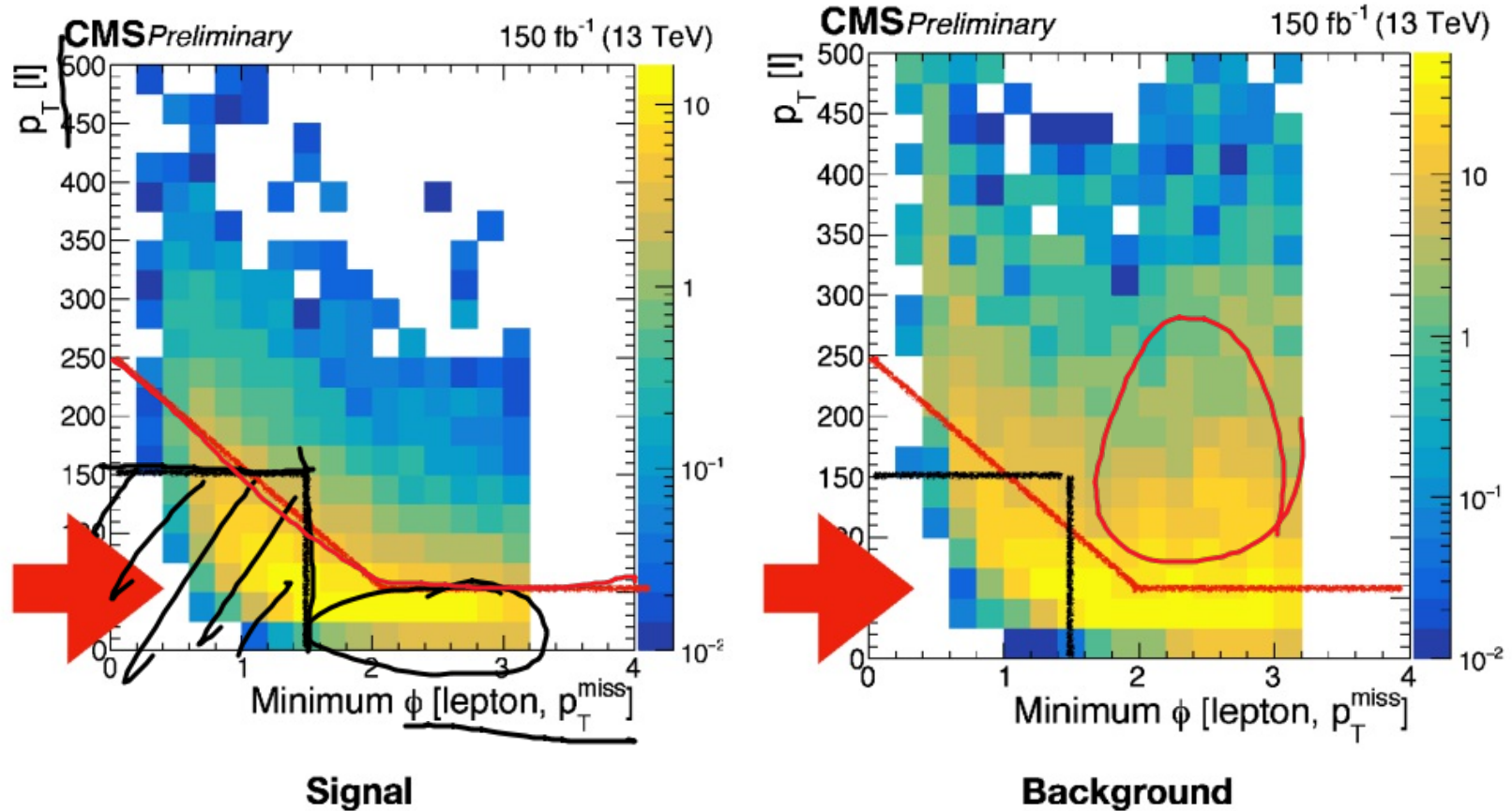
p_T Lepton < 150 GeV



$\Delta\Phi$ (Lepton, MET) < 1.5



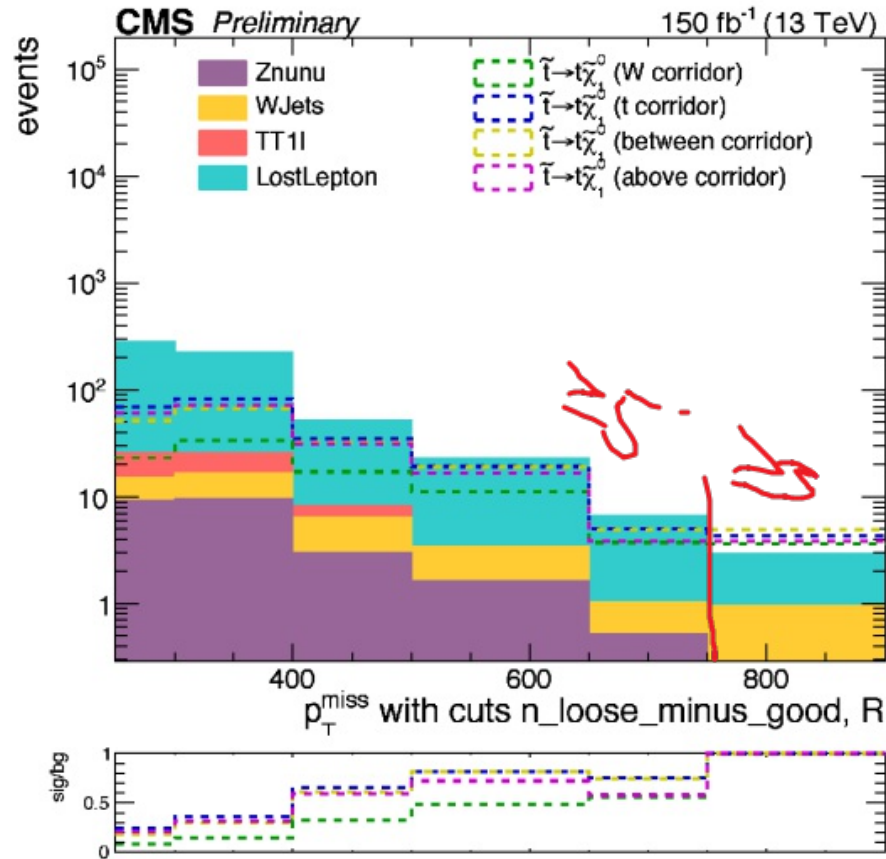
Shape Cut



Process

- We look at several sensitive variables
- Started with single cut or a shape cut
- Add another cut on top, investigate if sensitivity improves
- Repeat until sensitivity stops improving

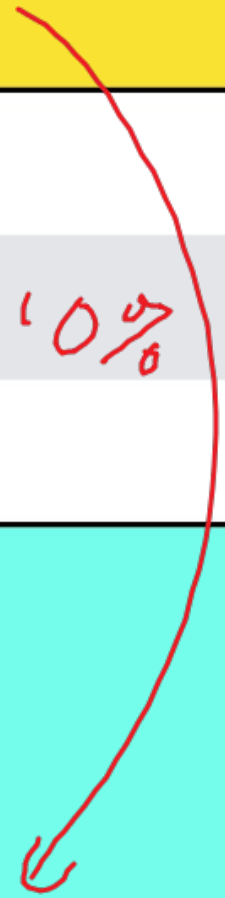
MET Binning



Final Cuts With Missing E_T Binning	S/\sqrt{B}^{**}
2016 Analysis (with new MET binning)	<u>3.293</u>
$\Delta\Phi$ (lepton, MET), p_T lepton	3.424
Number of only loosely b-tagged jets, $\Delta\Phi$ (lepton, missing E_T), p_T lepton	3.328
$\Delta\Phi$ (lepton, MET), p_T lepton, R	3.432
Shape: Number of only loosely b-tagged jets, R	3.634
Shape: Position of first b-tagged jet, R	3.580
<u>Shape: $\Delta\Phi$ (lepton, missing E_T)</u>	<u>3.578</u>

$$\frac{S}{\sqrt{B}}$$

$$= \frac{S}{\sqrt{B + \Delta S^2 + \Delta B^2}}$$



10%