
Missing E_T in semileptonic $t\bar{t}$

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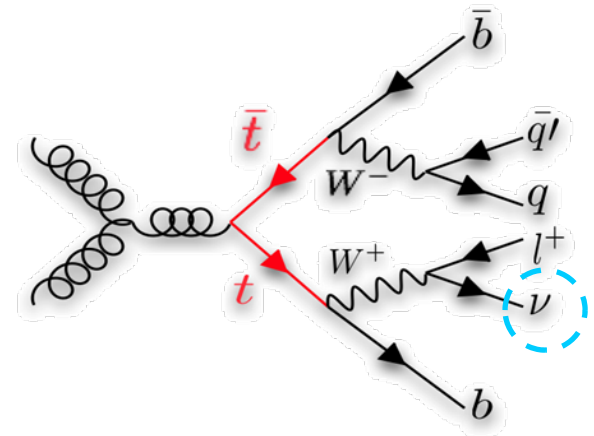
Motivation

- ❖ ttbar events similar in topology to several **new physics** channels
 - High p_T (b-)Jets, **Missing E_T** , lepton
- ❖ Understand the behavior of Missing E_T in ttbar and apply to new physics searches

Event Selection

(no b-tagging)

- ❖ > 3 jets, $p_T > 40$ GeV
- ❖ > 1 jet, $p_T > 20$ GeV
- ❖ 1 lepton (e/ μ), $p_T > 20$ GeV
- ❖ $E_{T\text{miss}} > 20$ GeV



Samples

- Signal : 105200 (semi- and dileptonic)
 - 100 pb⁻¹: ~ 3000 selected events (e and μ)
- Background: W+jets (108240-108251)
 - 100 pb⁻¹: ~ 1675 selected events

Triggers

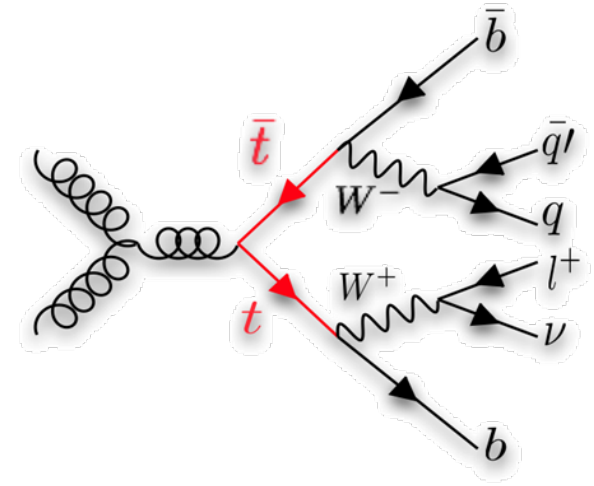
- ❖ not decided within Top Group
- ❖ for now:
 - ❖ EF_e20_loose
 - ❖ EF_mu10

DPDs

- ❖ SINGLEEL
- ❖ SINGLEMU

Transverse W Mass

- $m_W^T = \sqrt{(2 p_l^T p_\nu^T (1 - \cos(\Delta\phi)))}$
- Sensitive to Missing E_T reconstruction



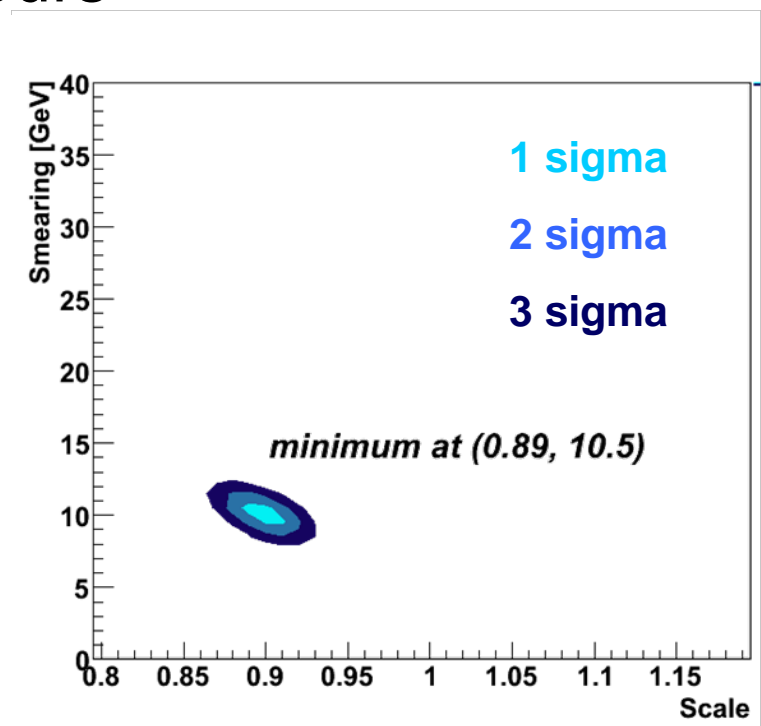
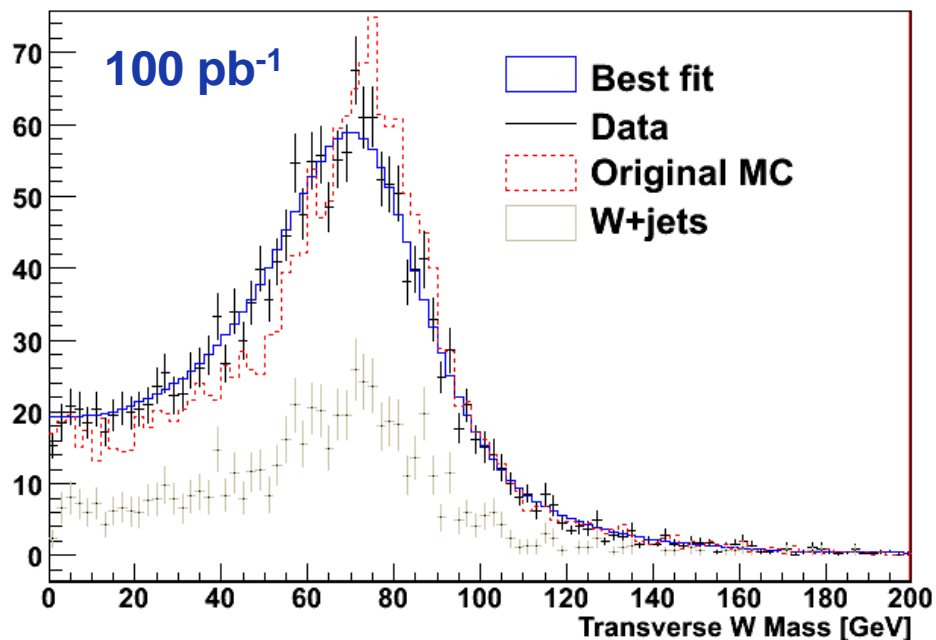
2D scan

- ❖ run over a grid of scales and resolutions with full MC
- ❖ For every point, **scale** $p_{x,miss}$ and $p_{y,miss}$ and convolute them with a **Gaussian**
- ❖ Recalculate m_W^T distribution
- ❖ → Fithistos (scaled to equal # events in [40,120])
- ❖ Calculate χ^2 for every fithisto and find minimum

Results

e.g. Input: scale 0.90 and Gauss 10 GeV

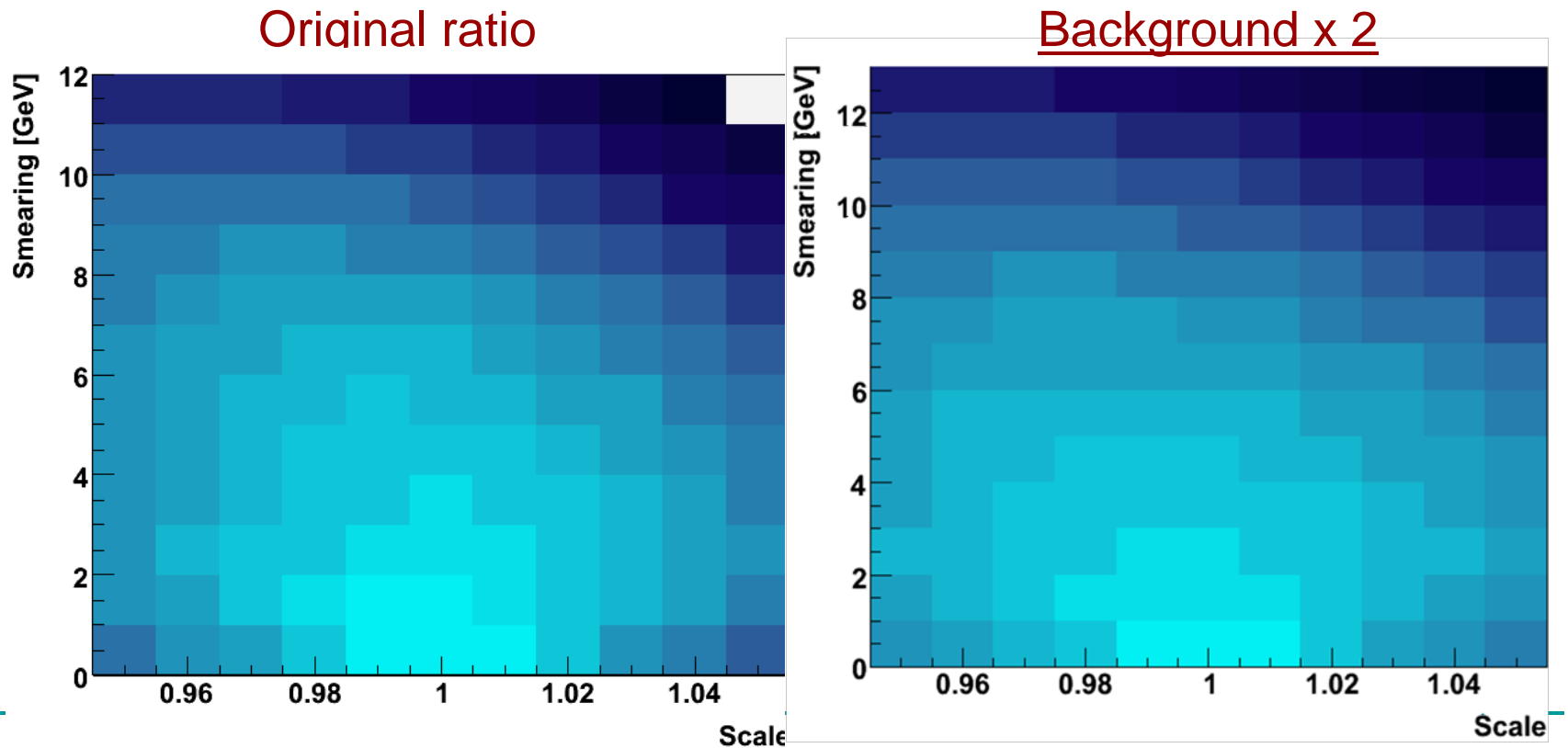
- Fit to distribution from MC for every point on the grid (scale, smearing)
- Find minimum χ^2 and contours



W+jets Background

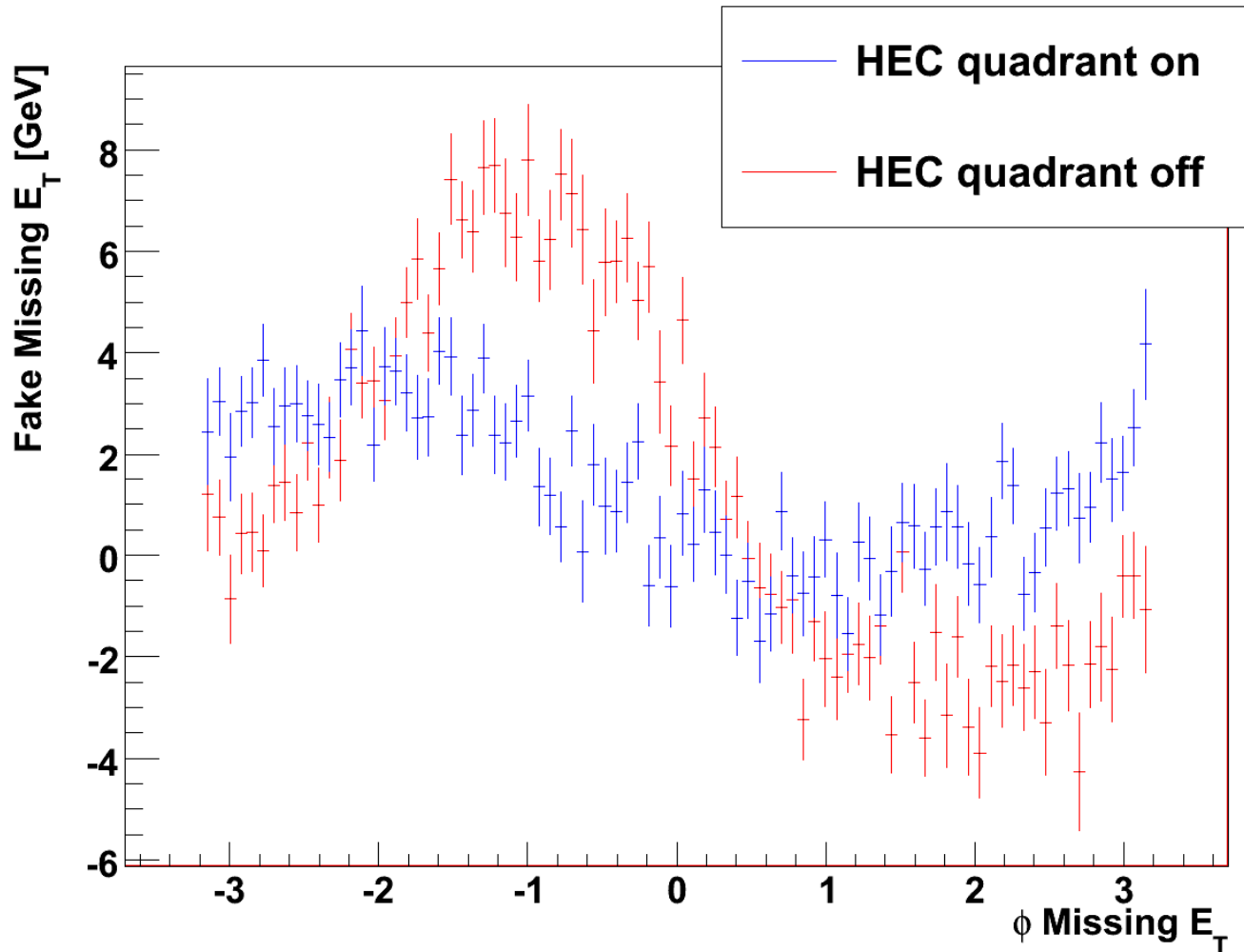
Hardly sensitive to W+jets

- ✓ Transverse W Mass present in selected events



Back-up

Phi Asymmetry



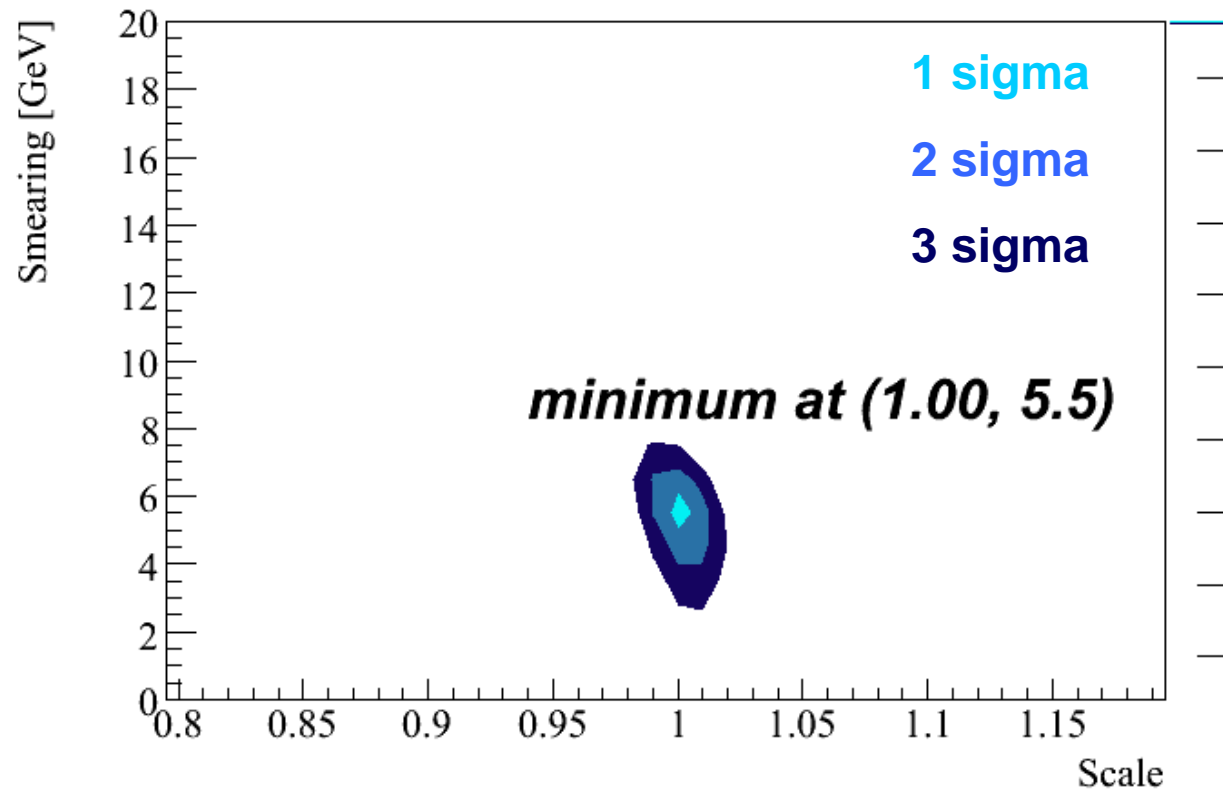
Remaining asymmetry:

- displaced beamspot
- ?

Scan

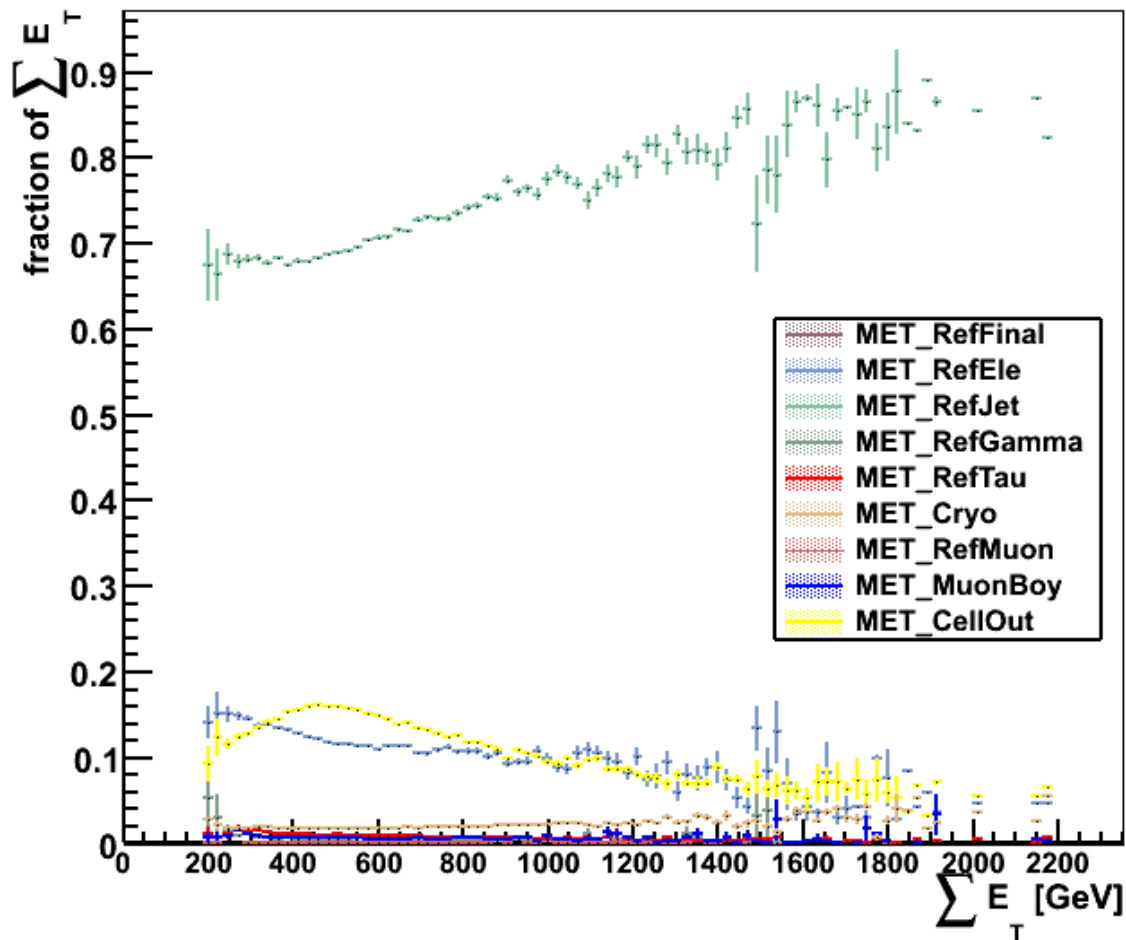
“data” : sample with HEC quadrant OFF

MC : reprocessed sample with HEC quadrant ON



Components

electron channel



Main contribution
from jets, electrons
and out-of-cone cells