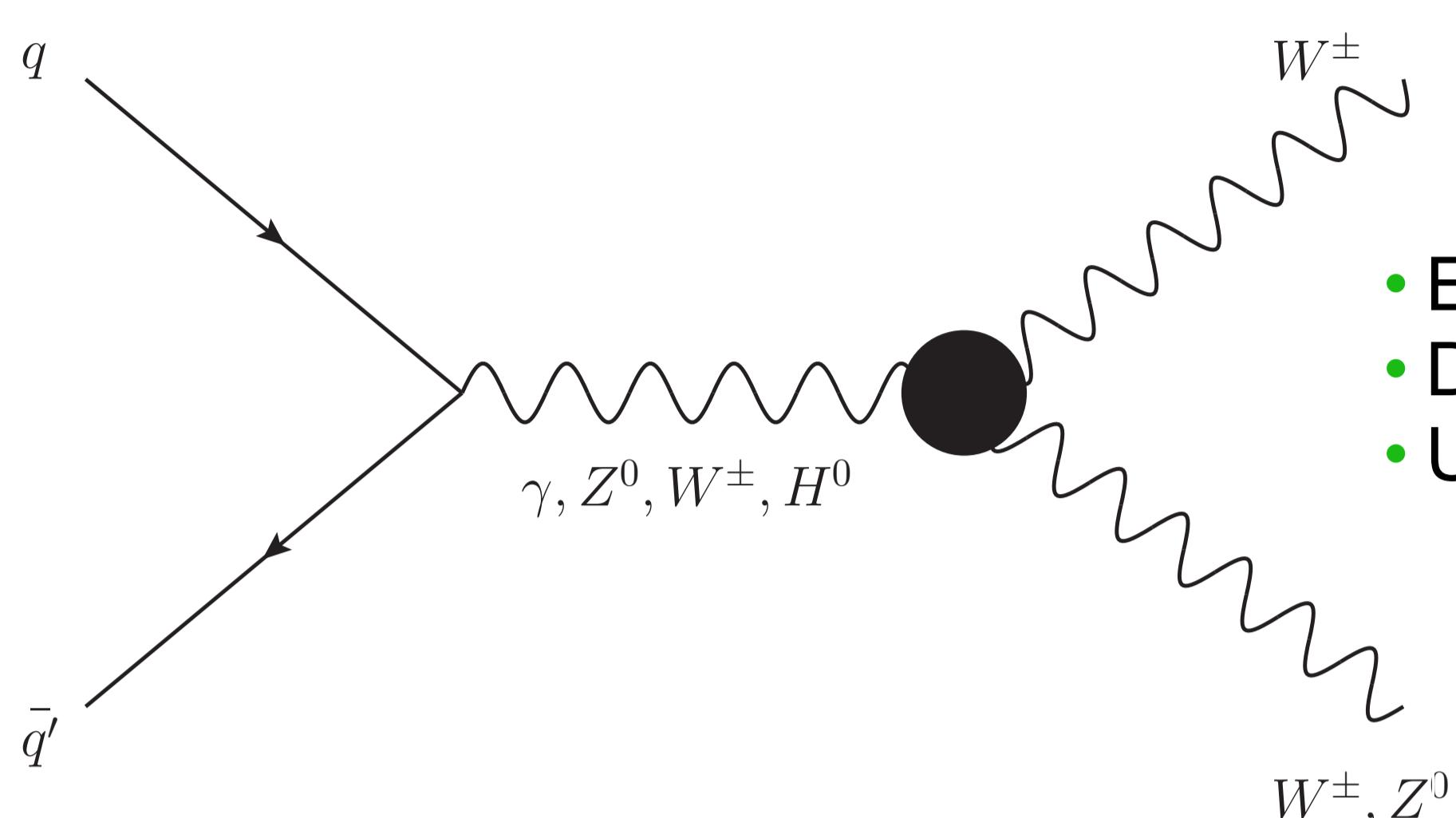


Limits on anomalous triple gauge couplings at $\sqrt{s}=13$ TeV in the CMS experiment

Ivan Shvetsov - Institut für Experimentelle Kernphysik

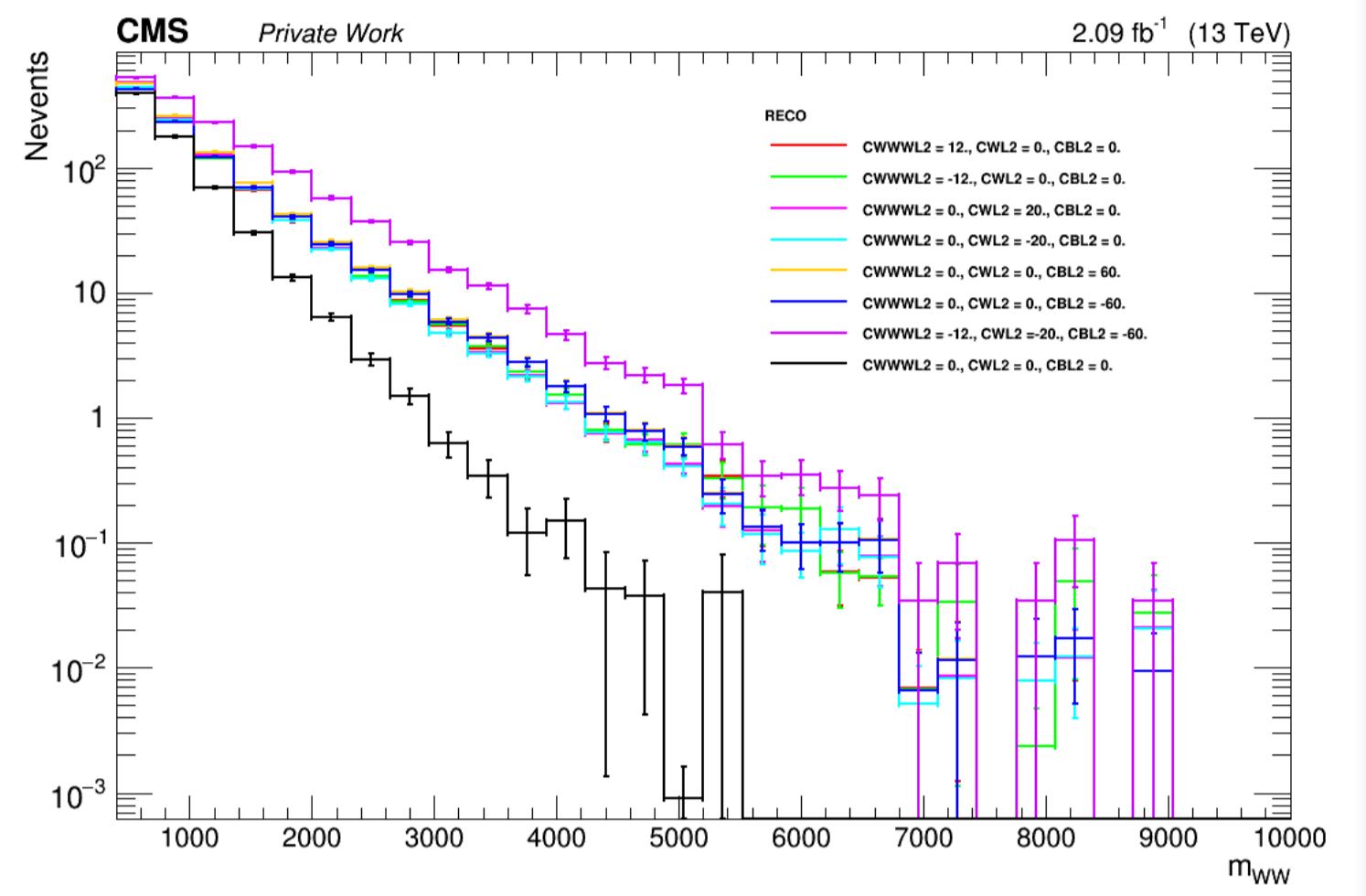


Motivation



$$\mathcal{L}_{eff} = \frac{c_{WWW}}{\Lambda^2} \cdot Tr(W_{\mu\nu}W^{\mu\rho}W_{\rho}^{\mu}) + \frac{c_W}{\Lambda^2} \cdot (D_{\mu}\Phi)^{\dagger}W^{\mu\nu}(D_{\nu}\Phi) + \frac{c_B}{\Lambda^2} \cdot (D_{\mu}\Phi)^{\dagger}B^{\mu\nu}(D_{\nu}\Phi)$$

- Effective field theory: probing new physics
- Dimension 6 operators that don't violate CP-symmetry
- Use invariant mass of WW/ WZ as discriminator



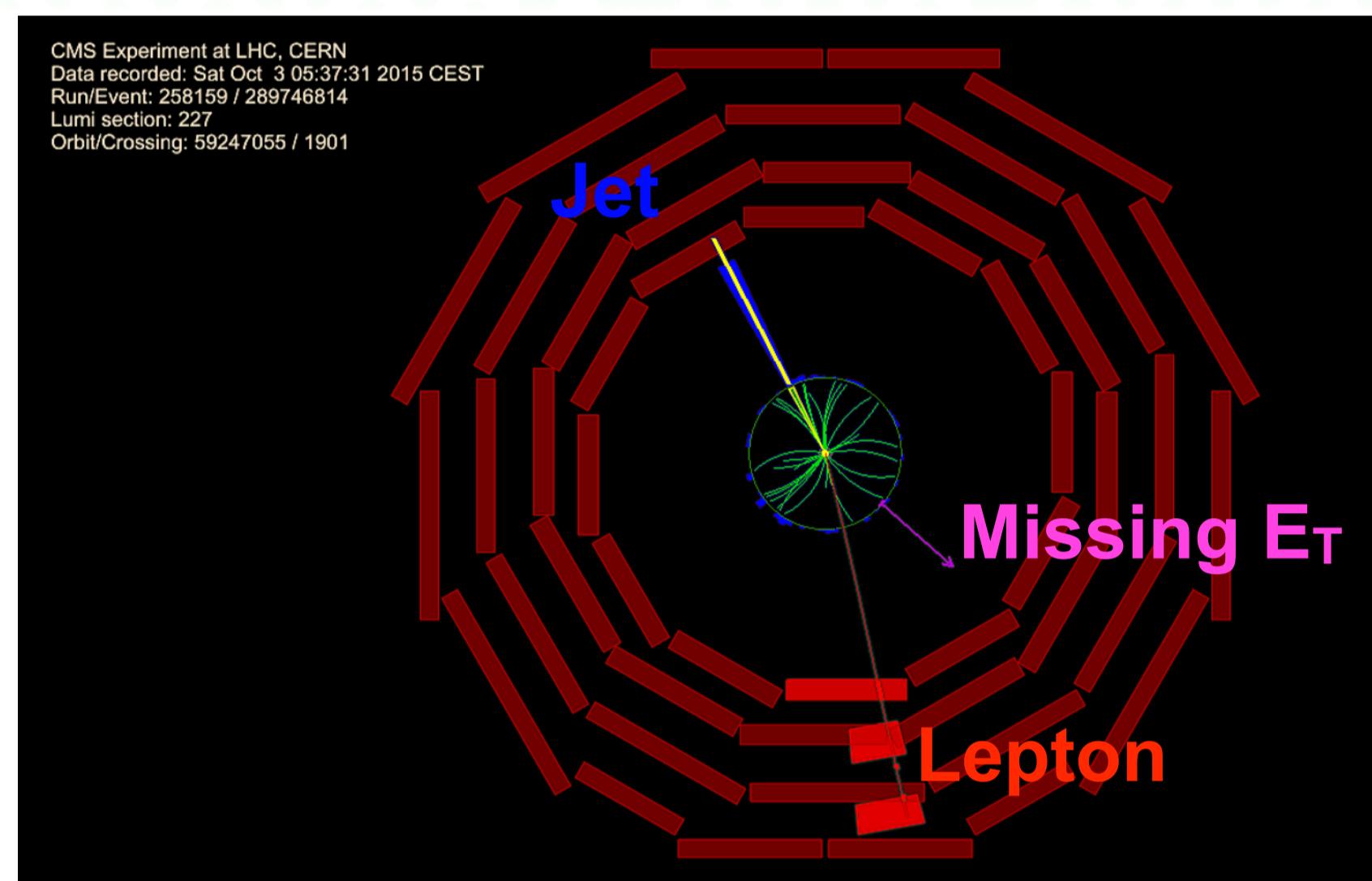
Event topology and selection

★ At least 1 boosted jet:

- $p_T > 200$ GeV
- $T_{21} < 0.5$
- 40 GeV $< m_{\text{pruned}} < 130$ GeV

★ Back-to-back typology:

- $\Delta R(\text{lep}, \text{jets}) > \pi/2$
- $|\Delta\phi(\text{MET}, \text{jet})| > 2.0$
- $|\Delta\phi(\text{Wlep}, \text{jet})| > 2.$



★ electron:

- $p_T > 140$ GeV

★ muon:

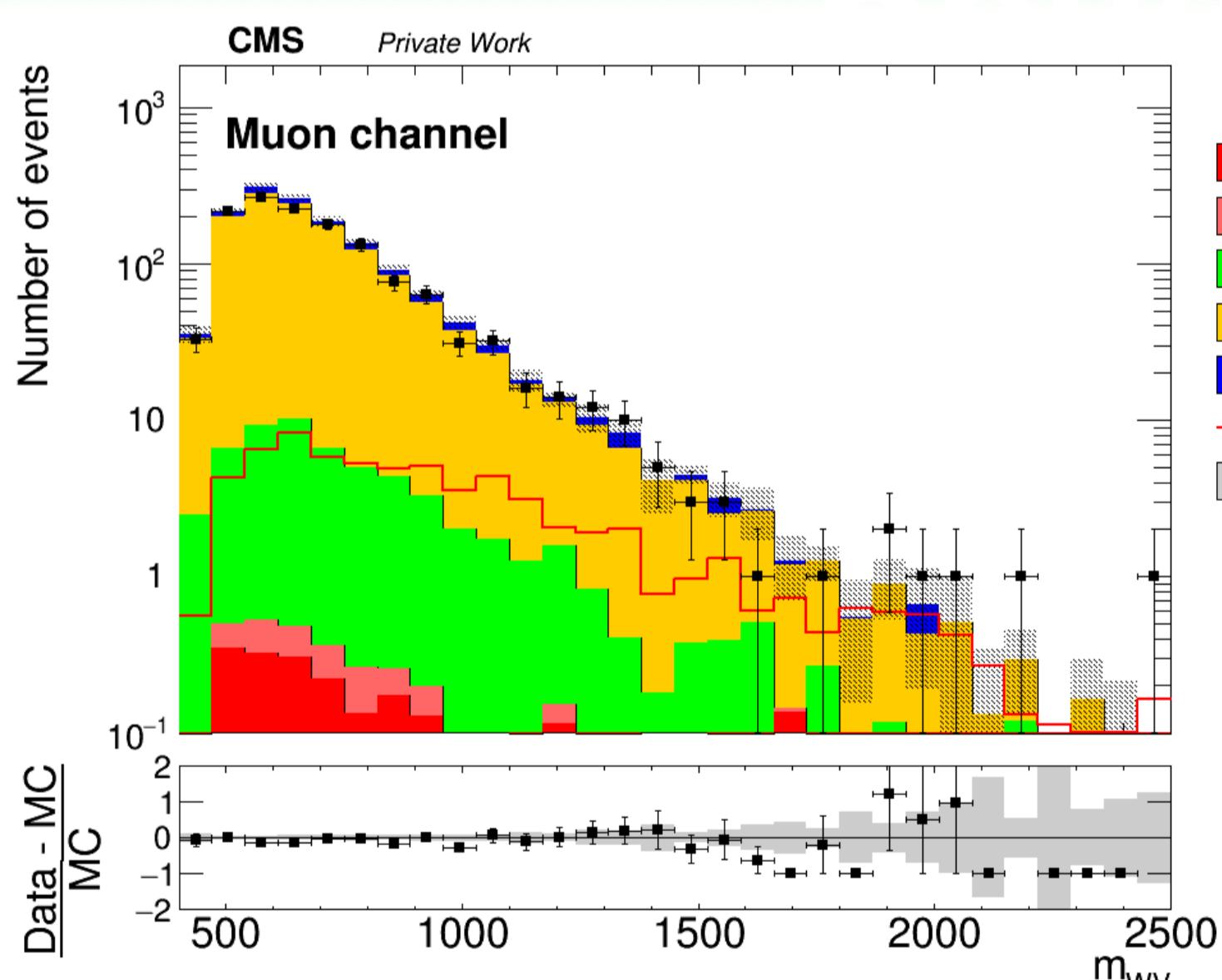
- $p_T > 50$ GeV
- OR
- $\text{trackIso}/p_T < 0.1$
- $|\eta| < 2.1$

★ Missing $E_T > 40$ (80) GeV
muon (electron) channel

Control regions

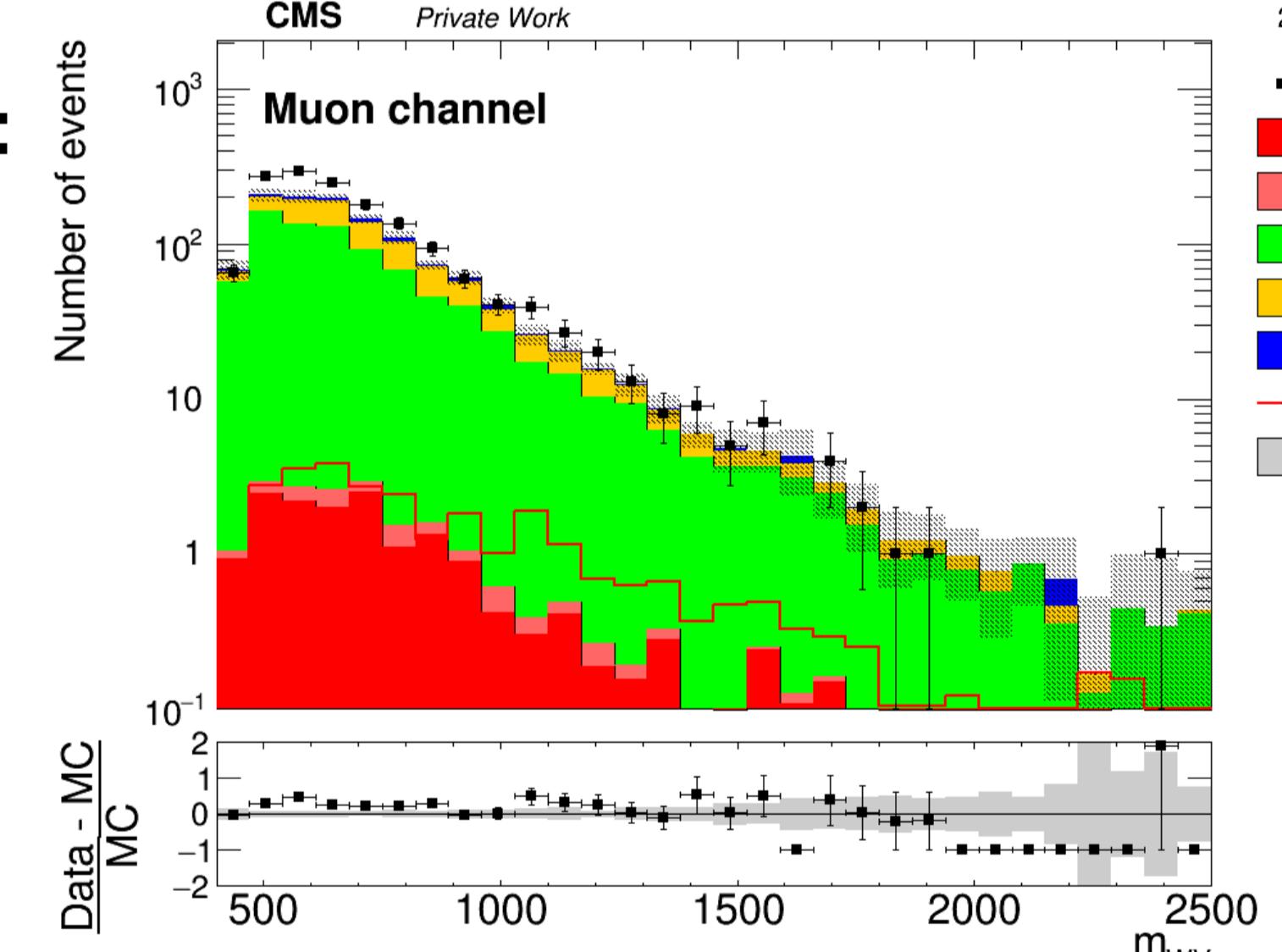
ttbar control region:

- number of b-tagged jet > 0



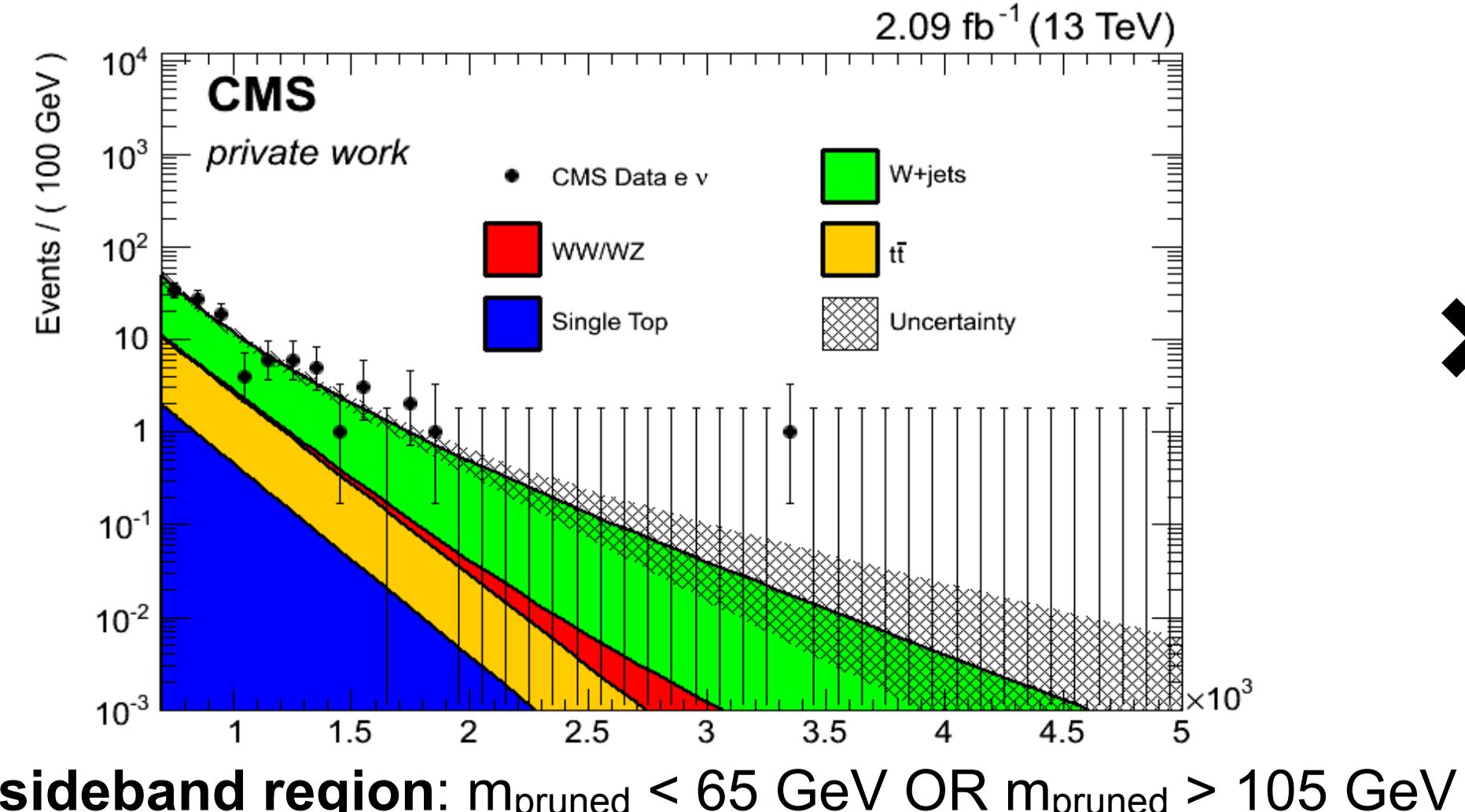
W+jets control region:

- no b-tagged jet > 0
- $m_{\text{pruned}} < 65$ OR $m_{\text{pruned}} > 105$ GeV



Background estimation

W+jets is estimated from data using **alpha ratio method**:



X

$$\alpha^{MC}(m_{WW}) = \frac{N_{W+jets}^{\text{signal}}(m_{WW})}{N_{W+jets}^{\text{sideband}}(m_{WW})}$$

