

# Fake rate estimation

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Weekly SUSY meeting

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## Sources of fake tracks:

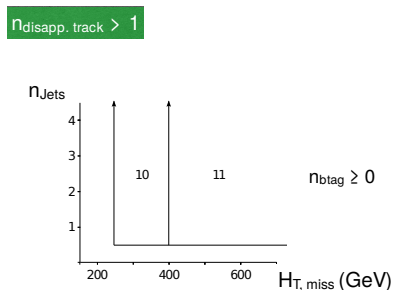
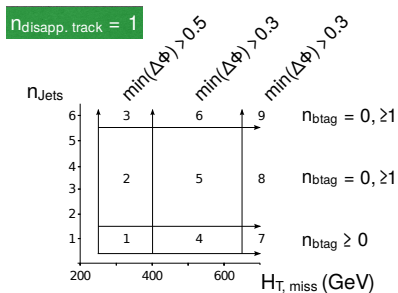
- noise
- noise + true hits
- random combination of true hits
- true tracks (but missing hits)

## Fake rate estimation:

- imitate  $Z \rightarrow \nu\nu$  events by selecting  $Z \rightarrow ll$  events and removing leptons
- select events with 2 leptons
- invariant mass of leptons  $\approx Z$  mass  $\pm 10$  GeV
- first lepton:  $p_T > 30$  GeV
- check events for  $n_{DT} > 0$ , using full disappearing track tag: TMVA preselection + BDT classifier cut  $> 0.19$

# Determination of fake rate

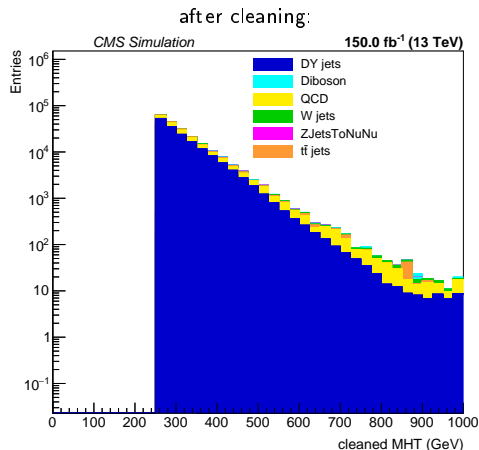
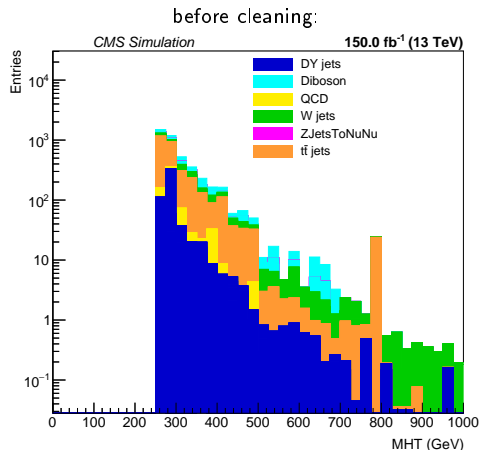
## signal regions:



- for each region drop requirement on DT and nbtags
- determine fake rate for each region

## Event cleaning

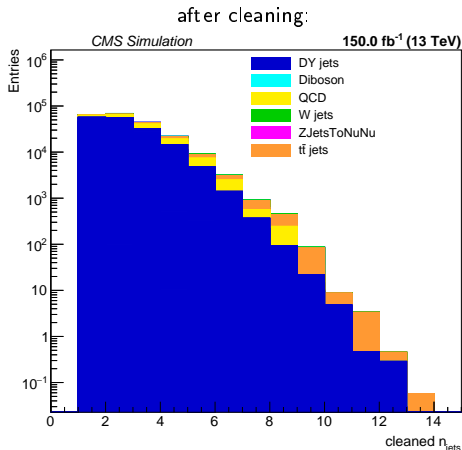
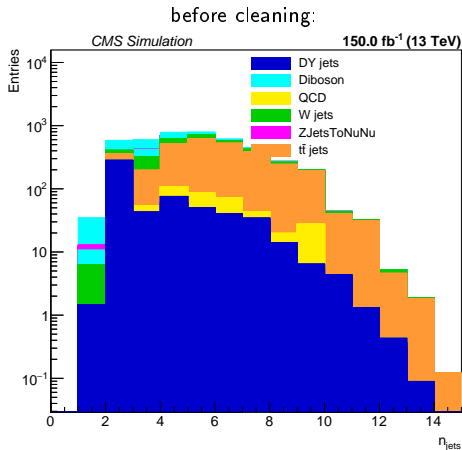
- clean events by removing leptons, recalculate number of jets, MHT and MinDeltaPhiMhtJets
- additional cuts:  $MHT \geq 250$  GeV



- recalculate MHT with jets with  $|\eta| < 2.4$  and  $p_T > 30$  GeV
- jets connected to leptons are not used for MHT calculation (veto jets with  $\Delta R(\text{jet}, \text{lepton}) < 0.05$ )

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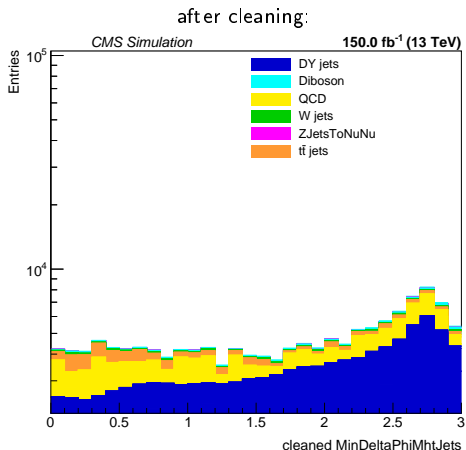
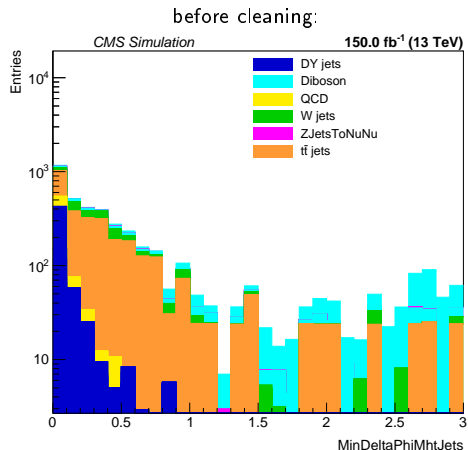
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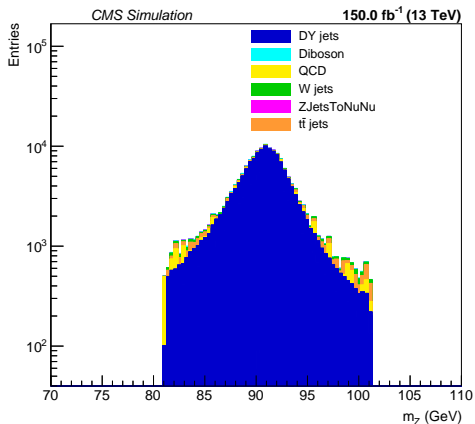


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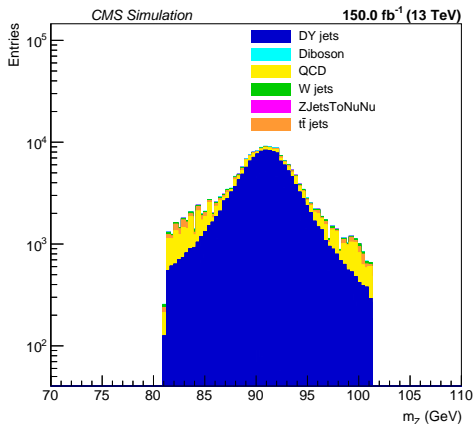
# Z mass peak

- Z mass peak:

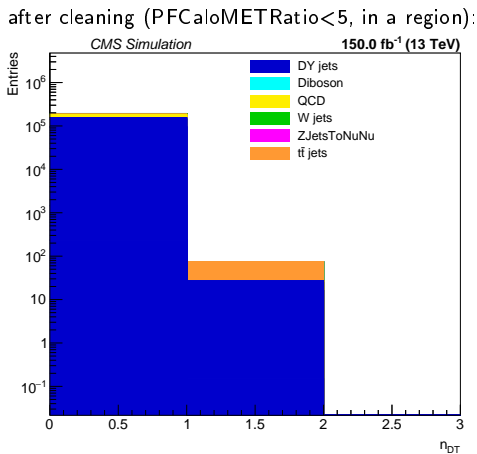
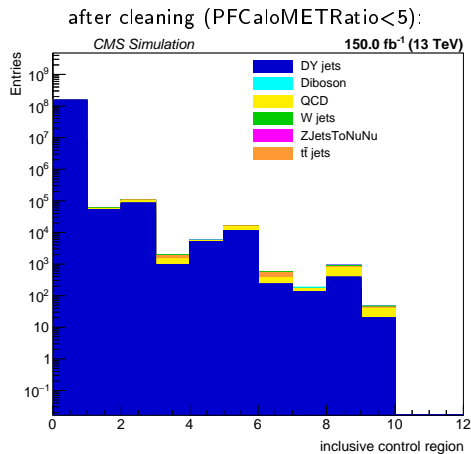
electrons, after cleaning (PF<sub>CaloMET</sub>Ratio < 5, in a region):



muons, after cleaning (PF<sub>CaloMET</sub>Ratio < 5, in a region):



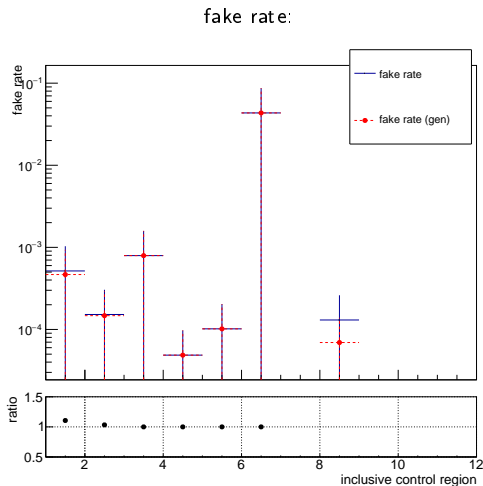
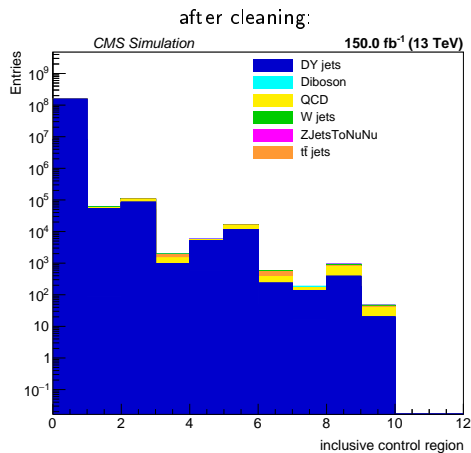
# Inclusive control regions, $n_{DT}$





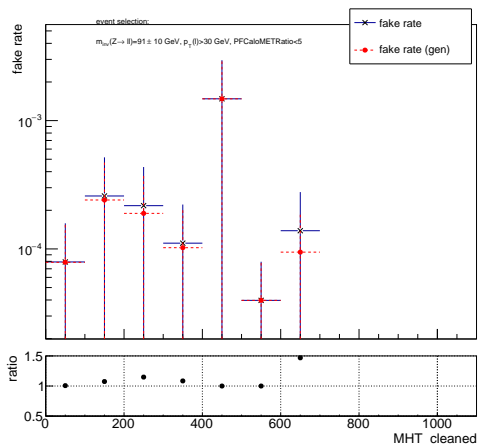
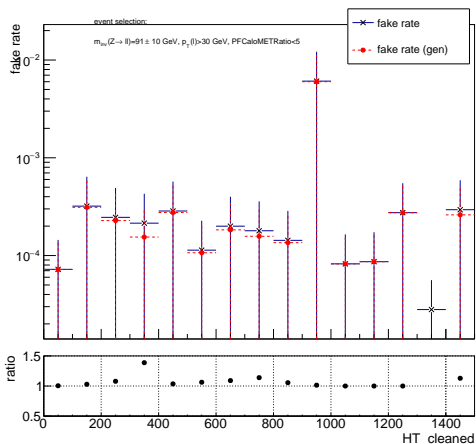
## Fake rate depending on inclusive control regions

- fake rate: ratio of events after event selection with and without  $n_{DT} > 0$
- included check if no genParticle present around track ( $\Delta R(\text{genParticle}, \text{track}) < 0.001$ )
- additional cut:  $\text{PFCaloMETRatio} < 5$



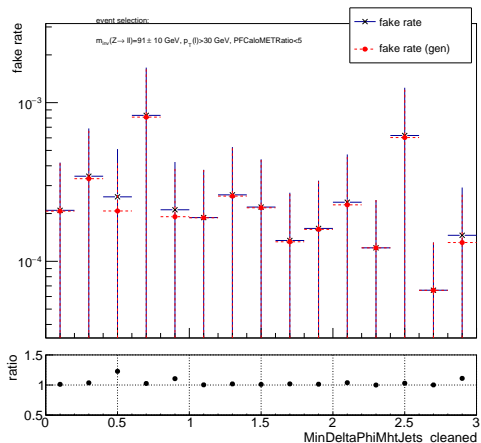
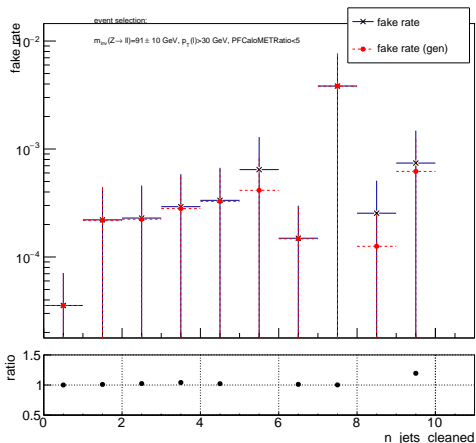
# Fake rate depending on HT, MHT

- fake rate: ratio of events after event selection with and without  $n_{DT} > 0$
- additional cut: PFCaloMETRatio < 5



# Fake rate depending on nJets, MinDeltaPhiMhtJets

- fake rate: ratio of events after event selection with and without  $n_{DT} > 0$
- additional cut: PFCaloMETRatio < 5



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- fake rate: ratio of events after event selection with and without  $n_{DT} > 0$
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