

Non-prompt background estimation: prediction and closure

Viktor Kutzner

Weekly SUSY meeting

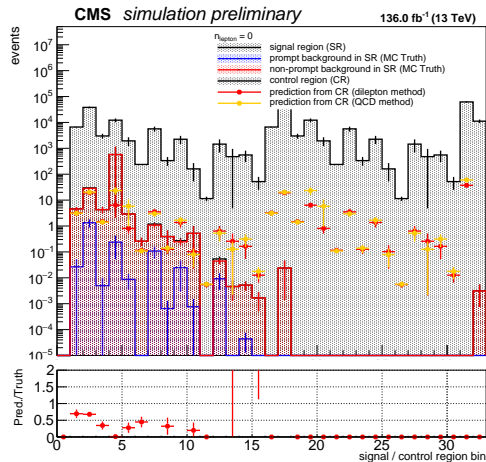
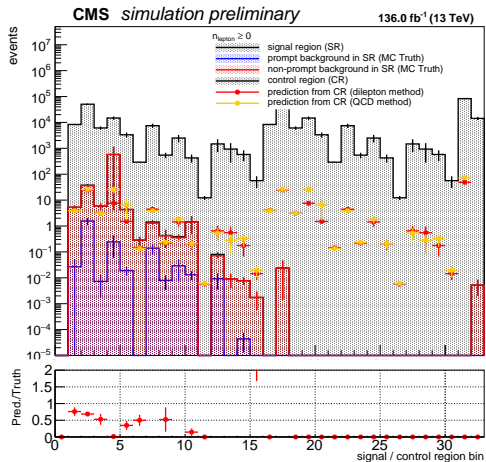
February 4 2019

Data-driven estimation method for non-prompt background:

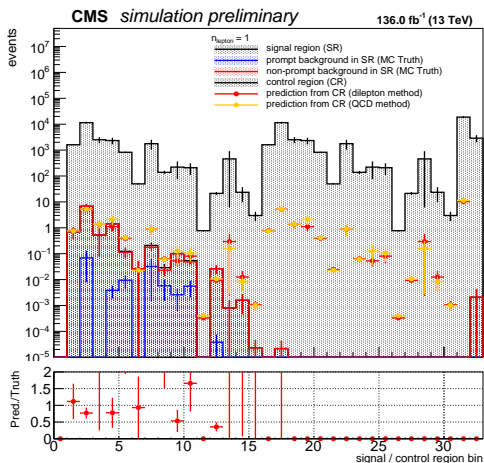
- two ways: determine fake rate from
 - cleaned dilepton events
 - low-MHT QCD samples
- fake rate depending on pileup and H_T , generate 2D maps: $FR(nVtx, H_T)$
 - included overflow bins in 2D histograms
- estimate fakes in prediction region via $n_{\text{predicted}} = \mathbf{FR} \cdot n_{\text{CR}}$
with CR = signal region *without* a disappearing track
⇒ do this for every signal region
- **closure test** for method:
 - compare predicted number of events to MC Truth (events with actual fake tracks)

Control plot

- test closure of method: prediction should match number of MC events containing fake tracks
- plots show events in signal and control region for $n_{lepton} \geq 0$, $n_{lepton} = 0$



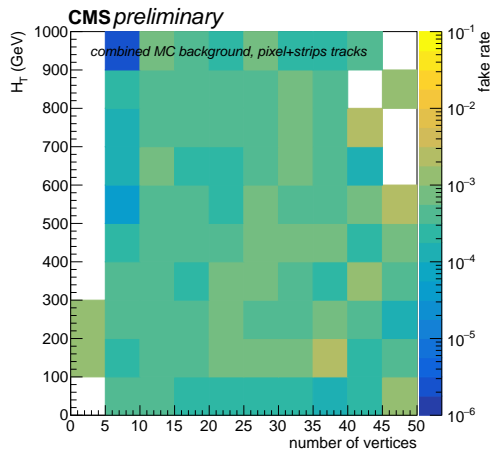
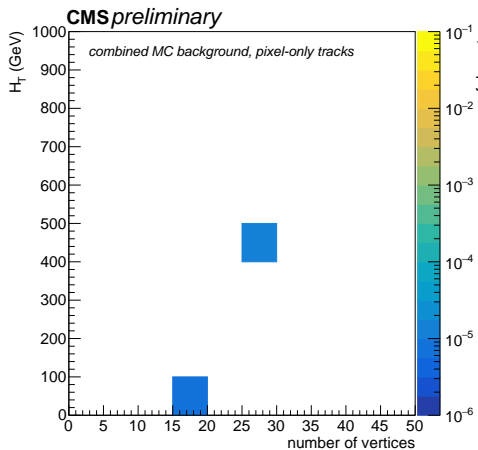
Control plot



- events in signal and control region for $n_{lepton} \geq 1$
- **prediction performs well for long tracks**
- similar prediction for both fake rate estimation methods
- fake rate binned in $FR(n_{Vtx}, H_T)$, but until now not depending on track category \Rightarrow next slides
- caveat: short track selection, modify control region for events with 2 disappearing tracks

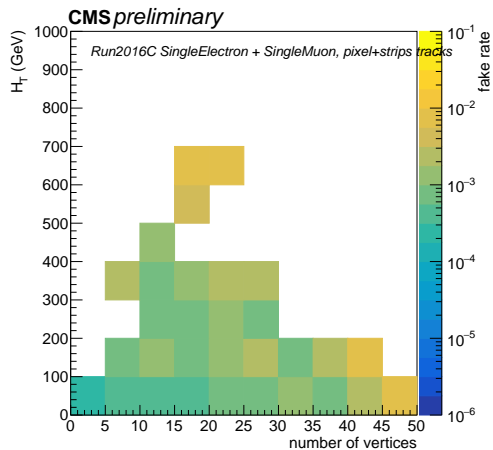
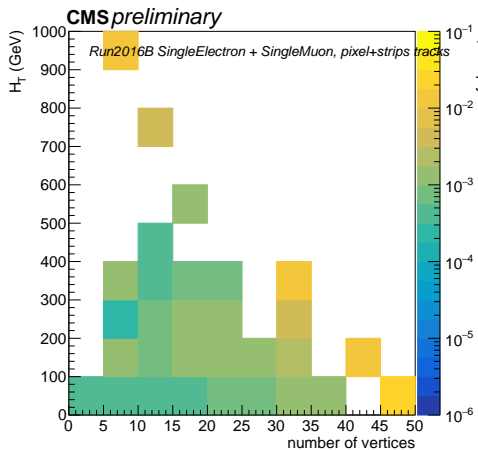
Dilepton method fake rate maps

- separate FR maps for short / long tracks
- pixel-only track selection issue evident:



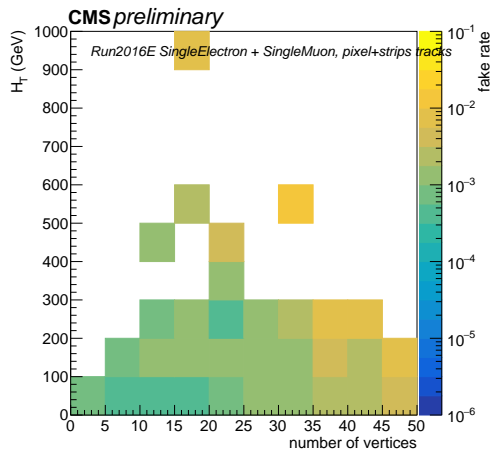
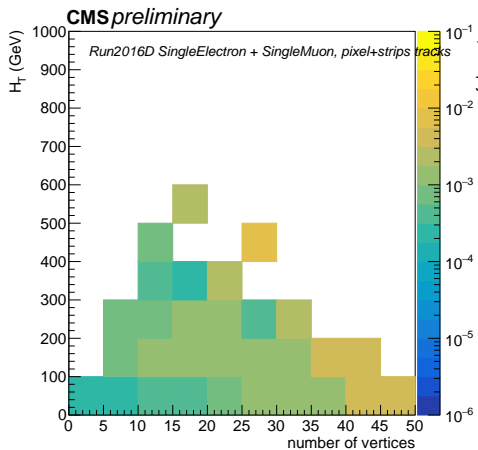
Dilepton method fake rate maps

- fake rate maps for long tracks using Run2016 data:



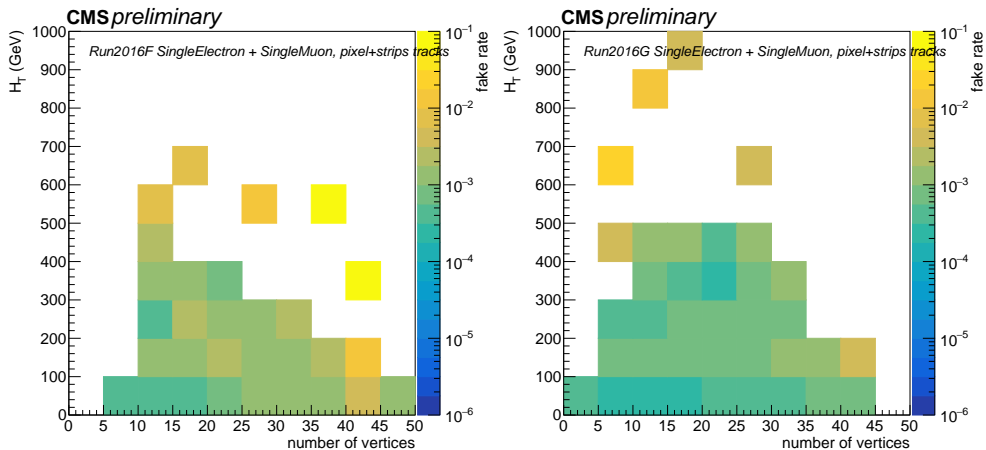
Dilepton method fake rate maps

- fake rate maps for long tracks using Run2016 data:



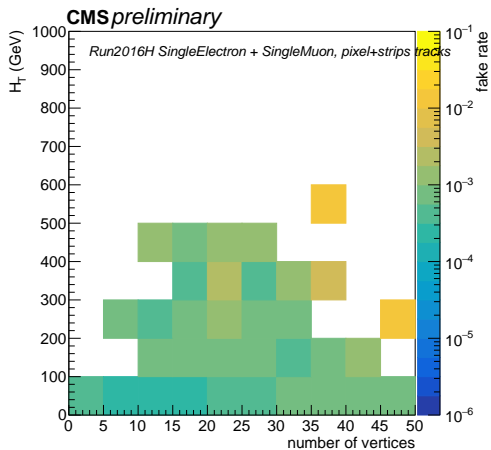
Dilepton method fake rate maps

- fake rate maps for long tracks using Run2016 data:



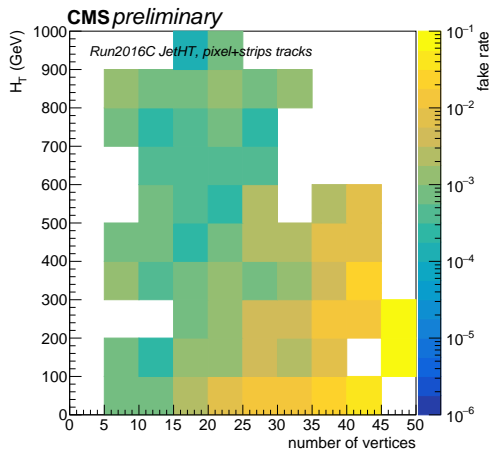
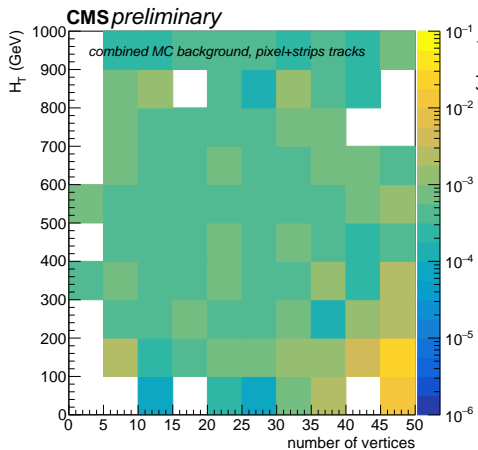
Dilepton method fake rate maps

- fake rate maps for long tracks using Run2016 data:



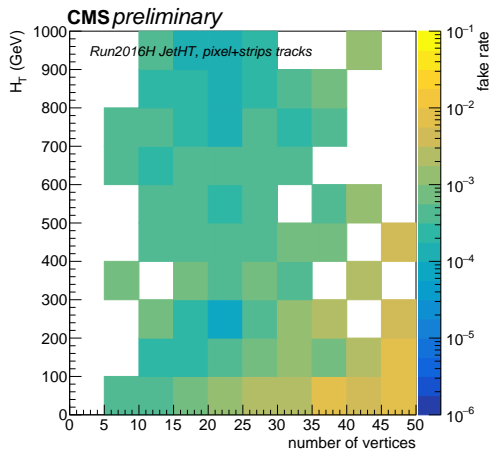
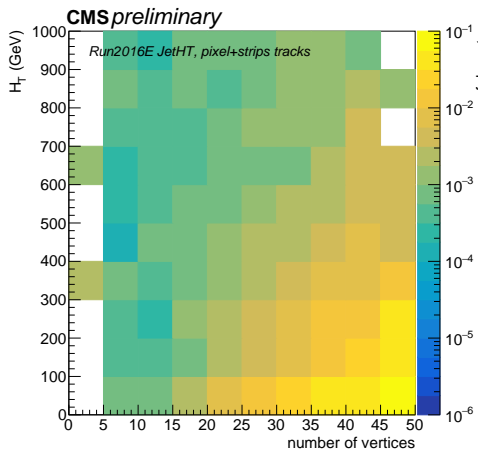
QCD method fake rate maps

- fake rate maps derived using QCD method (long tracks):



QCD method fake rate maps

- fake rate maps derived using QCD method (long tracks):



- fix short track selection issue
- change control region for events with 2 disappearing tracks
- get predicted number of background events in data
- data ntuples for Run2018A, Run2018B and Run2018C are on the way (with fixed Electron selection in Treemaker)
- Treemaker configured for 2018 re-reco JetHT, MET and SingleMuon datastreams, no SingleElectron yet

Signal regions

