TOP trigger report

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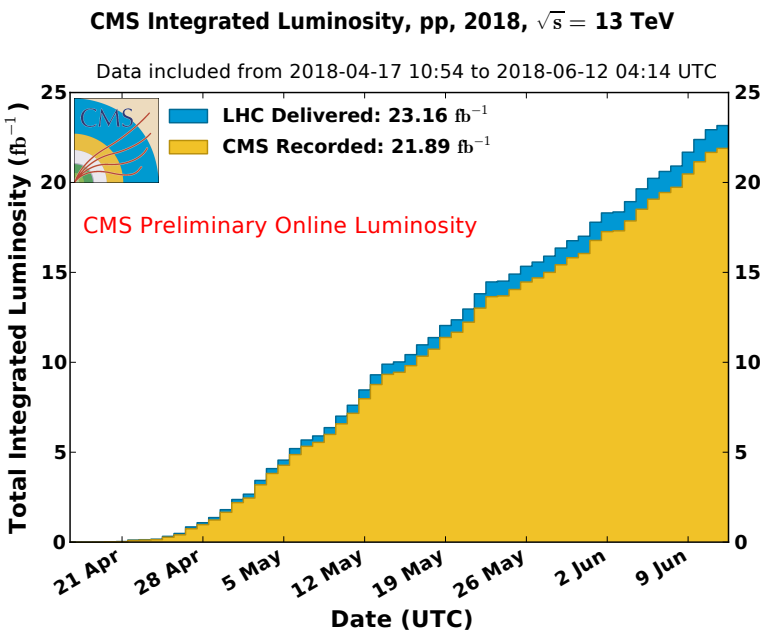
News and announcements

- Showing the status of 2018 triggers: information about the trigger paths available + first efficiency measurements
- Four versions of the trigger menus
- More than 20 fb^{-1} recorded
  - It is crucial to review the efficiency of our triggers
- More volunteers to look at data are very welcome
  - Tools already available!



Trigger history in 2018

- Info about this years paths collected in the Top Trigger twiki

Run 2018A

- Menu v1.0 (Tellaro): 4.7 fb^{-1} certified
  - Small changes in L1 seeds
- Menu v2.0 (Lerici): 3.5 fb^{-1} certified
  - Changes in L1 seeds for Electron+Jet/HT and electron + jets trigger paths
  - Migration of fully hadronic paths to deep CSV
  - New seeds in fully hadronic paths
- Menu v2.1 (Portovenere): 7.8 fb^{-1} certified
  - Implementation of enhancement of muon HLT reconstruction

Run 2018B

- Menu v2.2 (Riomaggiore): 0.5 fb^{-1} certified
  - Reoptimization of fully hadronic paths

Single lepton paths

Single Muon

- HLT_IsoMu24_v
  - Lowest unprescaled seed L1_SingleMu22
  - Menu v2.1: Enhanced muon HLT reconstruction

Single Electron

- HLT_Ele32/35/38_WPTight_Gsf_v
  - Beginning of the year: L1_SingleIsoEG30er2p1 and L1_SingleIsoEG32er2p5
  - Run 317170 (during menu v2.1): L1_SingleEG36er2p5, L1_SingleEG38er2p5, L1_SingleIsoEG28er2p1, L1_SingleIsoEG30er2p5 unprescaled

DILEPTON PATHS

H. Gamsizkan
D. Kizbay

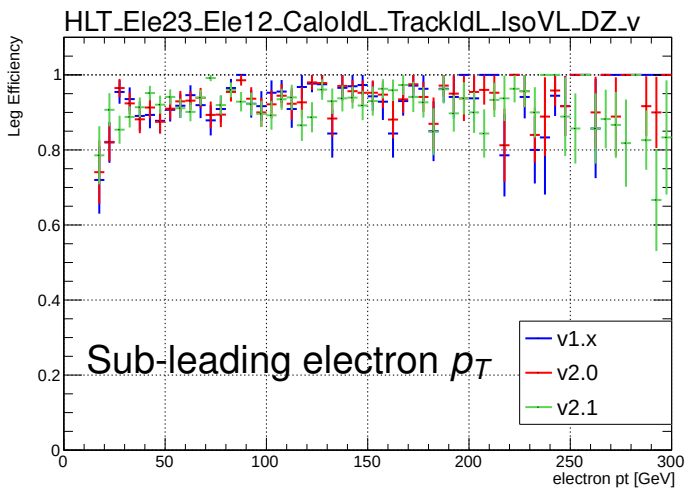
Di-electron

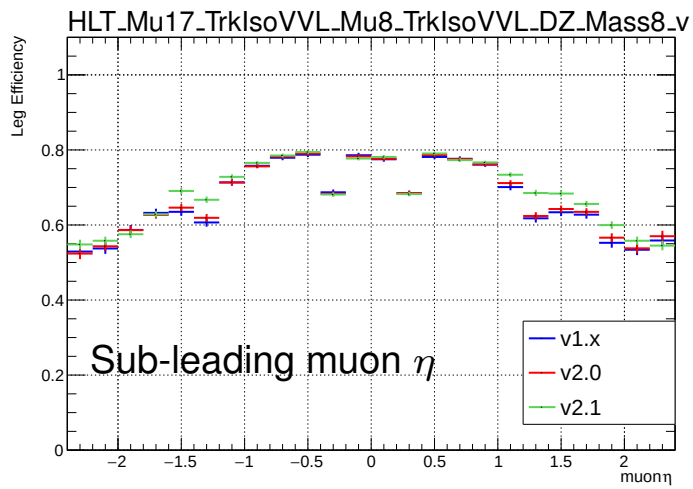
- HLT_Ele23_Ele12_CaloIdL_TrackIdL_IsoVL(_DZ)_v
  - Same as last year

Di-muon

- HLT_Mu17_TrkIsoVVL_Mu8_TrkIsoVVL_DZ_Mass3p8_v
  - Same as last year
  - Improvement of muon HLT reconstruction

- Showing full path efficiency using orthogonal triggers





- Significant efficiency gain in muons from v2.1

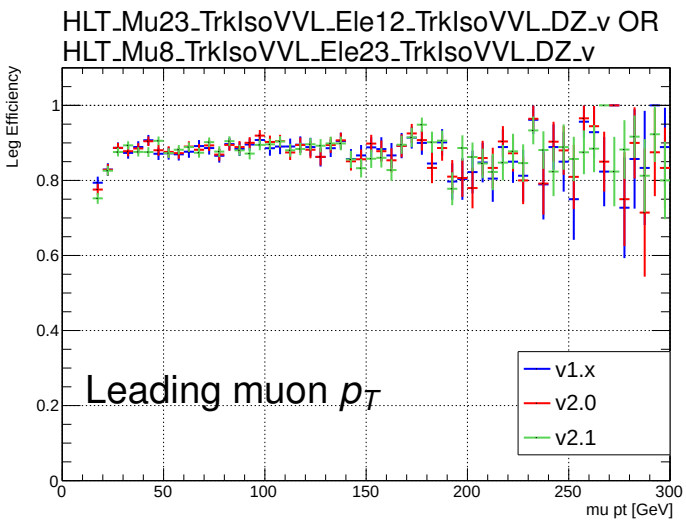
DILEPTON PATH

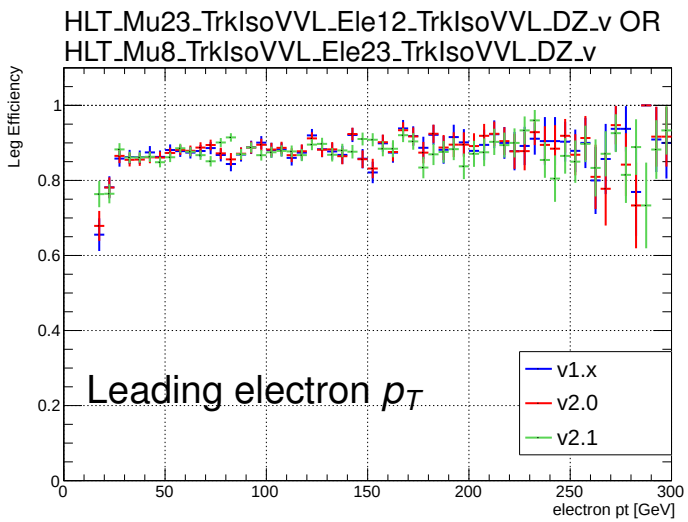
H. Gamsizkan
D. Kizbay

Electron + muon

- HLT_Mu23_TrkIsoVVL_Ele12_CaloIdL_TrackIdL_IsoVL(_DZ)_v
  - Menu v1.0 and v2.0: Addition of L1_Mu20_EG10er2p5 OR L1_SingleMu22
- HLT_Mu8_TrkIsoVVL_Ele23_CaloIdL_TrackIdL_IsoVL(_DZ)_v
  - Same as last year

- Showing full path efficiency using orthogonal triggers

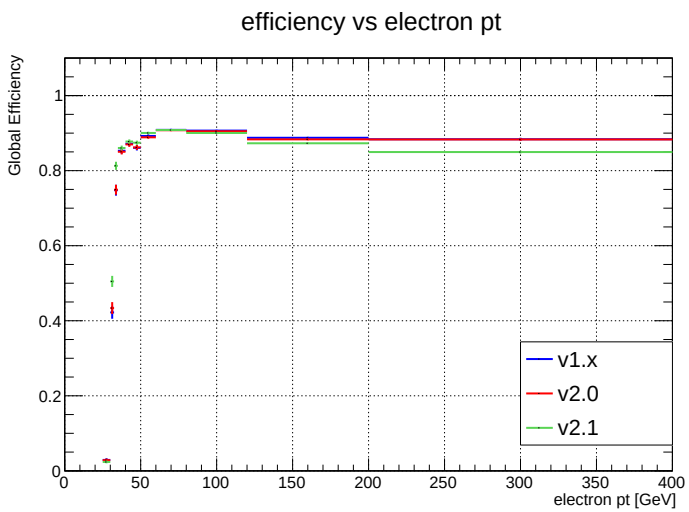


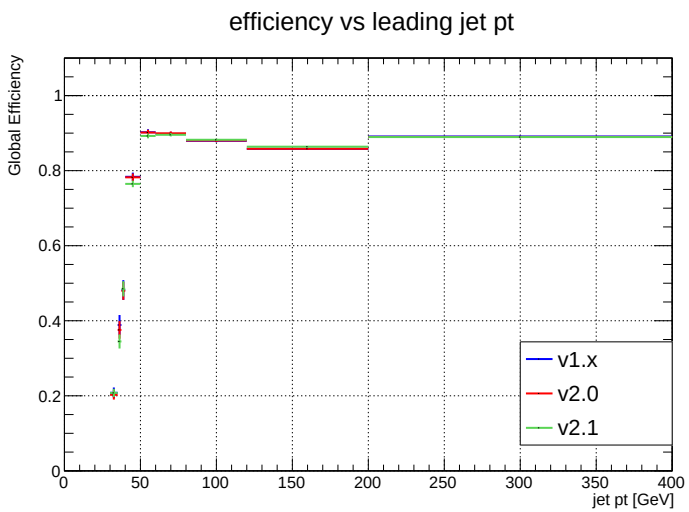


Lepton + jets cross-triggers

H. Gamsizkan
D. Kizbay

- Crucial paths to explore single top topologies
- Introduced in 2017 data-taking
- HLT_Ele30_eta2p1_WPTight_Gsf_CentralPFJet35_EleCleaned_v
  - Run 317170 (during menu v2.1): L1_LooseIsoEG28er2p1_Jet34er2p5_dR_Min0p3 enabled
- HLT_Ele28_eta2p1_WPTight_Gsf_HT150_v
  - Run 317170 (during menu v2.1): L1_LooseIsoEG26er2p1_HTT100er enabled
- Showing full path efficiency using orthogonal triggers





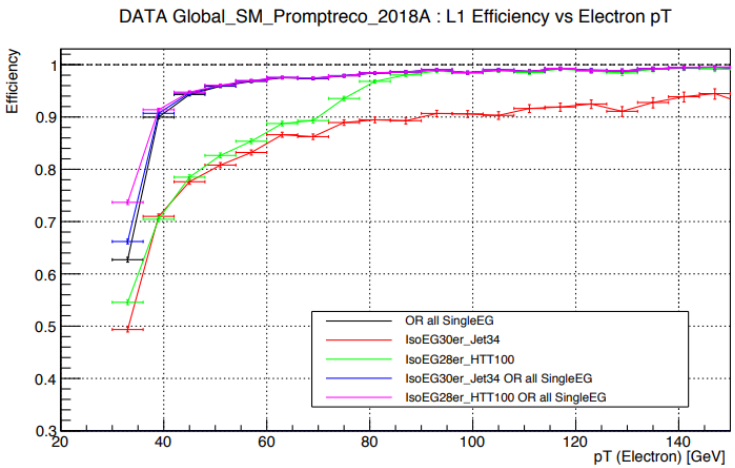
- Comparable efficiency to last year
- Significant gain at low p_T when enabling seeds

LEPTON + JETS CROSS-TRIGGERS

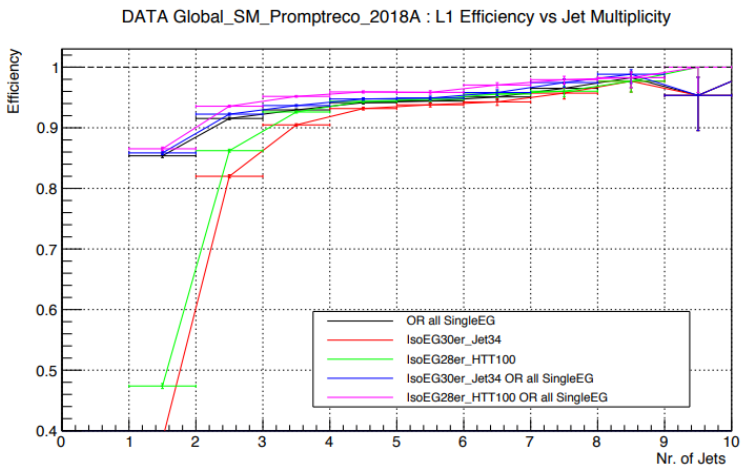
A. Datta

- Ele + jet / HT triggers require ad-hoc seeds
- Their efficiencies is also monitored
- Significant gain of L1 efficiency at low electron p_T
- Efficiency comparable to those of last year

- Showing L1 efficiency using orthogonal triggers



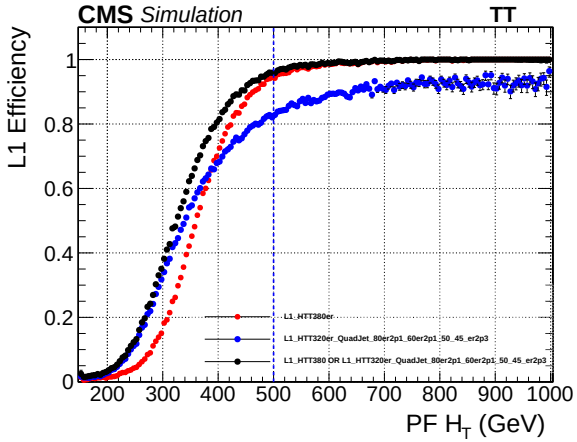
Efficiency vs Electron PT



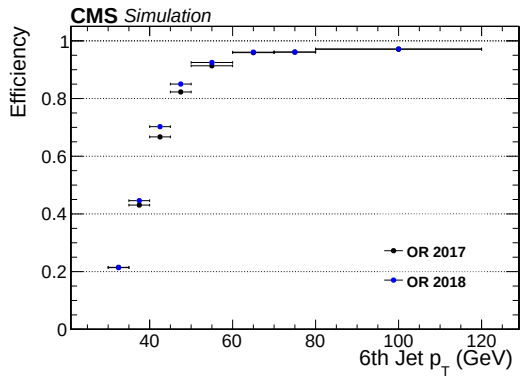
Efficiency vs Jet Multiplicity

FULLY HADRONIC TRIGGERS

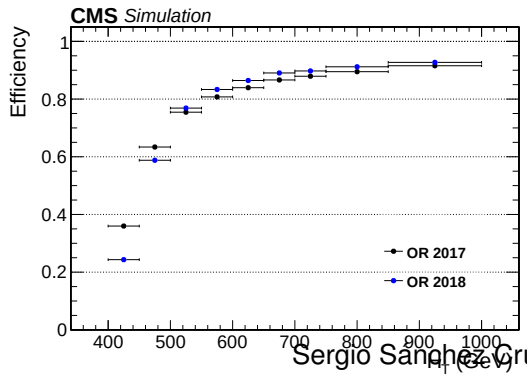
- L1 seeds reoptimization:
  L1_HTT320er_QuadJet_80_60_er2p1_45_40_er2p3
  (implemented in v2.0 menu)
- Lower rate to account for the higher luminosity



- Migration of fully hadronic paths from CSV to deep CSV (implemented in v2.0 menu)
- New HLT paths (in v2.1 menu)
  HLT_PFHT450_SixPFJet36_PFBTagDeepCSV_1p59_v
  HLT_PFHT400_SixPFJet32_DoublePFBTagDeepCSV_2p94_v



- 5-10 % efficiency gain at low H_T with the new strategy



M. Kolosova

TRIGGERS FOR BOOSTED TOPOLOGIES AND τ_h

Fully hadronic (boosted)

- HLT_AK8PFHT800_TrimMass50_v $\Rightarrow$ 750 version prescaled
- HLT_AK8PFJet330_TrimMass30_PFAK8BTagDeepCSV_p17_v
- HLT_AK8PFJet400_TrimMass30_v $\Rightarrow$ 360 version prescaled

Lepton / lepton + jets (boosted)

- HLT_Mu50_v
- HLT_Ele50_CaloIdVT_GsfTrkIdT_PFJet165_v
- HLT_Ele115_CaloIdVT_GsfTrkIdT_v

τ_h + light lepton

- HLT_IsoMu20_eta2p1_TightChargedIsoPFTau27_
- Lower tau thresholds in the shadow of HLT_IsoMu24_
- HLT_Ele24_eta2p1_WPTight_Gsf_TightCharedIsoPFTau_eta2p1

CONCLUSIONS

- Review of trigger status in 2018
- TOP triggers are deployed and in place
- Monitoring the efficiency of main trigger paths of interest for TOP

- Let us know if you want to contribute!