# Upgrade DT software

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Software coupling L1 DT Trigger Primitives to Longbarrel L1 objects available in CMSSW_4_2_8

Follow the instructions to get the Longbarrel Tracking Trigger code in CMSSW_4_2_8 as reported in
https://twiki.cern.ch/twiki/bin/viewauth/CMS/SLHCTrackerTriggerSWTools#How_to_Get_the_Code_and_Run_It

then (in CMSSW_4_2_8_SLHCtk3/src)

cvs co -r SLHCDT_4_2_8_001 SLHCUpgradeSimulations/L1DTTrigger
cvs co L1Trigger/DTTrigger
rm L1Trigger/DTTrigger/BuildFile.xml
cp /afs/cern.ch/user/z/zotto/public/L1Trigger/DTTrigger/BuildFile.xml L1Trigger/DTTrigger/
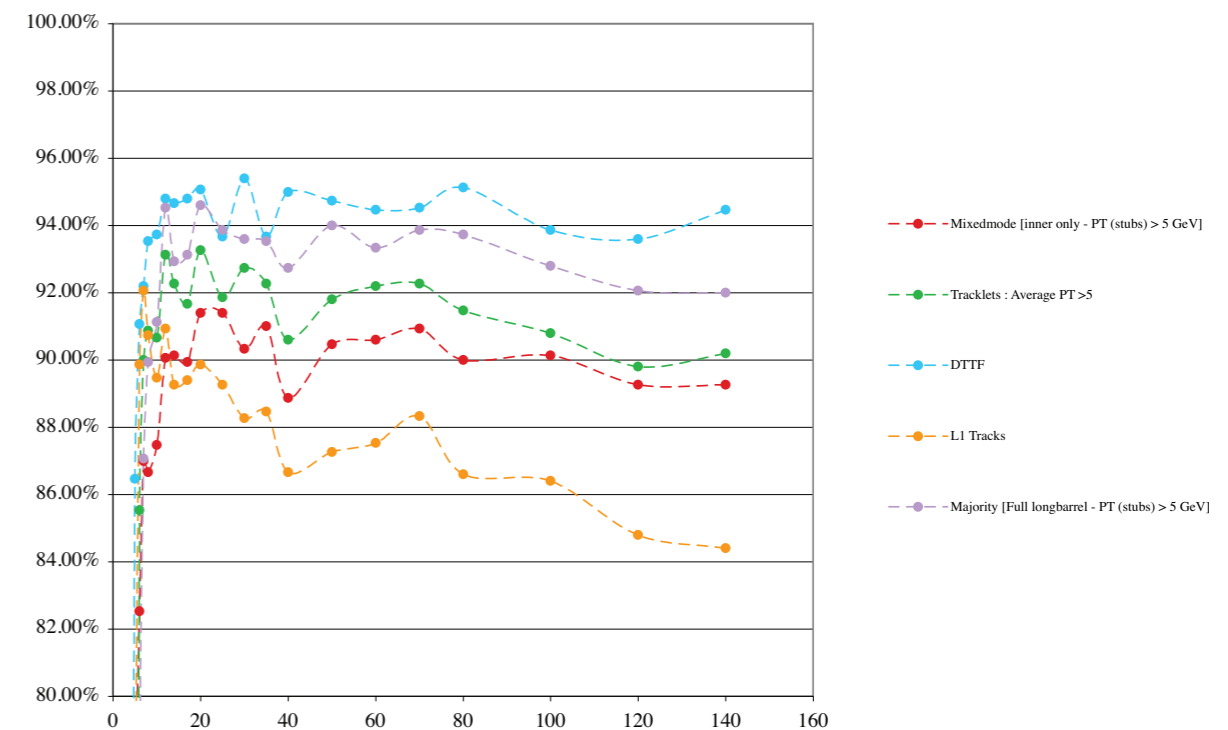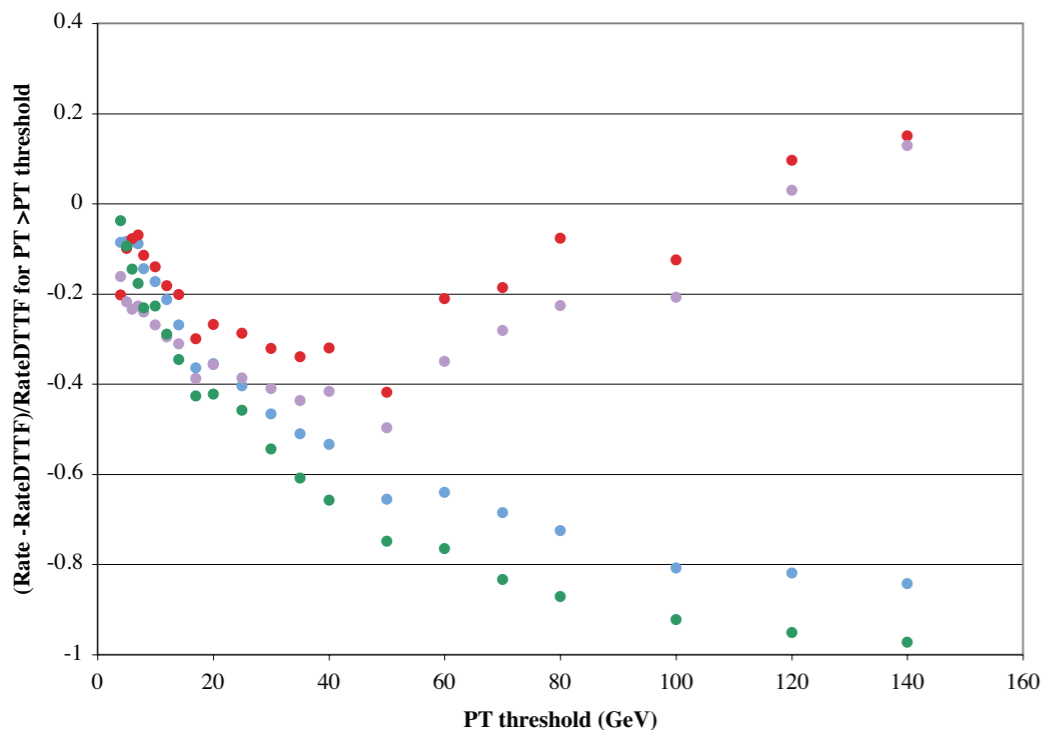
- Muon TPs are intercepted in the code before they are sent to the Sector Collector in order to have full resolution (requires re-running the L1 DT trigger code)

- Different choices of the muon input flow requires re-running the program

- All tracker objects matching a DT TP are stored in collection DTMatchesCollection

- All tried PT calculation algorithms are applied to any muon candidate and stored in collection DTMatch in order to compare all results straight

- An analysis method is provided

In directory SLHCUpgradeSimulations/L1DTTrigger

Main : DTL1SimOperations

Access to DT L1 objects : DTSimTrigger

Access to tracker L1 objects : DTL1get*

Matching : DTPrimitivesToTrackerObjectMatches

Analysis : Analyze_DTTPGStubMatches

In directory SimDataFormats/SLHC

DT L1 objects : DTBTITrigger, DTTSPhiTrigger

Tracker L1 objects : DTMatchesCollection

Matched objects : DTMatch (best DT-Tracker match only)

Auxiliary to PT determination : DTMatchPt*

The code requires samples obtained with few iterations

Example jobs for each step in directory
SLHCUpgradeSimulations/L1DTTrigger/test

Sample Generation

Minimum bias : Fullsim_MB.py

Minimum bias + single muon : Fullsim_SingleMuon.py

New DT Trigger

DTSeededTrackletsProdGO.py

The code can run only in Full Simulation since no parameterization of the L1 DT Trigger algorithm is available (too complicated algorithm)

Updating to other layouts requires new samples production

- Several parameterizations included
  - Extrapolations to tracker layers
  - Matching windows size
- Some fixed values forced
  - Number of L1 tracker trigger layers/superlayers
  - Position of tracker trigger layers/superlayers

Updating to other layouts may require recomputing the parameterizations (compulsory if the R-position of L1 tracker layers or their number is changing)
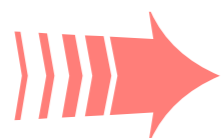
Long time gap between availability of tracker objects and availability of muon-matches results