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HLT Paths included

The summary of HLT paths is shown below. The table is copied from AN-12-140, the polarization analysis. Since we follow their ananlysis for efficiences and acceptance, we must duplicate these triggers exactly. The filters are shown for running studies of the rho factor, which is documented elswhere.

In the HLT path of the table, a link to wbm details of a few triggers is included, which can be used for accessing additional information. Instructions for accessing all this information are listed below.

Trigger Menu	HLT Path	Filter	Run Range
1E33	HLT_Dimuon5_Barrel_Upsilon_v1,v2	hltVertexmumuFilterDimuon5UpsilonBarrelV1,2	165088-167046
1.4E33	HLT_Dimuon5_Barrel_Upsilon_v3	hltVertexmumuFilterDimuon5UpsilonBarrelV3	167078-167913
2E33	HLT_Dimuon5_Barrel_Upsilon_v5	hltVertexmumuFilterDimuon5UpsilonBarrelV5	170722-173198
3E33	HLT_Dimuon7_Upsilon_Barrel_v1	hltVertexmumuFilterDimuon7UpsilonBarrelV1	173236-178380
3E33	HLT_Dimuon9_Upsilon_Barrel_v1	hltVertexmumuFilterDimuon9UpsilonBarrelV1	173236-178380
5E33	HLT_Dimuon7_Upsilon_Barrel_v4	hltVertexmumuFilterDimuon7UpsilonBarrelV4	178420-179889
5E33	HLT_Dimuon9_Upsilon_Barrel_v4	hltVertexmumuFilterDimuon9UpsilonBarrelV4	178420-179889
Total			

HLT Labels

HLT Details

The most accessible (but somewhat inefficient) way I have found to get HLT info is to use WBM and enter a run number range. Once you get the list of runs, click on a run. This takes you to a detailed page, and then use that to navitage to the HLT summary for the run.

```
version4
  Module: hltBarrelDimuon7UpsilonL3Filtered
  {
    bool CutCowboys = 1
    bool saveTags = 1
    int32 ChargeOpt = -1
    double MaxRapidityPair = 1.25
    double MaxDCAMuMu = .5
    double MaxAcop = 999
    double MinAcop = -999
    double MaxInvMass = 11.5
    double MinInvMass = 8.5
    double MinPtMin = 0
    double MinPtMax = 0
    double MinPtPair = 6.9
    InputTag PreviousCandTag = hltDimuonL2PreFiltered0
    InputTag BeamSpotTag = hltOnlineBeamSpot
  }


  Module: hltDimuon9BarrelUpsilonL3Filtered
  {
    bool CutCowboys = 1
    bool saveTags = 1
    int32 ChargeOpt = -1
    double MaxRapidityPair = 1.25
    double MaxDCAMuMu = .5
    double MaxAcop = 999
    double MinAcop = -999
    double MaxInvMass = 11.5
```

```
    double MinInvMass = 8.5
    double MinPtMin = 0
    double MinPtMax = 0
    double MinPtPair = 8.9
    InputTag PreviousCandTag = hltDimuonL2PreFiltered0
    InputTag BeamSpotTag = hltOnlineBeamSpot
  }
```

HLT_Dimuon5_Upsilon_Barrel_v5 Module: hltBarrelUpsilonL3Filtered

```
 {
    bool CutCowboys = 1
    bool saveTags = 1
    int32 ChargeOpt = -1
    double MaxRapidityPair = 1.25
    double MaxDCAMuMu = .5
    double MaxAcop = 999
    double MinAcop = -999
    double MaxInvMass = 11.5
    double MinInvMass = 8.5
    double MinPtMin = 0
    double MaxPtMax = 0
    double MinPtPair = 4.9
    InputTag PreviousCandTag = hltDimuonL2PreFiltered0
    InputTag BeamSpotTag = hltOnlineBeamSpot
  }

 Module: hltVertexmumuFilterUpsilonBarrel
  {
    bool saveTags = 1
    bool FastAccept = 1
    double MinCosinePointingAngle = -2
    double MinVtxProbability = .005
    double MaxNormalisedChi2 = 999999
    double MinLxySignificance = 0
    InputTag MuonTag = hltL3MuonCandidates
    InputTag BeamSpotTag = hltOnlineBeamSpot
    InputTag DisplacedVertexTag = hltDisplacedmumuVtxProducerUpsilonBarrel
  }
```

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What does a Dimuon_Upsilon trigger that is NOT a barrel trigger look like? There does not seem to be a cowboy veto. See HLT_Dimuon0_Upsilon_Muonv7:

```
  Module: hltUpsilonMuonL3Filtered
  {
    bool saveTags = 1
    int32 ChargeOpt = -1
    double MaxRapidityPair = 2.5
    double MaxDCAMuMu = .5
    double MaxAcop = 999
    double MinAcop = -999
    double MaxInvMass = 11.5
    double MinInvMass = 8.5
    double MinPtMin = 0
    double MaxPtMax = 0
    InputTag PreviousCandTag = hltTripleMuonL2PreFiltered0
    InputTag BeamSpotTag = hltOnlineBeamSpot
  }
```

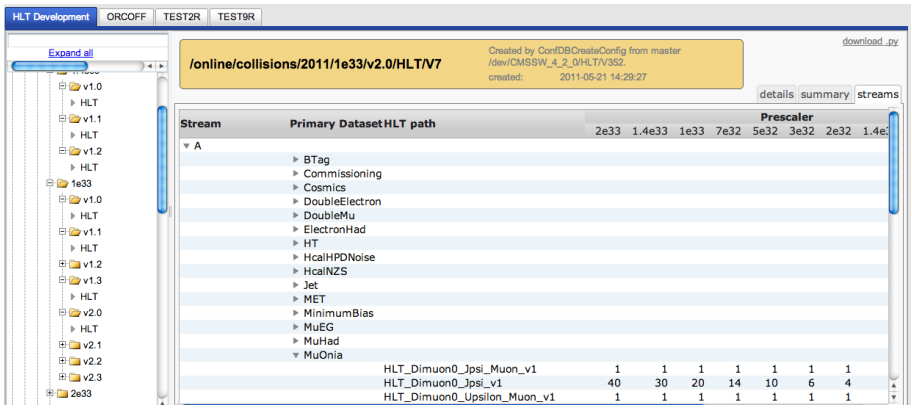
Single muon triggers are also of interest for studying the factor in data. See for instance HLT_Mu24_v2.

```
  module  *hltSingleMu24L3Filtered24*  =  {
```

```
    InputTag BeamSpotTag = hltOnlineBeamSpot
    InputTag CandTag = hltL3MuonCandidates
    InputTag PreviousCandTag = hltL2Mu12L2Filtered12
    int32 MinN = 1
    double MaxEta = 2.5
    int32 MinNhits = 0
    double MaxDr = 2.0
    double MaxDz = 9999.0
    double MinPt = 24.0
    double NSigmaPt = 0.0
    untracked bool SaveTag = true
  }
```

HLT Browser

The HLT browser is a helpful way of determing trigger path names and the sequence of filters applied for each path. To find trigger information, select the year, trigger menu, and version (for example 2011/e33/v2). Then go to stream A, find the class of trigger that interests you (for instance MuOnia) then select the trigger you want. This will bring up a list of details for the sequence of that trigger.



The attached text file shows the sequence for each trigger used in the analysis.

Sequences

Some sample path sequences are listed here:

path **HLT_Mu24_v2** = HLTBeginSequenceBPTX + hltL1sL1SingleMu12 + hltPreMu24 + hltL1SingleMu12L1Filtered0 + HLTL2muonrecoSequence + hltL2Mu12L2Filtered12 + HLTL3muonrecoSequence + hltSingleMu24L3Filtered24 + HLTEndSequence

path **HLT_Dimuon0_Barrel_Upsilon_v1** = HLTBeginSequenceBPTX + hltL1sL1DoubleMu0 + hltPreDimuon0BarrelUpsilon + hltDimuonL1Filtered0 + HLTL2muonrecoSequence + hltDimuonL2PreFiltered0 + HLTL3muonrecoSequence + hltDimuonL3PreFiltered0Upsilon + hltDimuon0BarrelUpsilonL3Filtered + HLTEndSequence

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Topic revision: r8 - 2013-03-25 - BenCarlson