

# Level-1 Trigger Items in FDR-1 StreamJet AODs: Introduction

- Details of the Full Dress Rehearsal:  
<https://twiki.cern.ch/twiki/bin/view/Atlas/FullDressRehearsal>
- *"FDR phase-1 (FDR-1) took place at the start of February 2008, and had a wider scope, namely to simulate the full data processing chain from the SFO output disk at point-1 through to Tier-2 AOD distribution and analysis. The instantaneous luminosity simulated was be appropriate to the 2008 expectations (1031 and 1032)."*  
(quoting Dave Charlton)
- AODs of release 13.0.40 format *without* Truth. But with full and detailed trigger info.
- Luminosity block not used yet (tool can 'ask' sample for it):  
<https://twiki.cern.ch/twiki/bin/view/Atlas/TopFdrLumi>



# Level-1 Trigger Items in FDR-1 StreamJet AODs: Goal and Setup

- **NOTE:** This study is at an early stage. **Goal** is: Find ttbar candidates using commissioning selection (semilep). Apply redundant triggering and item overlap as described in CSC Note T5 'Triggering Top Events'
- Directly reading FDR-1 StreamJet AODs with code based on UserAnalysis-00-10-12 (AnalysisSkeleton) in 13.0.40 (kit release)
- Sample: run 3050 (10000 Events used here) (The full FDR-1 has 8M): `fdr08_run1.0003050.StreamJet.merge.AOD.o1_r6_t1`
- Two objects contain trigger result:
  - TrigDecision: Official high-level object (L1, L2, EF)
  - CTP\_Decision: Lower-level (L1 only)





# Producing Event Display Images from FDR AODs (1)

- Instructions:  
<https://uimon.cern.ch/twiki/bin/view/Atlas/AtlantisWithAOD>  
<http://www.cern.ch/atlantis>
- Updates necessary for 13.0.30/40:

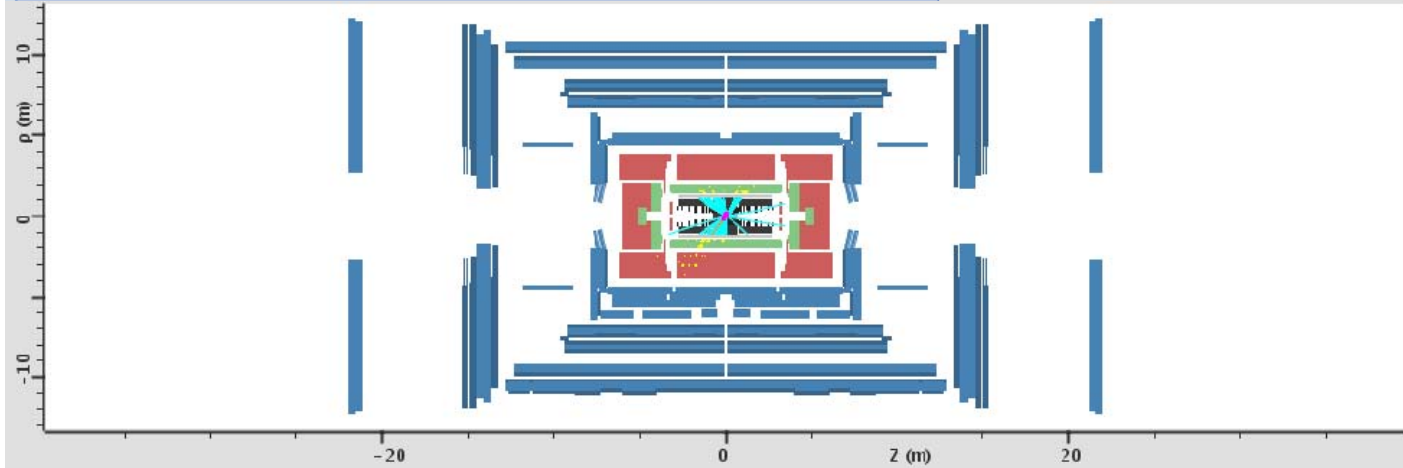
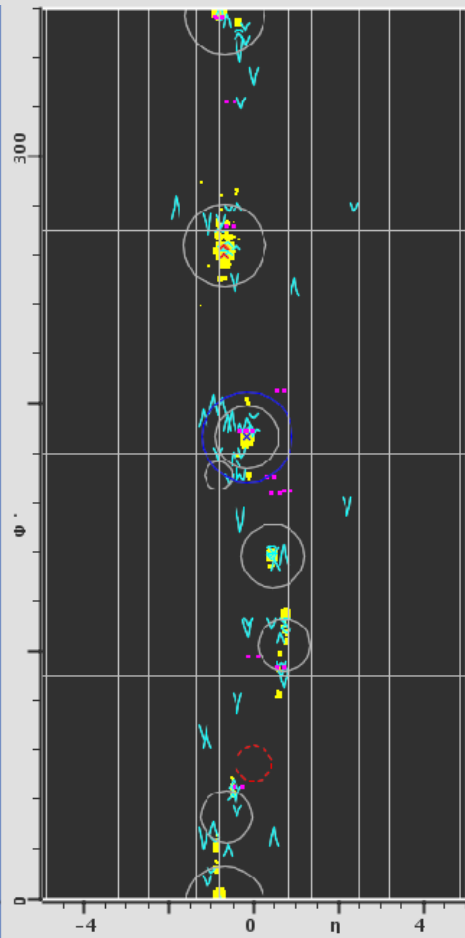
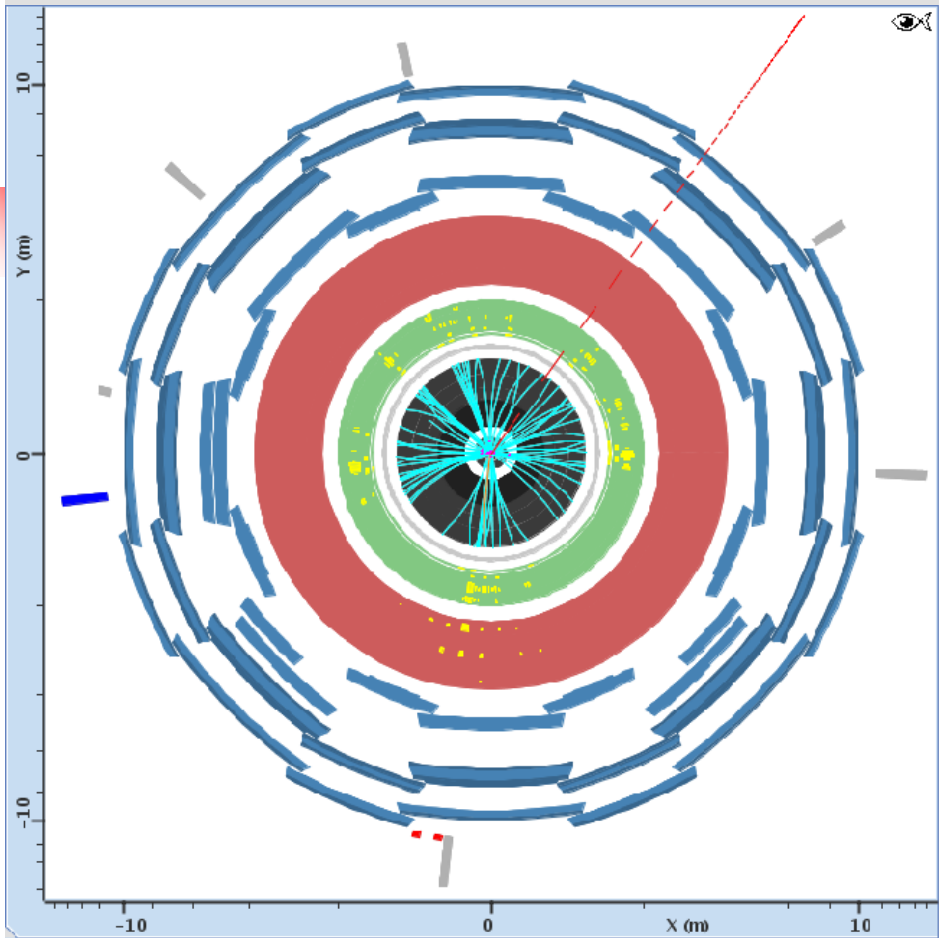
```
cmt co -r TrkJiveXML-00-00-18-05 Tracking/TrkEventCnv/TrkJiveXML
cmt co -r TrigJiveXML-00-00-48 Trigger/TrigAnalysis/TrigJiveXML
cd Tracking/TrkEventCnv/TrkJiveXML/cmt
cmt config && source setup.sh && gmake
cd ../../../../
cd Trigger/TrigAnalysis/TrigJiveXML/cmt
cmt config && source setup.sh && gmake
cd ../../../../
```
- Add JiveXML options into your analysis package, e.g. in UserAnalysis/AnalysisSkeleton\_topOptions.py:

```
include( "TrkJiveXML/JiveXML_jobOptions_FDR_AOD_re113.py" )
```
- Alternatively, try those options which read calo cells from AODs (egamma only):

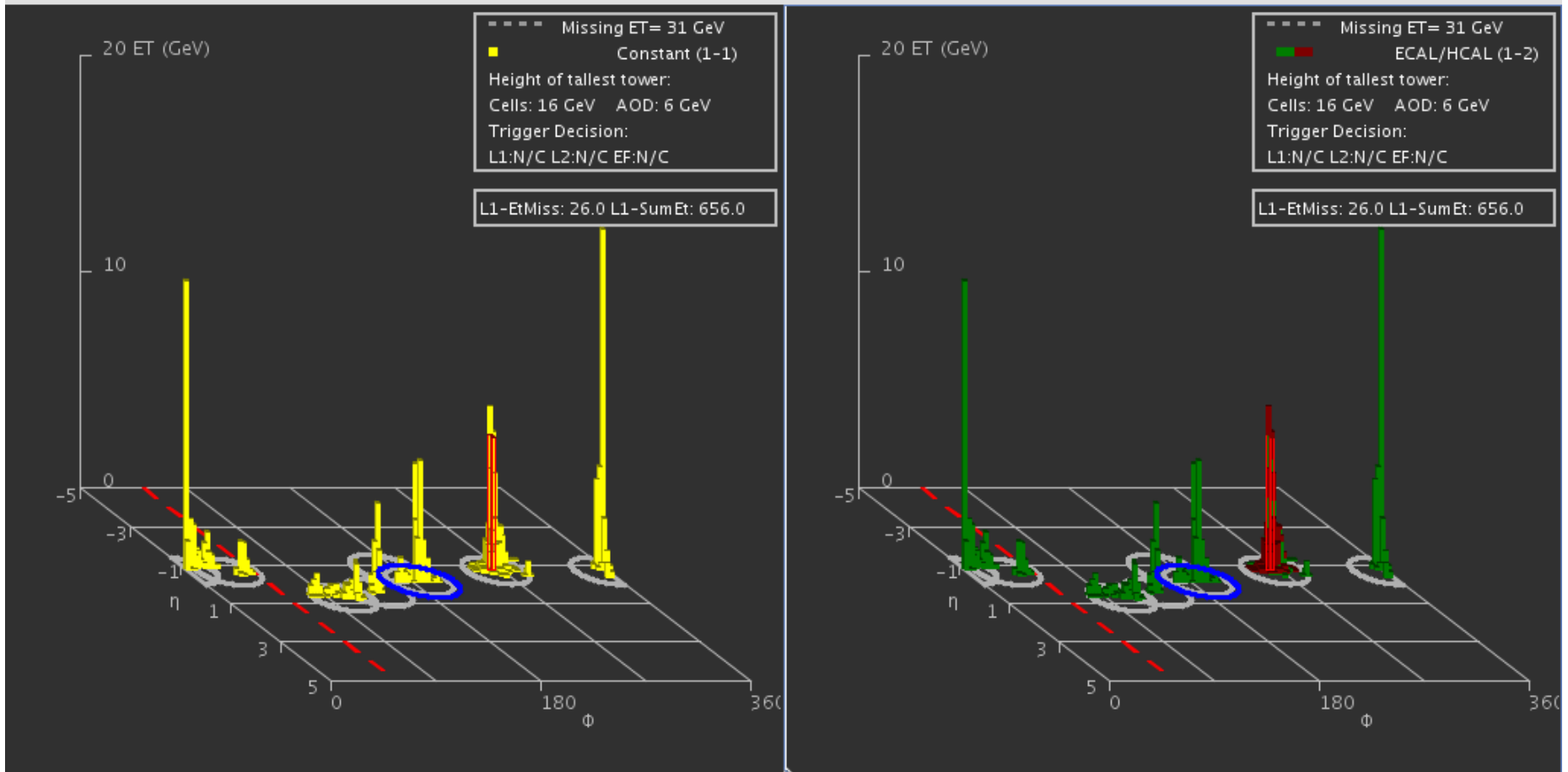
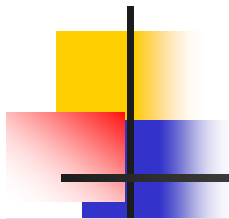
```
include( "TrkJiveXML/JiveXML_jobOptions_FDR_AOD_CaloCells_re113.py" )
```
- Run:

```
athena.py AnalysisSkeleton_topOptions.py
```





Event  
Display  
Images  
from FDR  
AODs



Event Display Images from FDR AODs



## (I) TrigDecision

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- TrigDecisionTool: Trigger configuration changed from 13.0.30 to 13.0.40. Not trivial to get to work. Patches are being prepared.

For details, see:

<https://hypernews.cern.ch/HyperNews/Atlas/get/primaryDPDcontent/7.html>

[https://twiki.cern.ch/twiki/bin/view/Atlas/FDR1ForUsers#Using\\_Trigger\\_Information](https://twiki.cern.ch/twiki/bin/view/Atlas/FDR1ForUsers#Using_Trigger_Information)

- Can read full trigger configuration L1,L2,EF (passed/failed) using EV trigger package. But not from standard AOD analysis (UserAnalysis)
- Prescale factors not readable, apparently all '1' ?  
NOTE: This should work in FDR-2...



## (II) Reading CTP\_Decision

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- Reverted back to 'old-fashioned' L1 item list from CTP\_Decision, easy to read in standard AOD analysis
- Prescales are not obeyed in CTP\_Decision output (visible: L1\_EM3 triggers all events)
- See next pages for an overview acceptances of selected L1 items. No warranty for typos...
- The trigger menu has 12 pages in total.
  
- 'Overall acceptance': Event fraction which have this trigger item passed, in present of total events read-in (10000)  
No usage of reconstructed objects ! ('Efficiency').

# CTP\_Decison FDR-1 StreamJet: Efficiencies of L1 items: J

- Acceptance (10000 Ev used):

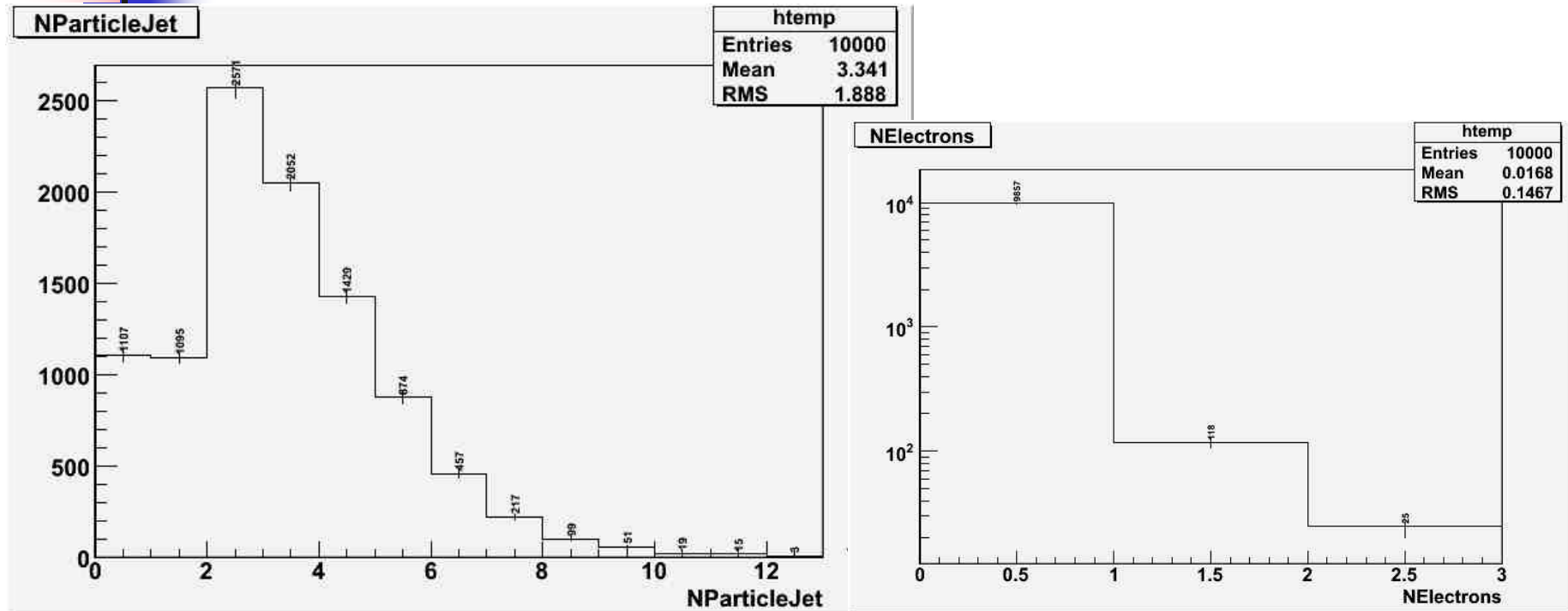
Name	Acceptance [%]	Name	Acceptance [%]
L1_J5	96.8	L1_3J10	56.8
L1_J10	95.7	L1_3J18	36.9
L1_J18	81.9	L1_4J10	35.6
L1_J23	77.2	L1_4J18	16.5
L1_J35	69.8	L1_4J23	12.1
L1_J42	65.7	L1_4J23_MU11	0.6
L1_J70	49.6	L1_4J23_EM13I	2.8
L1_J120	25.7	L1_FJ18	27.1
		L1_2FJ18	1.7
L1_J70_XE30	22.8	L1_FJ35	14.4
L1_J42_XE30_EM13I	4.8		
L1_2J42_XE30	19.7		

(Selected J triggers  
listed here)





# FDR-1 StreamJet: Jets and Electrons



- L1 trigger can't do overlap removal, therefore interesting to inspect non-overlap-removed ParticleJetContainer contents.
- ParticleJets: Cone4H1TowerParticleJets,  $e_T > 15$  GeV,  $|\eta| < 2.5$   
Electrons: ElectronAODContainer,  $isEM=0$ ,  $e_T > 15$  GeV,  $|\eta| < 2.5$

# CTP\_Decision FDR-1 StreamJet: Efficiencies of L1 items: XE, TE, JE

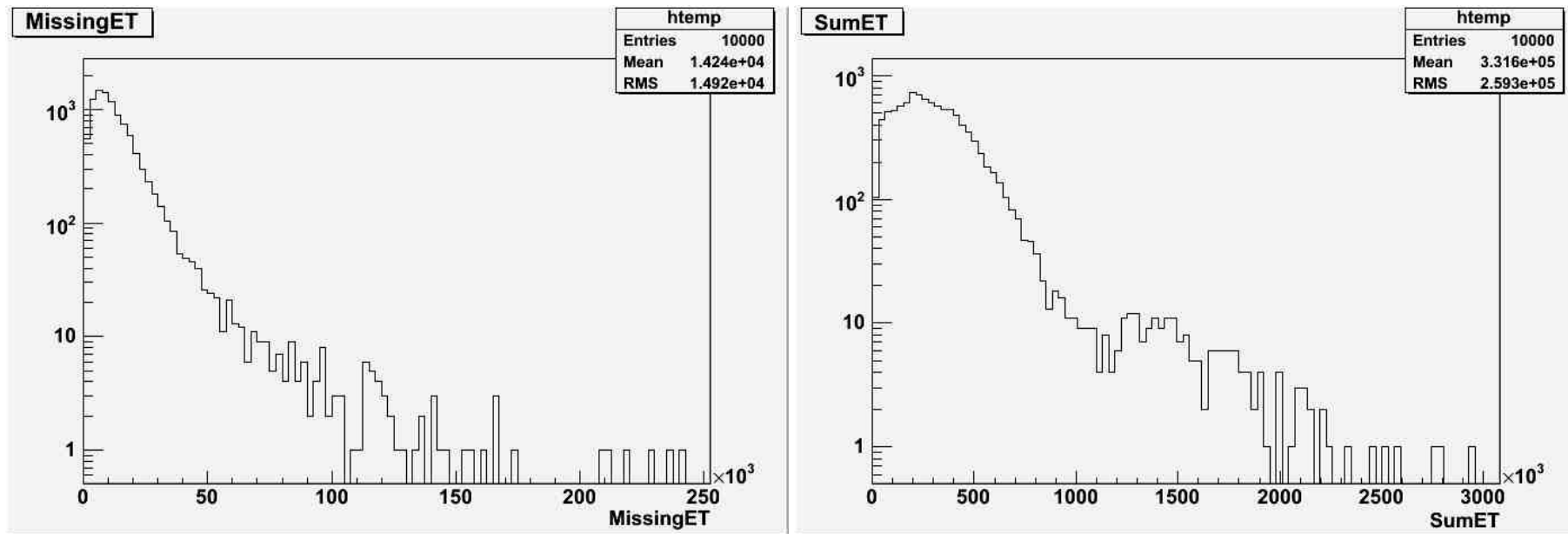
- Acceptance (10000 Ev used):

Name	Acceptance [%]	Name	Acceptance [%]
L1_XE15	62.2	L1_TE150	95.3
L1_XE20	47.6	L1_TE250	68.1
L1_XE25	38.2	L1_TE360	39.2
L1_XE30	30.0	L1_TE650	5.9
L1_XE40	18.3		
L1_XE50	11.4	L1_JE120	55.2
L1_XE70	5.7	L1_JE220	17.6
L1_XE80	4.0	L1_JE280	6.5
		L1_JE650	2.0

(all configured XE,TE,JE  
triggers listed here)



# Some kinematic variables: Missing-ET and Sum-ET



- Using MET\_RefFinal, no cuts applied.

# CTP\_Decision FDR-1 StreamJet: Efficiencies of L1 items: EM and TAU

- Acceptance (10000 Ev used):

Name	Acceptance [%]	Name	Acceptance [%]	Name	Acceptance [%]
L1_EM3	86.9	L1_TAU5	85.0	L1_TAU11I_XE30	17.6
L1_EM7	76.9	L1_TAU6	83.3	L1_TAU16I_XE20	22.4
L1_EM13	66.2	L1_TAU9I	56.3	L1_TAU16I_XE30	14.8
L1_EM13I	12.5	L1_TAU11I	50.8	L1_TAU16I_XE40	9.1
L1_EM18	58.5	L1_TAU16I	40.3		
L1_EM18I	8.6	L1_TAU25	60.0	L1_TAU9I_EM13I	6.6
L1_EM23I	7.0	L1_TAU25I	28.9	L1_TAU9I_MU10	2.8
				L1_TAU11I_MU20	1.4
L1_EM13_XE20	38.6	L1_TAU6_XE20	44.2		
L1_EM18_XE15	42.9	L1_TAU9I_XE20	29.5		
L1_EM7_XE30	28.0	L1_TAU9I_XE30	19.2		
L1_EM18_XE30	23.8	L1_TAU9I_XE40	11.8		
L1_EM7_MU6	4.7				

(Selected EM, TAU  
triggers listed here)



# CTP\_Decison FDR-1 StreamJet: Efficiencies of L1 items: MU

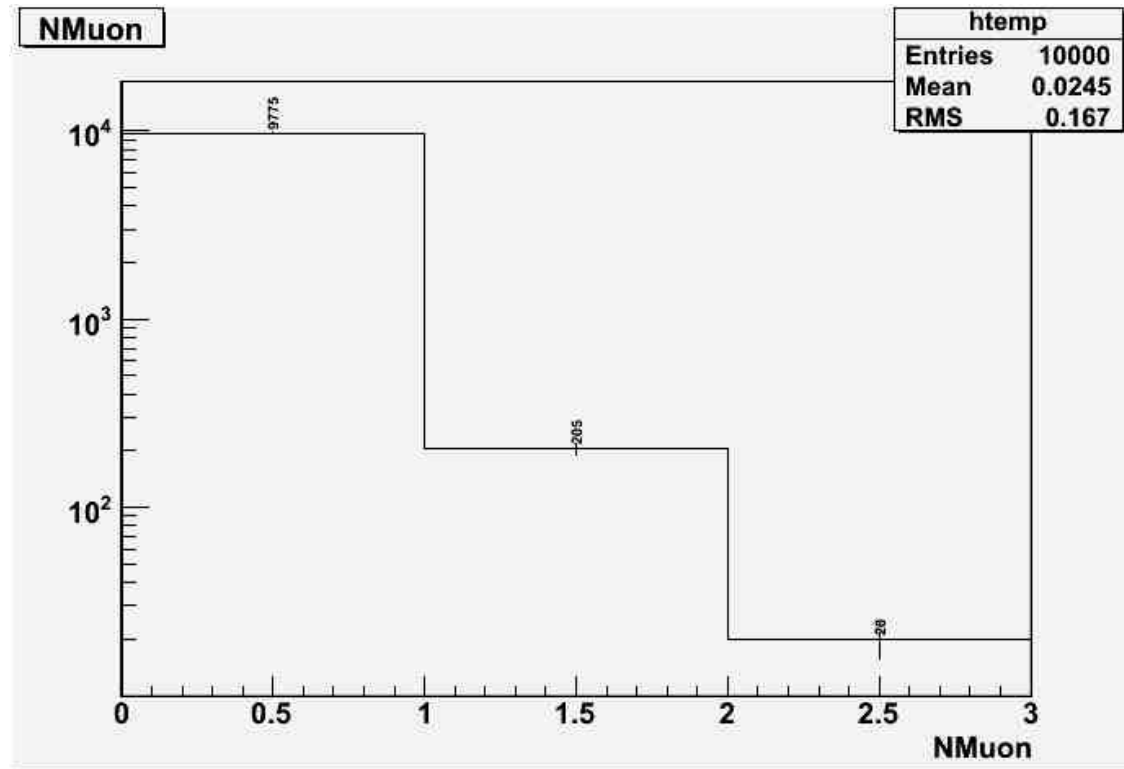
- Acceptance (10000 Ev used):

Name	Acceptance [%]	Name	Acceptance [%]
L1_MU4	7.1	L1_MU6_J5	5.0
L1_MU6	5.0	L1_MU11_XE15	2.3
L1_MU10	3.7	L1_MU20_XE30	1.3
L1_MU11	2.5	L1_MU6_EM3	4.9
L1_MU20	2.0	L1_MU4_J10	7.1
L1_MU40	1.5	L1_MU10_J18	3.7
L1_2MU4	1.1		
L1_2MU6	0.6		
L1_2MU10	0.5		
L1_2MU11	0.2		
L1_2MU20	0.1		
L1_2MU40	0.0		

(Selected MU  
triggers listed here)



# FDR-1 StreamJet: Muon



- Muon: StacoMuonCollection,  $p_T > 15$  GeV,  $|\eta| < 2.5$ , no isolation criteria (should be  $\Delta R > 0.2$ )

# FDR-1 StreamJet: Selected EF items...

- Acceptance (1000 Ev used):

Name	Acceptance [%]	Name	Acceptance [%]
EF_e20_xe15	2.4	EF_e5	3.6
EF_4J10	12.1	EF_e7	3.4
EF_4J23	8.9	EF_e25i	4.0
EF_xe20	35.8	EF_e25i_tight	1.5
EF_xe25	26.6	EF_j70_xe30	16.9
EF_te250	44.2	EF_j42_xe30_e15i	0.7
EF_J400	2.0	EF_j42_xe30_mu15	0.6
EF_e10_xe30	1.4		
EF_2b23_3L1J23_passHLT	2.1		





# Next Steps

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- FDR-1 now superseded by FDR-2: AODs currently being re-done (bug in b-layer).  
FDR-2 is produced with 14.1.0.3.
- Apply ttbar commissioning analysis (no b-tagging) and find candidates within FDR-2 sample
- Do item overlap plot (as in 'Trigger Top Events' CSC note T5 – long version)
- TrigDecision for prescales
- On related issue: Re-evaluate Multi-Jet trigger acceptance and rates for full hadronic ttbar-mode (sample 5204) from 14.2.0 production