Trigger Items in rel.14
Validation Samples
ttbar 5200:
(esp. L1 Combined Triggers with Jets)

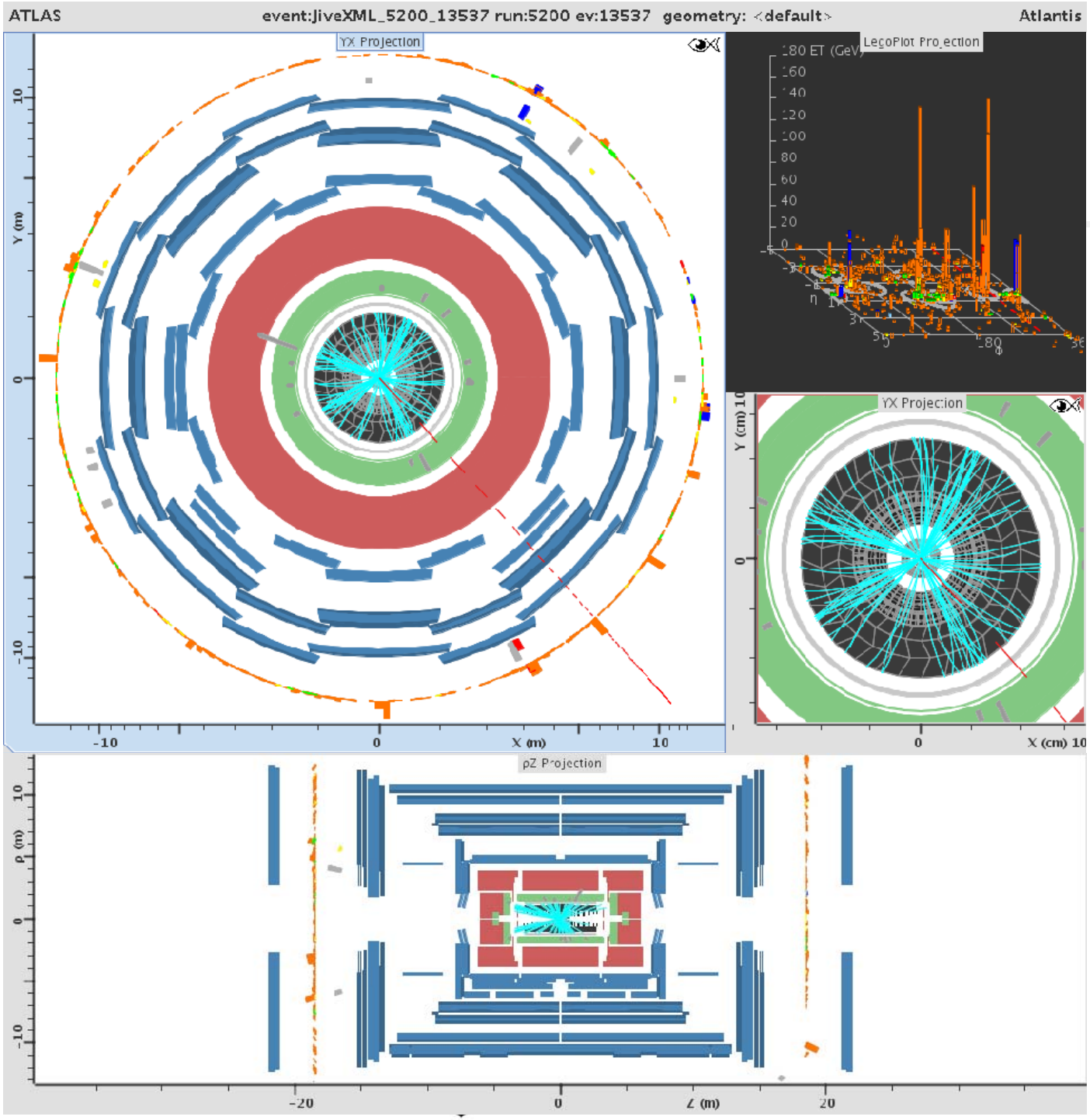
(Excuses for the unpolished talk, but surely you all enjoyed the event pictures from CERN last week...)

Setup (1)

- Access to TriggerDecision works ok since 14.2.10 (before only with tweaking)
- Package UserAnalsis (algorithm AnalysisSkeleton) in 14.2.10 has been updated, so you can see the access steps there.
- To run with AODs produced in older releases, e.g. FDR-2, special mode ('aod', not 'ds') has to be switched. Explained here: https://twiki.cern.ch/twiki/bin/view/Atlas/TrigDecisionTool14
- A more sophisticated analysis, connecting the trigger'chain' with ROI and Jets is explained here, this works with 'TriggerElements': **PhysicsAnalysis/AnalysisCommon/AnalysisExamples/ TrigAnalysisExample**
- For more on this, check the hypernews forum: https://hypernews.cern.ch/HyperNews/Atlas/get/TriggerHelp.html

Setup (2)

- Using kit 14.2.10 at Birmingham
- Trigger info scanned with TrigJiveXML:
  L1 items, L2 chain, EF chain.
- Looking at ‘Overall acceptance’: Event fraction which have this trigger item passed, in present of total events read-in.
  No usage of reconstructed objects ! (‘Efficiency’).
- Input: validation AODs from rel.14: standard ‘all-non-hadronic’ ttbar:
  valid3.005200.T1_McAtNlo_Jimmy.recon.AOD.e322_s472_r536
- In preparation for 10 TeV rel.14 mc08 production
  (likely already available)
- Not found 5204 full-hadronic ttbar

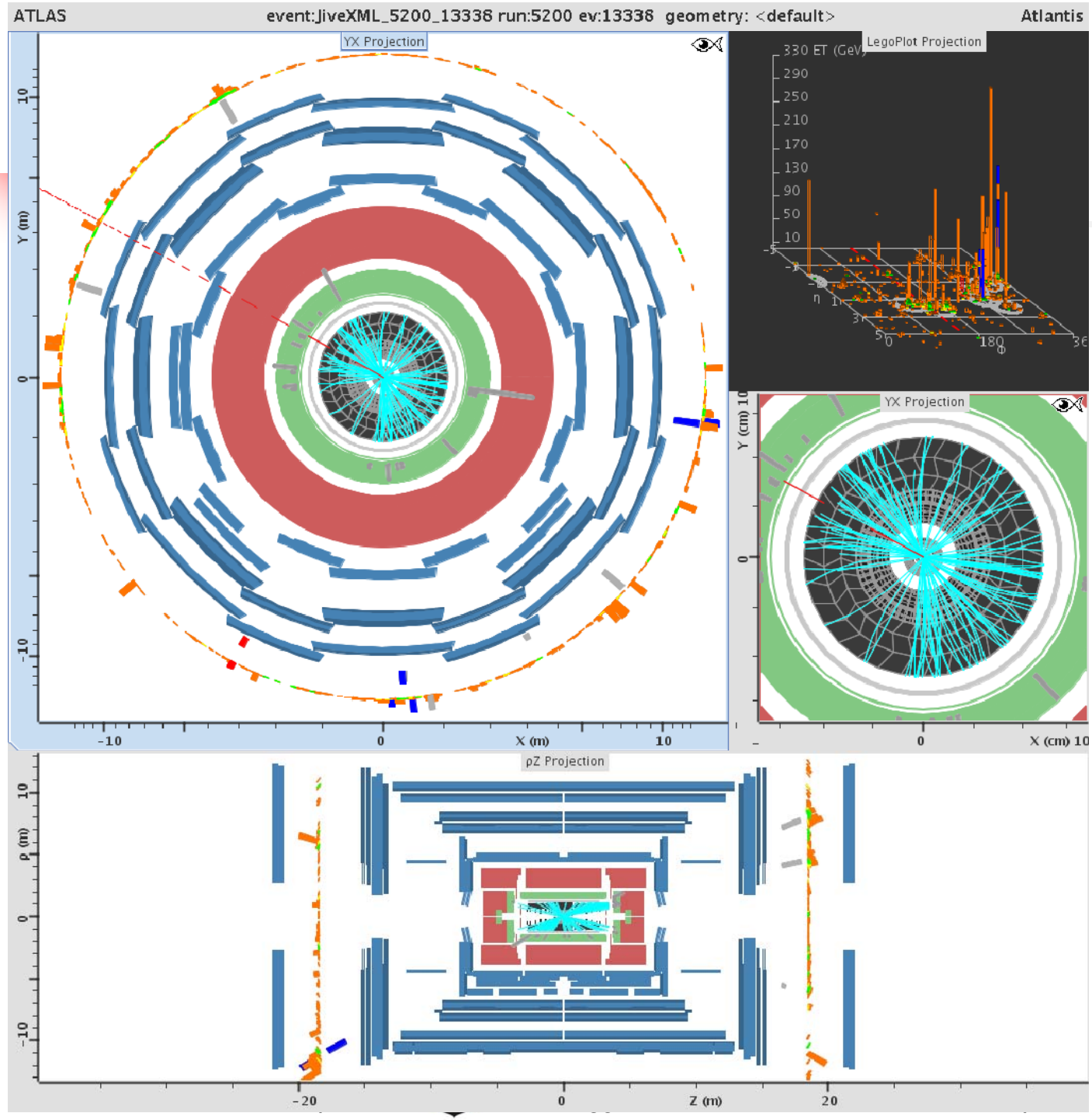


Atlantis
Event Display

To make you own image from AOD: see TWiki AtlantisWithAOD)

New: In Orange: TruthParticles from SpclMC. Coloured in same code as reco objects (e.g. green: Electron).

New friendly colourscheme.



Atlantis
Event Display

The top‘s are visible in the Truth (but not colour coded). ‚Pick‘ gives PDG_ID (sorry, not in current version due to a bug)

TrigDecision ttbar 5200 rel14 valid3: Efficiencies of L1 items: J

- Acceptance (1000 Ev used):

Name	Acceptance [%]
L1_J5	100
L1_J10	100
L1_J18	99.9
L1_J23	99.6
L1_J35	97.0
L1_J42	93.9
L1_J70	63.7
L1_J120	26.0
L1_J70_XE30	53.5
L1_J42_XE30_EM13I	38.3
L1_2J42_XE30	56.9

Name	Acceptance [%]
L1_3J10	96.2
L1_3J18	88.4
L1_4J10	84.4
L1_4J18	63.1
L1_4J23	49.5
L1_4J23_MU11	15.3
L1_4J23_EM13I	30.0
L1_FJ18	23.2
L1_2FJ18	1.1
L1_FJ35	8.3
L1_FJ70	1.5

(Selected J triggers listed here)

For Reference: CTP_Decison FDR-1 StreamJet: Efficiencies of L1 items: J

- Acceptance (10000 Ev used):

Name	Acceptance [%]
L1_J5	96.8
L1_J10	95.7
L1_J18	81.9
L1_J23	77.2
L1_J35	69.8
L1_J42	65.7
L1_J70	49.6
L1_J120	25.7
L1_J70_XE30	22.8
L1_J42_XE30_EM13I	4.8
L1_2J42_XE30	19.7

Name	Acceptance [%]
L1_3J10	56.8
L1_3J18	36.9
L1_4J10	35.6
L1_4J18	16.5
L1_4J23	12.1
L1_4J23_MU11	0.6
L1_4J23_EM13I	2.8
L1_FJ18	27.1
L1_2FJ18	1.7
L1_FJ35	14.4

(Selected J triggers listed here)

TrigDecision ttbar 5200 rel14 valid3: Efficiencies of L1 items: XE, TE, JE

- Acceptance (10000 Ev used):

Name	Acceptance [%]
L1_XE15	93.7
L1_XE20	90.4
L1_XE25	85.9
L1_XE30	79.5
L1_XE40	66.2
L1_XE50	52.3
L1_XE70	31.1
L1_XE80	24.4

Name	Acceptance [%]
L1_TE150	99.6
L1_TE250	86.5
L1_TE360	49.3
L1_TE650	6.7
L1_JE120	88.2
L1_JE220	43.9
L1_JE280	20.9
L1_JE650	n/c

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

For Reference: CTP_Decison FDR-1 StreamJet: Efficiencies of L1 items: XE, TE, JE

- Acceptance (10000 Ev used):

Name	Acceptance [%]
L1_XE15	62.2
L1_XE20	47.6
L1_XE25	38.2
L1_XE30	30.0
L1_XE40	18.3
L1_XE50	11.4
L1_XE70	5.7
L1_XE80	4.0

Name	Acceptance [%]
L1_TE150	95.3
L1_TE250	68.1
L1_TE360	39.2
L1_TE650	5.9
L1_JE120	55.2
L1_JE220	17.6
L1_JE280	6.5
L1_JE650	2.0

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

TrigDecision ttbar 5200 rel14 valid3: Efficiencies of L1 items: EM and MU

- Acceptance (1000 Ev used):

Name	Acceptance [%]	Name	Acceptance [%]
L1_EM3	100	L1_MU4	50.1
L1_EM7	98.7	L1_MU6	45.3
L1_EM13	94.1	L1_MU10	42.4
L1_EM13I	50.4	L1_MU11	37.2
L1_EM18	87.4	L1_MU20	33.4
L1_EM18I	42.5	L1_MU40	29.1
L1_EM23I	35.5		
		L1_2MU4	13.4
L1_EM13_XE20	85.7	L1_2MU6	9.9
L1_EM18_XE15	83.1	L1_2MU10	8.2
L1_EM7_XE30	78.9	L1_2MU11	5.8
L1_EM18_XE30	70.5	L1_2MU20	4.4 (!)
L1_EM7_MU6	44.3	L1_2MU40	0.0 (?)

(Selected EM, TAU triggers listed here)

TrigDecision ttbar 5200 rel14 valid3: Selected EF items...

- Acceptance (1000 Ev used):

Name	Acceptance [%]	Name	Acceptance [%]
EF_e20_xe15	30.6	EF_e5_medium	76.8
EF_4J10	83.4	EF_e7_medium	38.4
EF_4J23	48.9	EF_e25i_medium1	24.6
EF_xe20	81.8		
EF_xe25	74.2	EF_j70_xe30	44.2
EF_te250	82.3	EF_j42_xe30_e15i	19.2
EF_J400	1.7		
EF_e10_xe30	28.7		
EF_2b42_3L1J42	15.5		

Next Steps

- Do item overlap plot (as in ‘Trigger Top Events’ CSC note T5 – long version)
- TrigDecision prescales ? Non seen here, all 1.
- On related issue: Re-evaluate Multi-Jet trigger acceptance and rates for full hadronic ttbar-mode (sample 5204) from 14.2.0 production