

Tau Data Quality

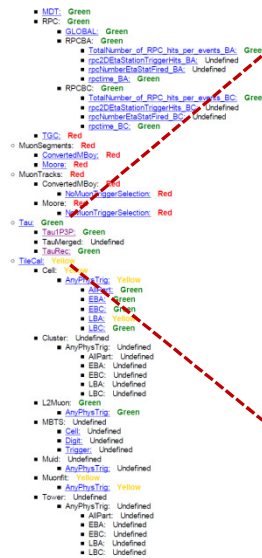
ATLAS Tau Workshop

Wednesday, April 15, 2009

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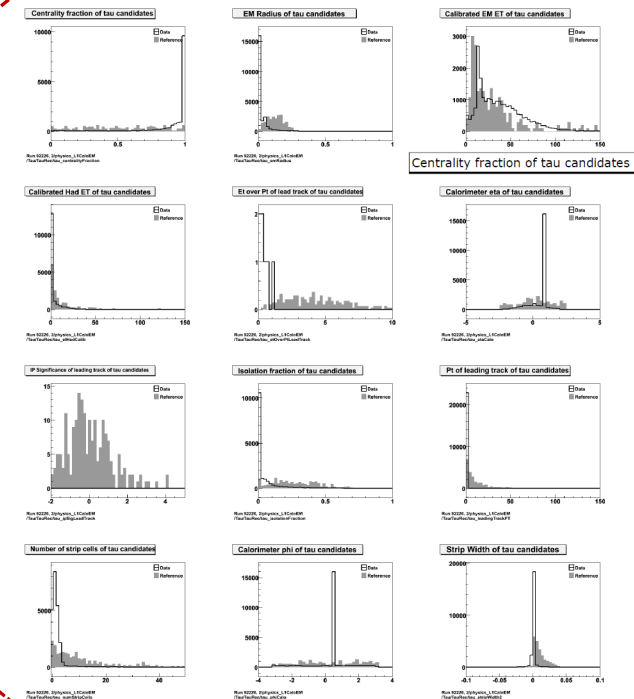
Outline

- ATLAS DQ News
- Athena Global Monitoring at Point 1 [\[Back\]](#)
- Cosmic Data Reprocessing
- Commissioning



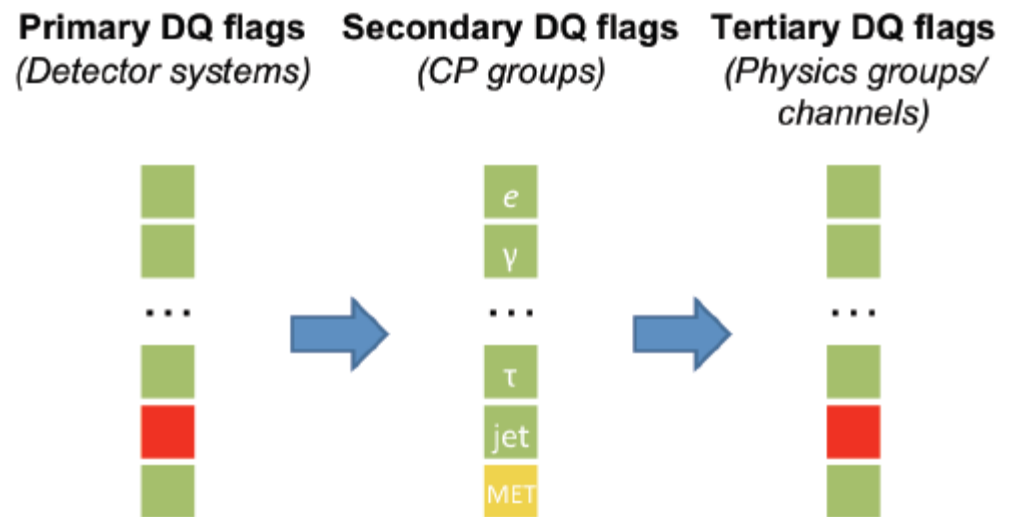
Run 92226, 2/physics_L1CaloEM
Tau/TauRec

[\[Only Red\]](#) [\[Only Yellow\]](#) [\[Only Green\]](#)



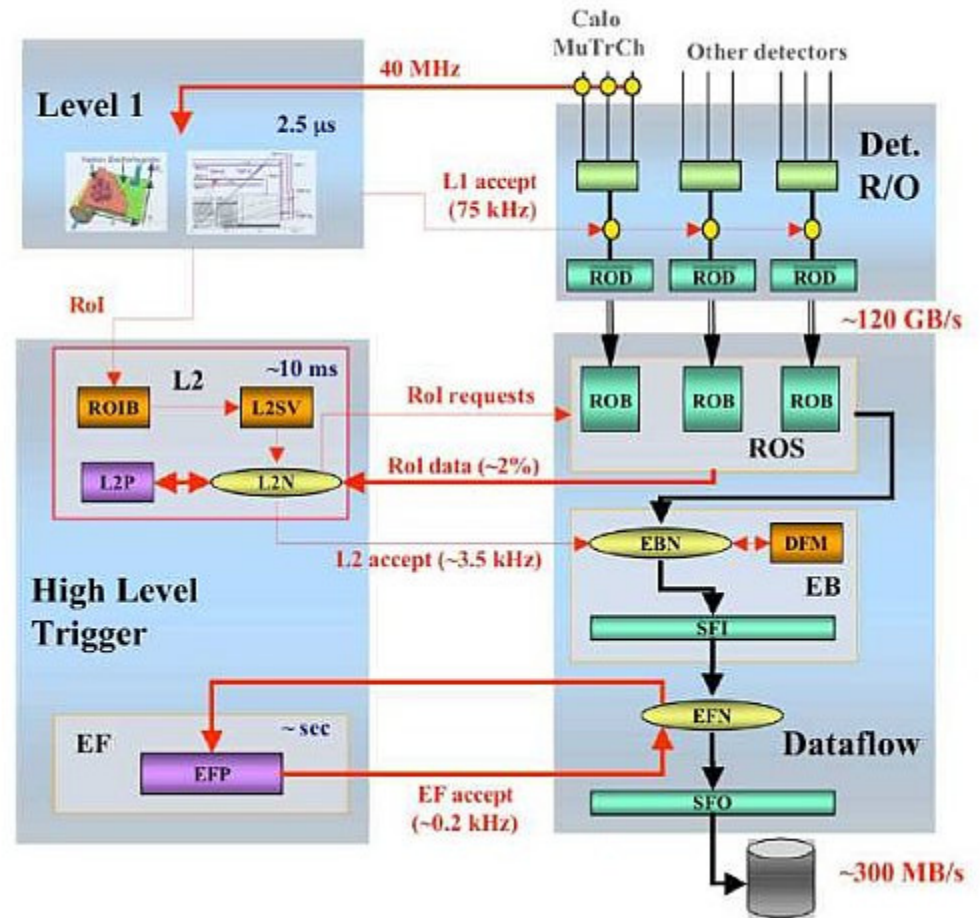
ATLAS DQ News

- General DQ Flag definitions and policies are in the process of being defined
 - Data Quality Status Flags and Good Run Lists for Physics Analysis in ATLAS: **ATL-COM-GEN-2009-015**
 - TRT Data Quality Status Flag Policy: **ATL-COM-INDET-2009-009**
- In addition to status flags, detectors will include
 - **deadFrac**: the fraction of detector that is dead
 - **thrust**: a measure of the clustering of the dead regions



Athena Global Monitoring at Point1

- 70 processes will be running at Point 1 during data-taking, receiving events after L2 seeded by L1 trigger
- The tau combined performance will be allotted an occupancy plot at this stage
- Current status: one process is running in testing mode with tau reconstruction run, but plot not yet turned on
- Plots will be published to a server and available online outside of Point1



Cosmic Data Reprocessing

- tauMonitoringTool was turned on for most recent reprocessing
- Plots are available here, under the column iteration 2:
 - http://atlasdqm.cern.ch/tier0/Cosmics08_r2/results_Cosmics08_r2.html
- Useful Streams (expect tau candidates):
 - physics_L1Calo
 - physics_L1CaloEM
- Pluses:
 - Jobs have been run for us
 - A huge number of events have been processed
 - Access available from anywhere on the web
- Minuses:
 - Cannot do interactive analysis
 - An “old” tag was used, without 2-d histograms or newer organization

Cosmic Data Reprocessing

- The majority of the tau candidates are calo-only, as expected with cosmic data (some example ratios of tau1p3p to tauRec are given in the table below)

Run #	# 1p3p	# tauRec
92226	15	22,860
92112	68	49,973
92081	3	3,841
92059	2	1,457
92058	5	4117

- Plots became available this past weekend
- This gives us the opportunity to exercise our monitoring code by analyzing a run to understand the quality of the tau variables

Procedure

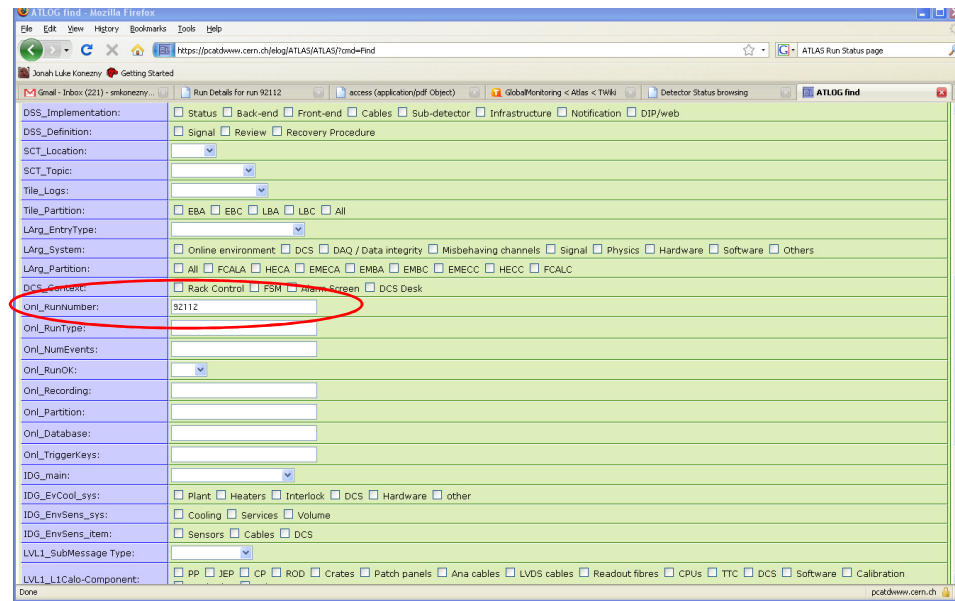
- Obtain list of runs to evaluate
- Understand trigger menu and pre-scale keys used
 - Available in E-Log, COOL database, and run display page
- Understand state of detector subsystems during runs
 - Automatically filled DQ flags (COOL)
 - ATLAS E-Log for error reports
 - Check online Data Quality Shift summary
- Look at Tier0 tau quality plots available on web display
- Follow-up as needed with the expert level plots available in Tier0 root histogram file
- Attend daily DQ Meeting to give tau feedback and learn about current issues with detectors

Example Analysis: Run 92112

- Overnight combined run on October 24, 2008
- Run duration: 9 hours
- Run stopped due to Tile being in busy state
- SuperMasterKey 373: Cosmic_v1_with_Solenoid
- Level 1 Pre-scale Key 530: with random trigger pre-scaled to 40 kHz
- HLT Pre-scale Key 396: Level 2 at 1 kHz
- Can take a look at menus and pre-scale keys with the trigger tool
 - <http://triggertool.web.cern.ch/triggertool/>

Run 92112

- Check E-Log entries to check for errors/circumstances surrounding Run that could impact the data quality
 - Log on to the E-Log (password and E-Log account needed?)
<https://pcatdwww.cern.ch/elog/ATLAS/ATLAS/>
 - Click “Find” on upper left of main page and search by run #
 - Note: Default is to only show results from last month!



The screenshot shows the ATLOG find web interface in Mozilla Firefox. The browser address bar displays the URL: <https://pcatdwww.cern.ch/elog/ATLAS/ATLAS/?cmd=Find>. The page title is "ATLAS Run Status page". The interface contains a search form with various filters. The "OnL_RunNumber" field is highlighted with a red circle and contains the value "92112". Other visible fields include "OnL_RunType", "OnL_NumEvents", "OnL_RunOK", "OnL_Recording", "OnL_Partition", "OnL_Database", "OnL_TriggerKeys", "IDG_main", "IDG_EvCool_sys", "IDG_EnvSens_sys", "IDG_EnvSens_item", "LV11_SubMessage Type", and "LV11_L1Calo-Component". The "OnL_RunNumber" field is the only one with a value entered.

Check the Level1 Pre-scale Key

Available Sets

- 535: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM
- 534: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM
- 533: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM
- 532: RNDM(1 Hz) no L1Calo, no TGC, RPCunprescaled
- 531: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM
- 530: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM**
- 529: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM

Comment Field for Set ID 530

Based on 529 but with a prescale of 2 on the RNDM0 (~40kHz)

Update Comment

Prescale Set Name: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM13, MBTS, CALREQ Shift Safe

Prescale Set Lumi: 0.0 Default

Prescale	Prescale Value	In/Out
CTP ID: 62 / L1_LUCID_A_FILLED / test comment	-1	<input type="checkbox"/>
CTP ID: 63 / L1_LUCID_C_FILLED / test comment	-1	<input type="checkbox"/>
CTP ID: 64 / L1_TAU5 / test comment	1	<input type="checkbox"/>
CTP ID: 65 / L1_TAU6 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 66 / L1_TAU9 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 67 / L1_TAU9I / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 68 / L1_TAU11I / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 69 / L1_TAU16 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 70 / L1_TAU16I / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 71 / L1_LUCID_A_C_FILLED / test comment	-1	<input type="checkbox"/>
CTP ID: 72 / L1_LUCID_FILLED / test comment	-1	<input type="checkbox"/>
CTP ID: 73 / L1_TAU40 / test comment	-1	<input checked="" type="checkbox"/>
CTP ID: 74 / L1_2TAU6 / test comment	-1	<input checked="" type="checkbox"/>
CTP ID: 75 / L1_2TAU9I / test comment	-1	<input checked="" type="checkbox"/>
CTP ID: 76 / L1_NIMDIR13 / test comment	-1	<input checked="" type="checkbox"/>
CTP ID: 77 / L1_NIMDIR14 / test comment	-1	<input checked="" type="checkbox"/>
CTP ID: 78 / L1_NIMDIR25 / test comment	-1	<input checked="" type="checkbox"/>
CTP ID: 79 / L1_NIMDIR26 / test comment	-1	<input checked="" type="checkbox"/>
CTP ID: 80 / L1_EM3_BPTX / test comment	1	<input checked="" type="checkbox"/>

L1 Prescale Set Diffing

Prescale Set 1: [Dropdown]

Prescale Set 2: [Dropdown]

Enable All/Selection | Disable All/Selection

Diff Selected Sets | Save

Close

L1_tau5 was usually a few hz during cosmics data taking

Also expect reco taus from jet triggers

Available Sets

- 535: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIF
- 534: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIF
- 533: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIF
- 532: RNDM(1 Hz) no L1Calo, no TGC, RPCunprescaled
- 531: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIF
- 530: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIF
- 529: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIF

Comment Field for Set ID 530

Based on 529 but with a prescale of 2 on the RNDM0 (~40kHz)

Prescale Set Name: RNDM(1 Hz) L1Calo no TGC, RPCunprescaled, NIM13, MBTS, CALREQ Shift Safe

Prescale Set Lumi: 0.0 Default

Prescale	Prescale Value	In/Out
CTP ID: 86 / L1_2EM4 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 87 / L1_2EM7I / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 88 / L1_MU0_TGC_HALO / test comment	-1	<input type="checkbox"/>
CTP ID: 89 / L1_MU0_LOW_RPC / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 90 / L1_MU6_RPC / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 91 / L1_MU0_TGC / test comment	-1	<input type="checkbox"/>
CTP ID: 92 / L1_MU6_TGC / test comment	-1	<input type="checkbox"/>
CTP ID: 93 / L1_MU0_HIGH_RPC / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 94 / L1_MU0_TGC_HALO_EMPTY / test...	-1	<input type="checkbox"/>
CTP ID: 95 / L1_MU6_LOW_RPC_EMPTY / test...	-1	<input type="checkbox"/>
CTP ID: 96 / L1_J5 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 97 / L1_J10 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 98 / L1_J18 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 99 / L1_J23 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 100 / L1_J35 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 101 / L1_J42 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 102 / L1_J70 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 103 / L1_MU0_TGC_EMPTY / test com...	-1	<input type="checkbox"/>
CTP ID: 104 / L1_2J5 / test comment	1	<input checked="" type="checkbox"/>
CTP ID: 105 / L1_2J10 / test comment	1	<input checked="" type="checkbox"/>

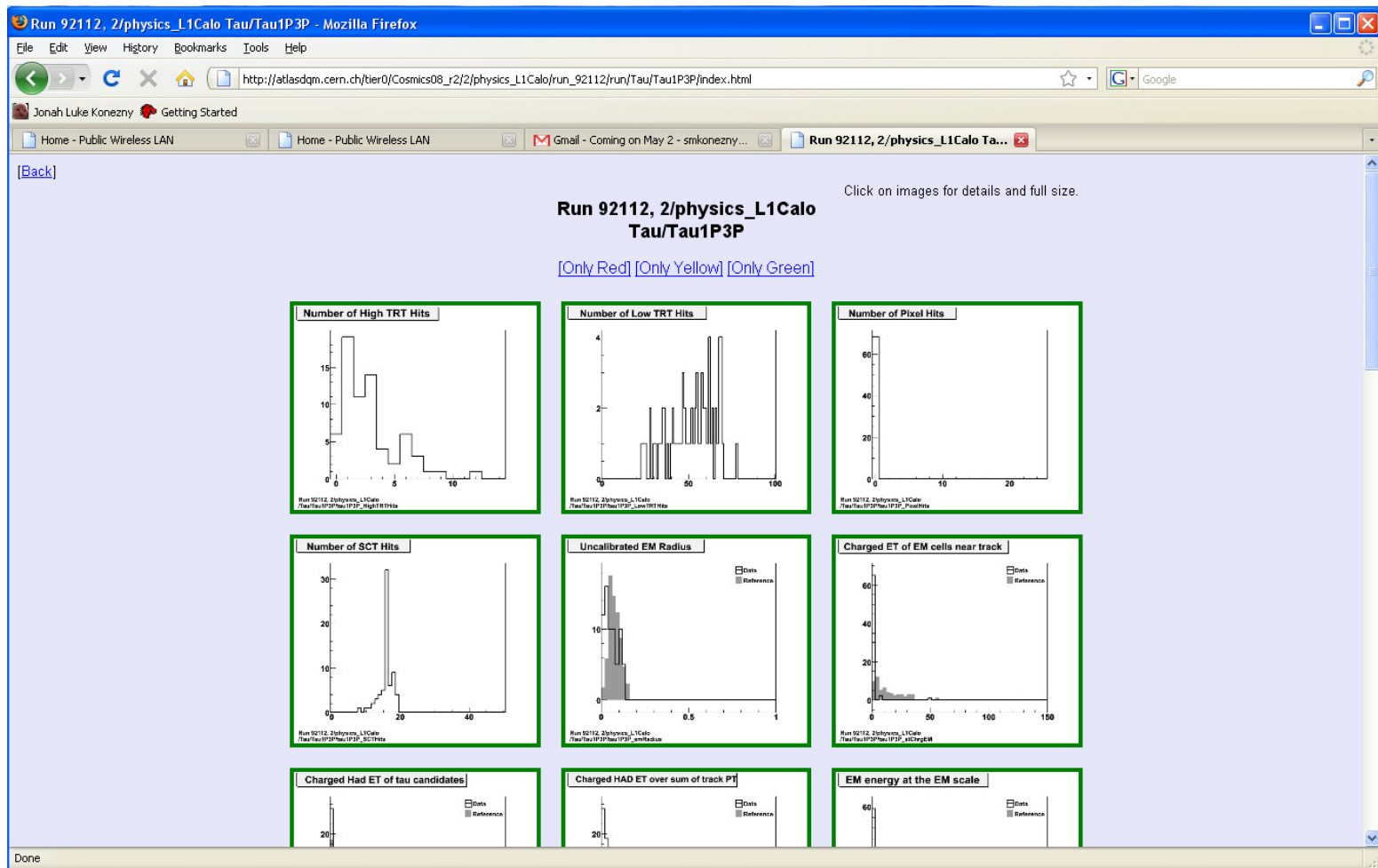
L1 Prescale Set Diffing

Prescale Set 1: [Dropdown]

Prescale Set 2: [Dropdown]

Buttons: Enable All/Selection, Disable All/Selection, Update Comment, Diff Selected Sets, Save, Close

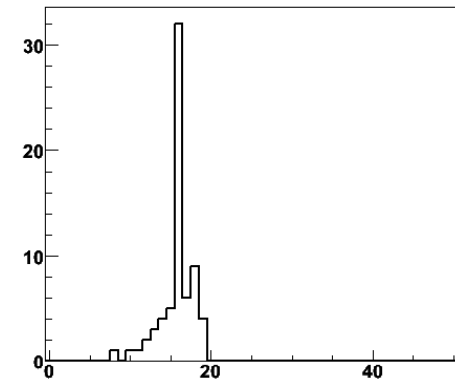
Tau1p3p seeds



Run 92112: Track info

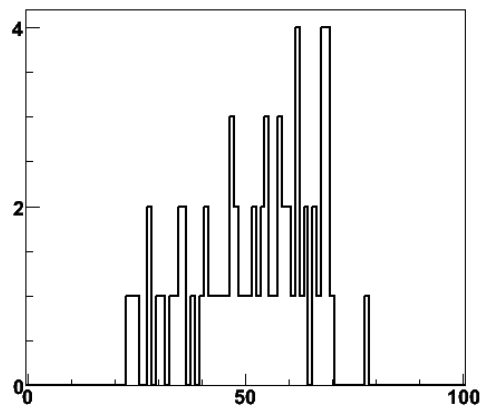
- Only 68 track-seeded tau candidates found in 9 hour run
- Pixel detector was not active during the run

Number of SCT Hits



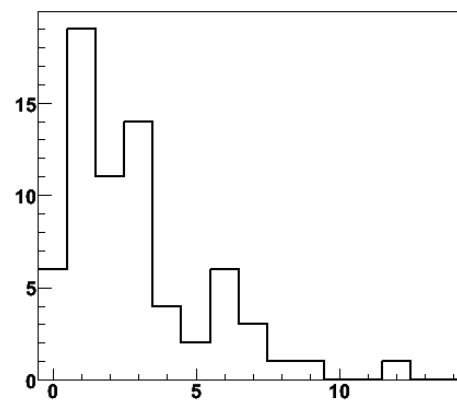
Run 92112, 2/physics_L1Calo
/Tau/Tau1P3P/tau1P3P_SCTHits

Number of Low TRT Hits



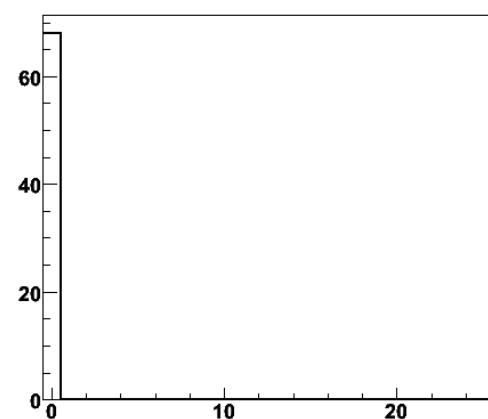
Run 92112, 2/physics_L1Calo
/Tau/Tau1P3P/tau1P3P_LowTRTHits

Number of High TRT Hits



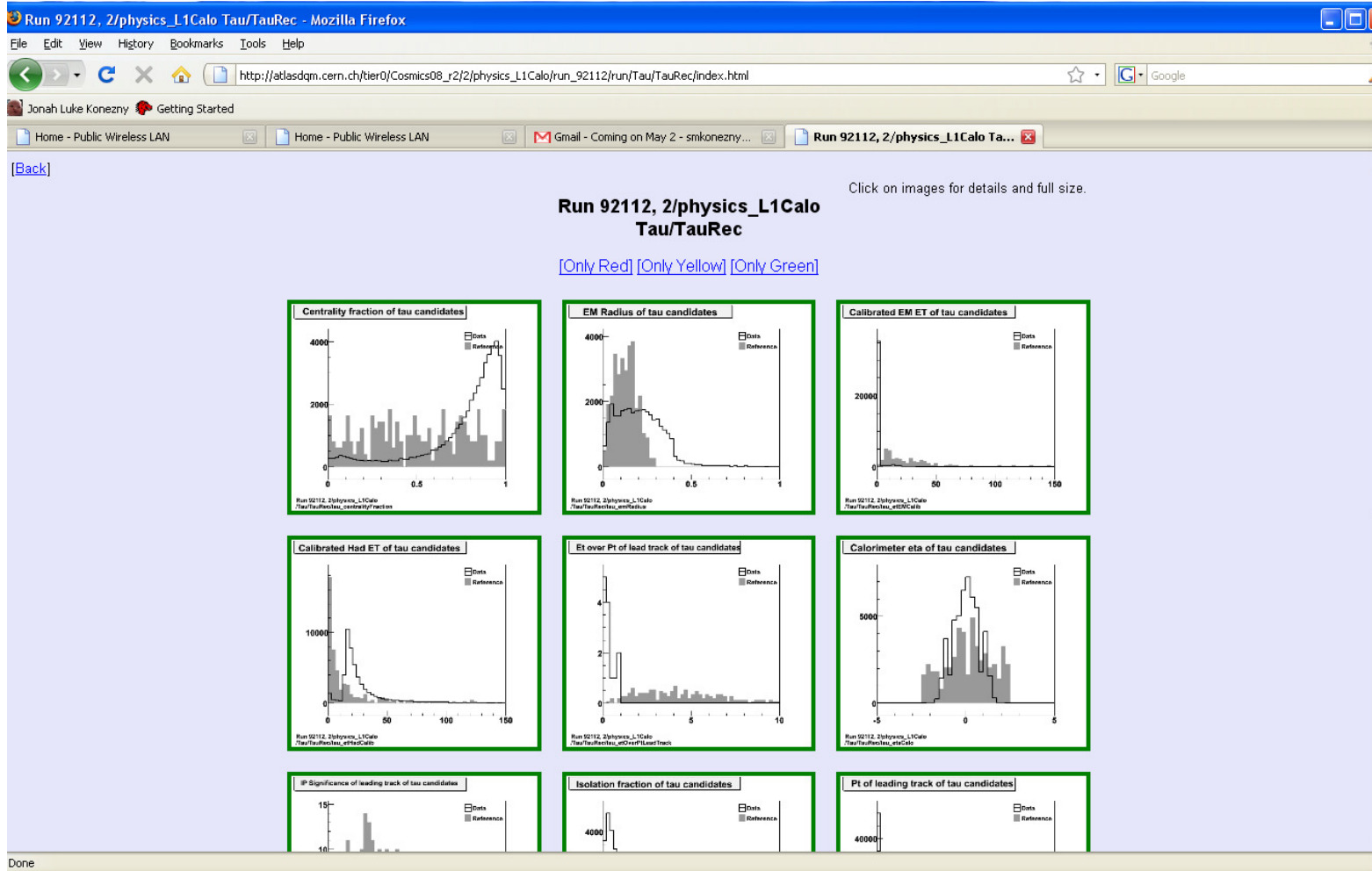
Run 92112, 2/physics_L1Calo
/Tau/Tau1P3P/tau1P3P_HighTRTHits

Number of Pixel Hits



Run 92112, 2/physics_L1Calo
/Tau/Tau1P3P/tau1P3P_PixelHits

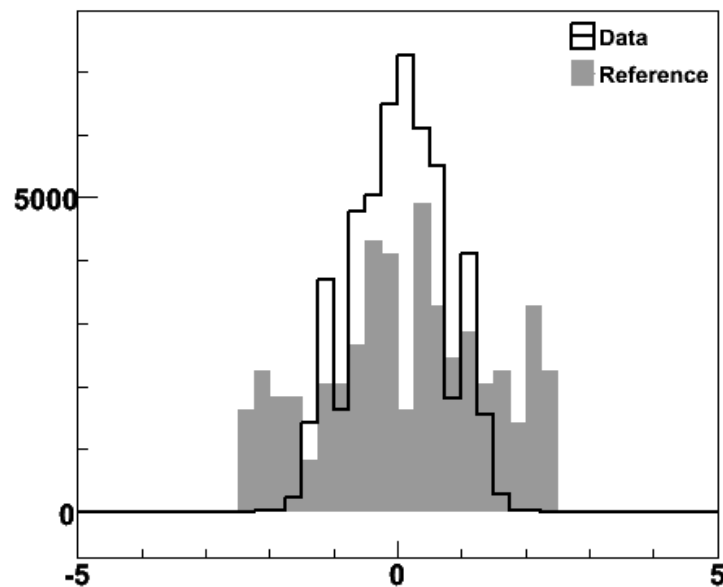
TauRec seeds



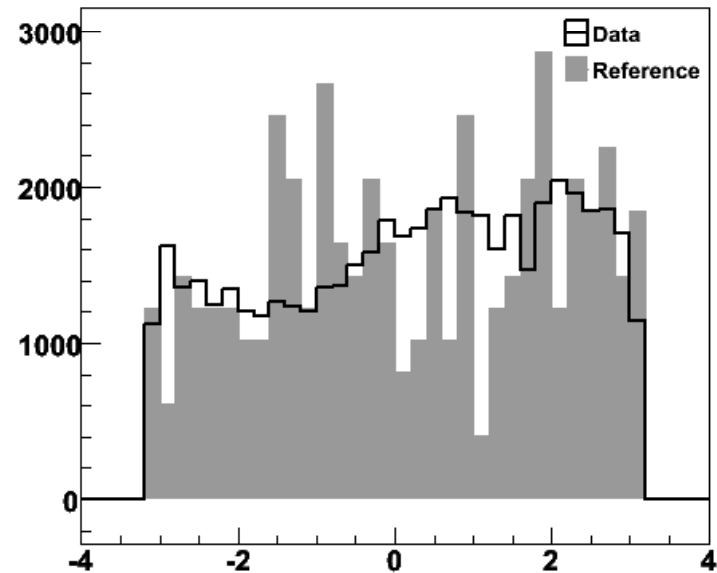
calo seeded taus

- 49,973 tau candidates reconstructed
- Expect ~ 2 Hz of L1 EM Calo triggers:
 - $(2 \text{ ev/second}) * (9 \text{ hours}) * (3600 \text{ seconds/hour}) = 64,800$ triggers

Calorimeter eta of tau candidates



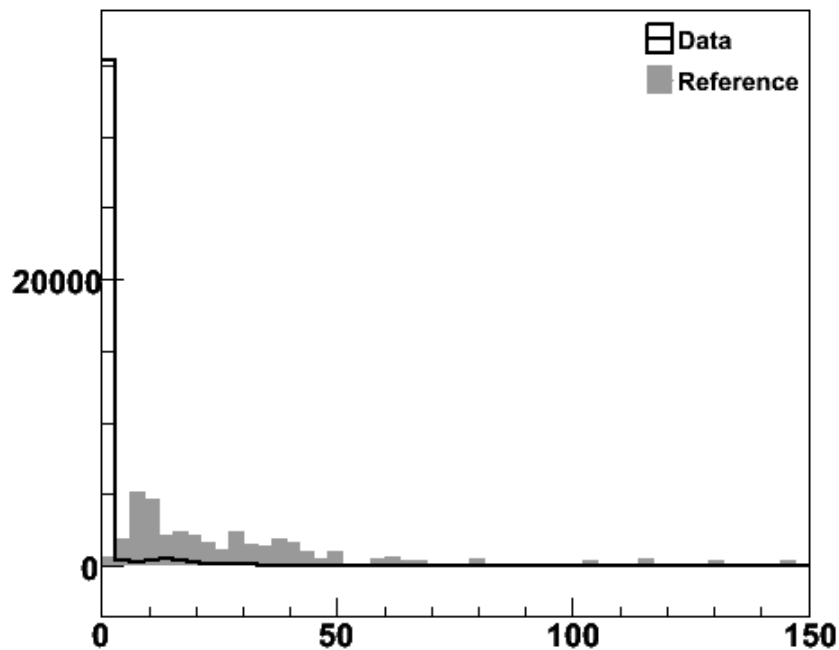
Calorimeter phi of tau candidates



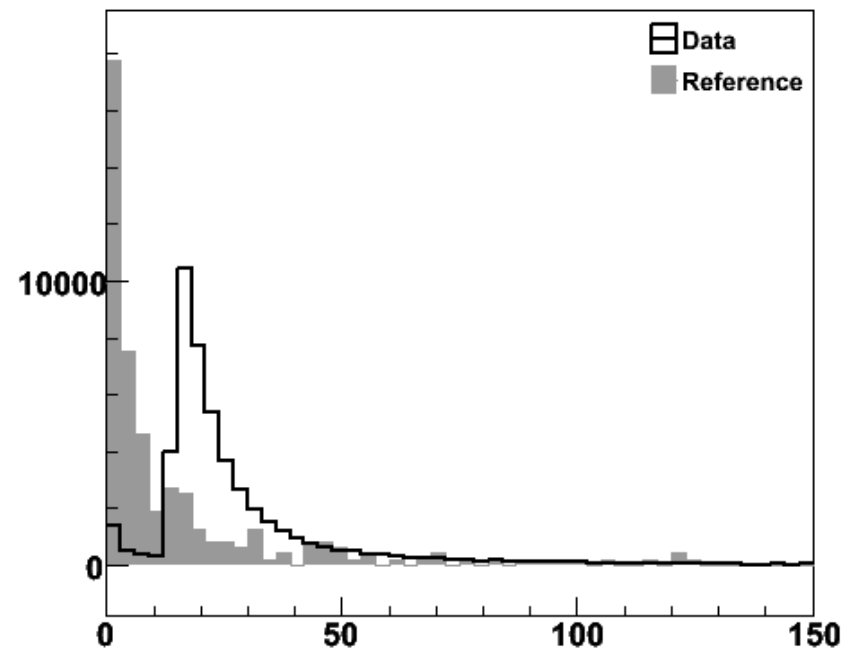
calo seeded taus

- See same double peak structure as shown in Mansoor's tau trigger DQ talk this morning

Calibrated EM ET of tau candidates

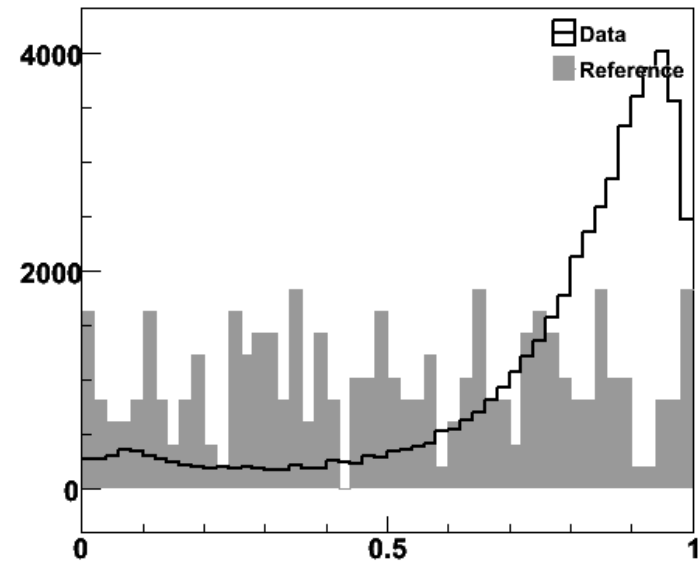


Calibrated Had ET of tau candidates

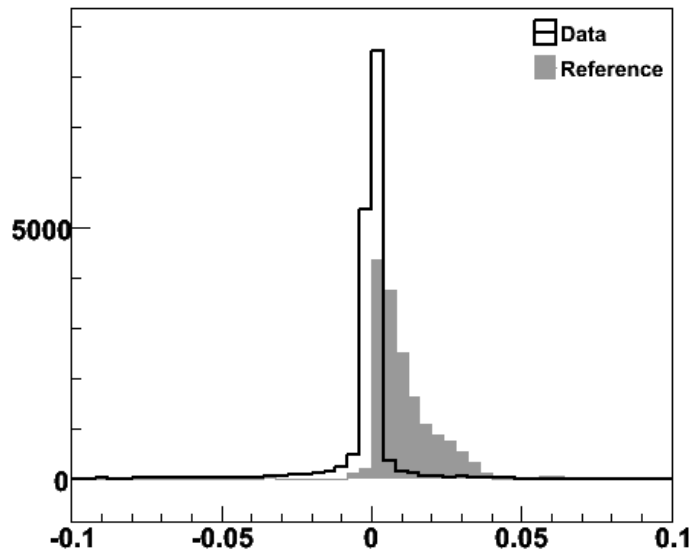


- References are from FDR2 simulation (mostly QCD) and have very different distributions in some variables.

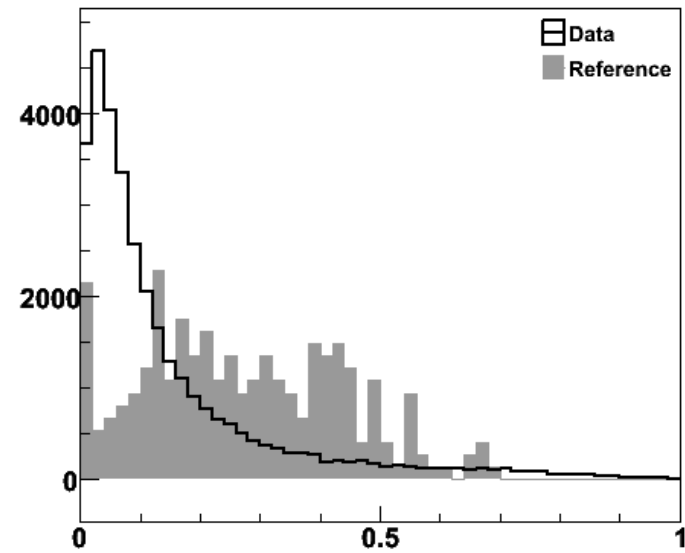
Centrality fraction of tau candidates



Strip Width of tau candidates



Isolation fraction of tau candidates



Commissioning Operations

- Detectors are making progress toward defining the meaning of their data quality flags, and next up is combined performance
- We are establishing procedures and exercising the tools needed to assess tau DQ on short timescales with information available after express stream processing at Tier0
- We have enough manpower for the cosmics combined running in the spring and summer, but could use a few more people beginning in the fall of 2009, so let us know if you are interested
- Even if you are not taking Data Quality shifts, you will have access to the histograms we produce on the web