Jet/MET/HLTCalo shift Report

Ricardo Gonçalo – LIP

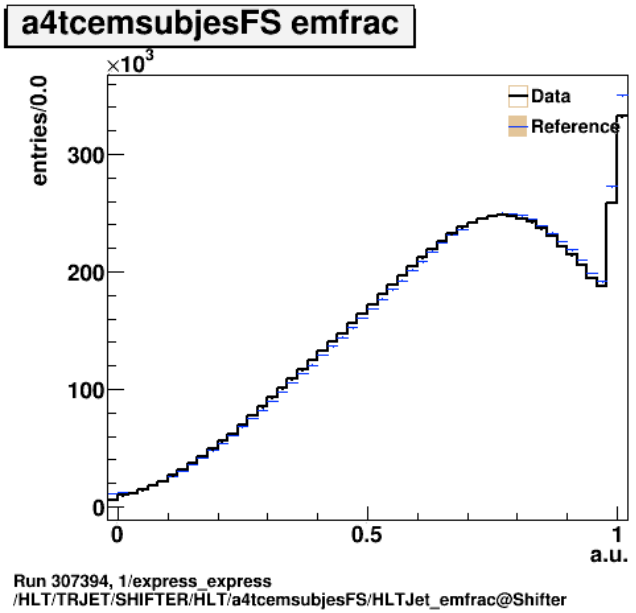
Jet and E_T^{miss} Trigger Meetings – 6/9/2016

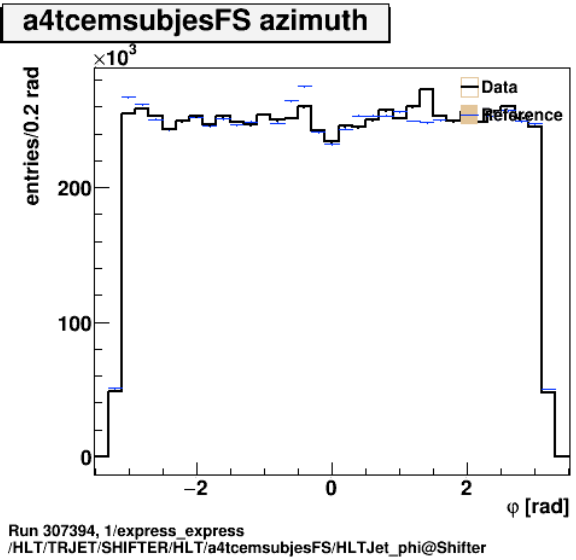
Run by Run DQ Summary

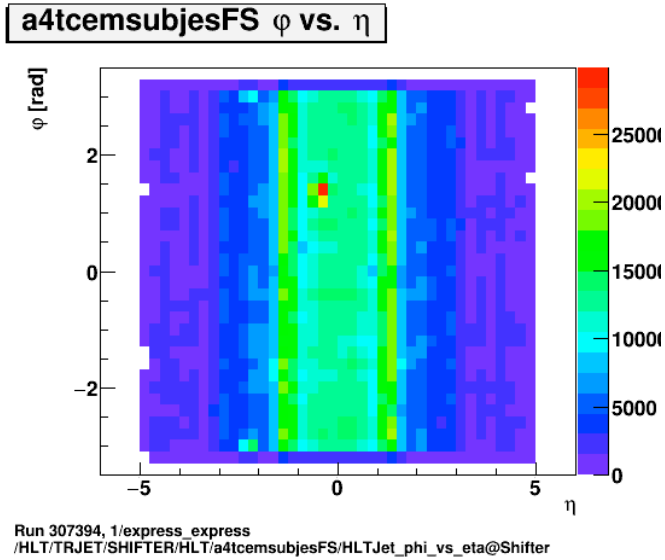
Run	Duration	Events	Lumi	Ended	Obs.
307394	1017.0m	57,723,356	0.38/fb	Mon 15:16	Low-E_T hotspot in jets η=-0.5/ϕ=1.5
307454	1433.0m	77,105,231	0.50/fb	Tue 19:22	Low-E_T hotspot in jets η=-0.5/ϕ=1.5
307514	731.2m	35,612,256	0.21/fb	Wed 08:54	Low-E_T hotspot in jets η=-0.5/ϕ=1.5
307539	250.6m	15,286,646	0.08/fb	Wed 14:19	Low-E_T hotspot in jets η=-0.5/ϕ=1.5
307569	907.5m	52,809,575	0.36/fb	Thu 06:45	Low-E_T hotsp. (η,ϕ)=(-0.5,0.5),(-2,-3)
307601	722.3m	47,578,917	0.32/fb	Thu 20:10	Low-E_T hotsp. (η,ϕ)=(-0.5,0.5),(-2,-3)
307619	249.4m	10,237,550	71.4/pb	Fri 03:31	Low-E_T hotsp. (η,ϕ)=(-0.5,0.5),(-2,-3)
307656	1316.4m	68,420,018	0.46/fb	Sat 08:48	Low-E_T hotspot (η,ϕ)= (-2,-3) MET hotspot (η,ϕ)=(2,2.5) from calo
307710	208.8m	12,757,663	0.08/fb	Sat 13:51	Low-E_T hotspot (η,ϕ)= (-2,-3)
307716	508.9m	32,764,641	0.23/fb	Sat 23:45	Low-E_T hotspot (η,ϕ)= (-2,-3)
307732	1551.8m	83,902,599	0.56/fb	Mon 02:57	Low-E_T hotspot (η,ϕ)= (-2,-3)

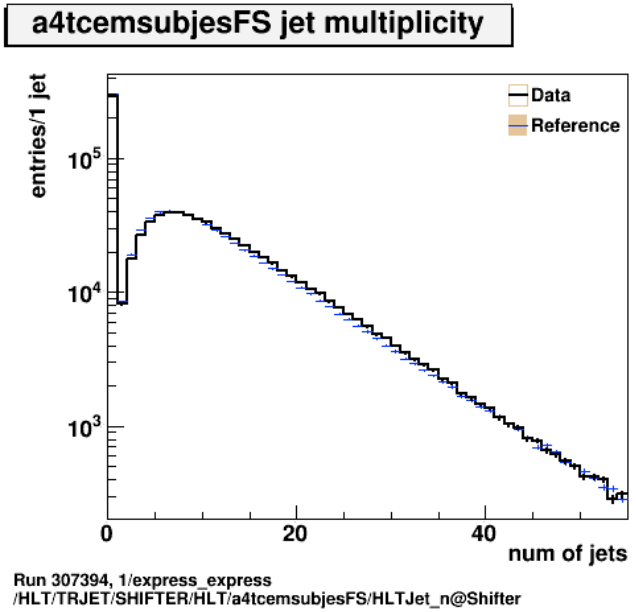
Jets: e.g. run 307394

- L1: ok
- a4tcemsubjesFS: mostly ok but is red
  - Due to hotspot at (eta,phi) = (-0.5,1.5)
    - Low p_T (can be seen in j25 but not j460)
  - Energy scale slightly different from reference; can be seen in EMfrac too
    - Most likely caused by the hotspot



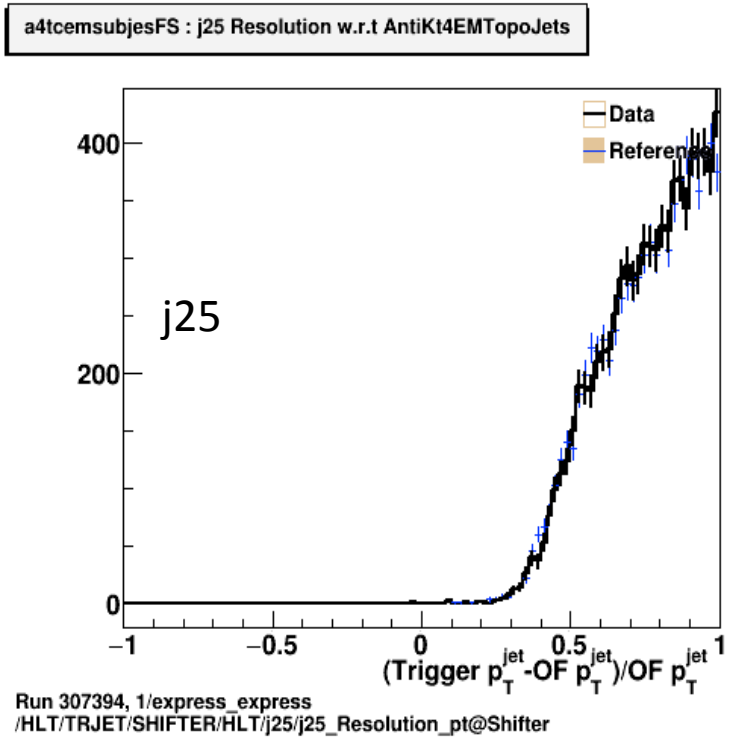


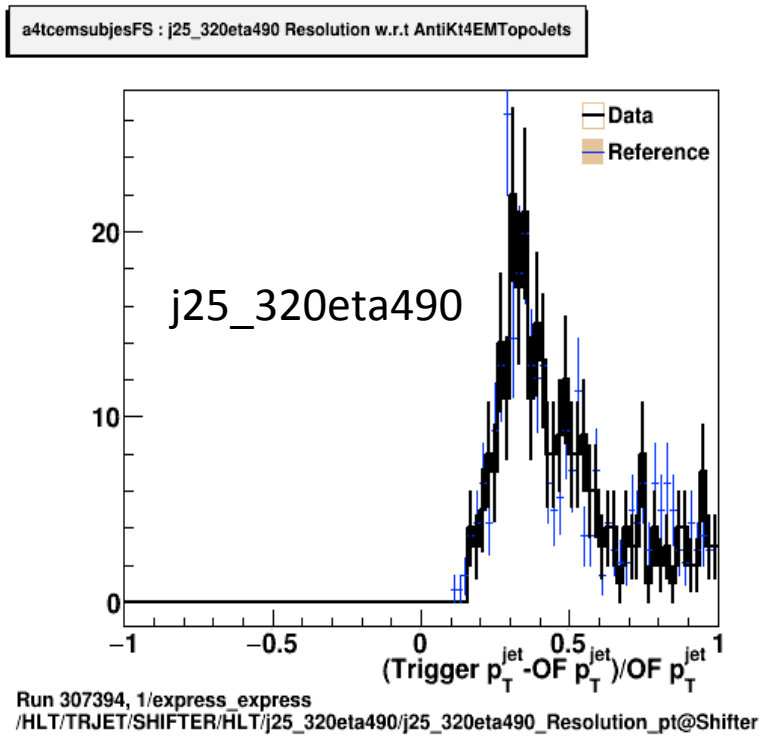




Jets: e.g. run 307394

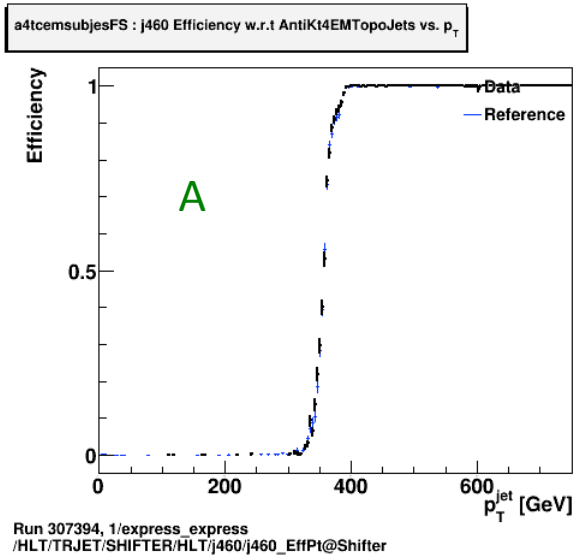
- j25: green
  - Online (pileup-subtracted + MCJES scale) vs offline (AntiKt4EMTopo, pileup-subtracted scale) p_T looks quite bad but agrees with reference
  - Caused by different online/offline calibrations: corrections from PU subtraction have large effect on low-E_T jets (high-E_T looks much better)
- j25_320eta490: green
  - Online vs offline p_T looks better than j25 due to higher jet energy

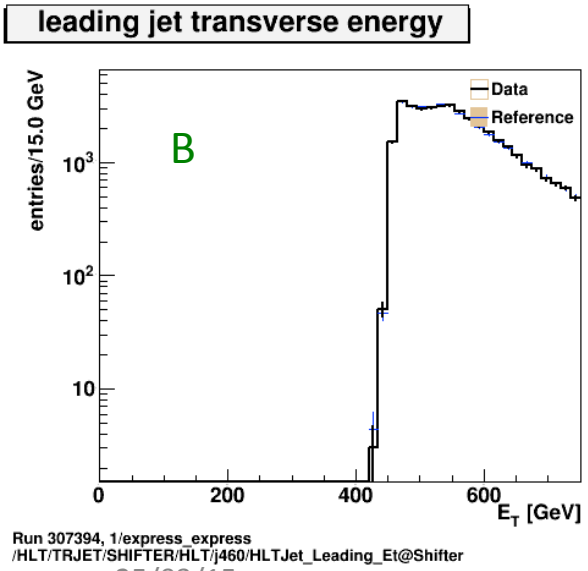


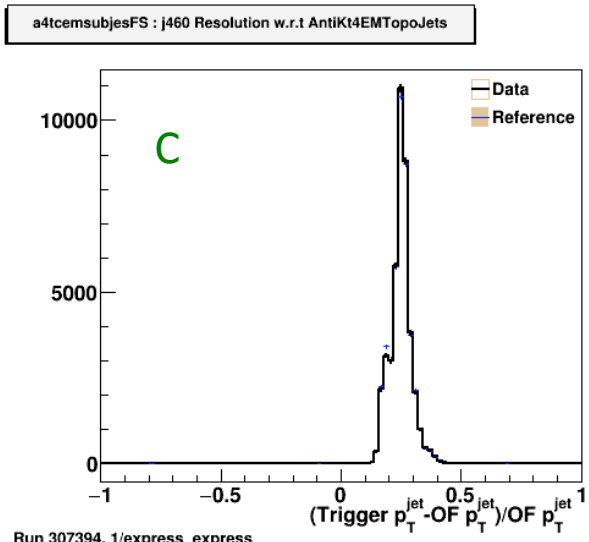


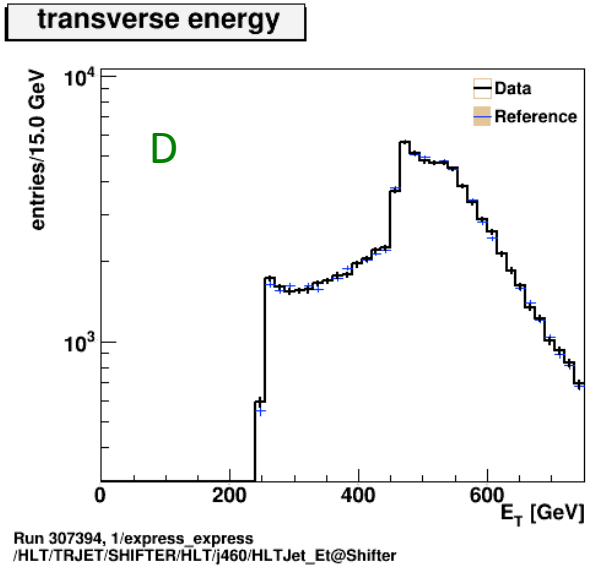
Jets: e.g. run 307394

- j460: green but shows a few surprising features
- Efficiency wrt offline starts at 350GeV:
  - Again difference comes from ≠ online/offline calibration
- In plot B:
  - First peak comes from j460_a10_lcw_sub_L1J100 (same rate in express stream as j460)
  - Second peak (at $E_T \approx 550$GeV) comes from j460 turning on fully
- Jet response (C) for j460: $E_T^{trig} \approx 1.25 \times E_T^{offl.}$
  - Again due to calibration differences
- Plot D has lower cut at 250 GeV applied by monitoring



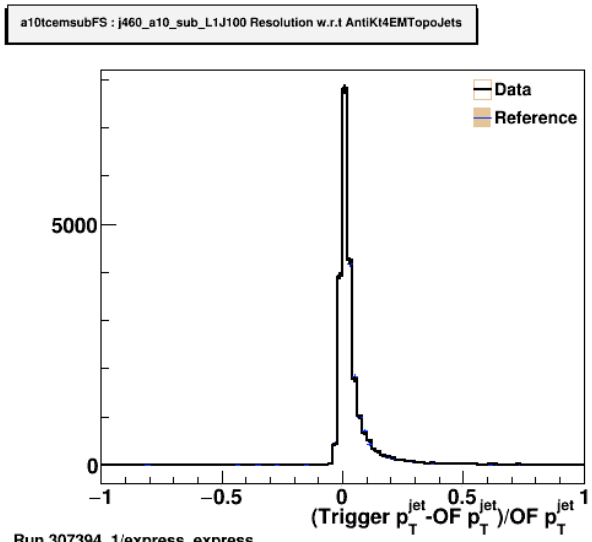


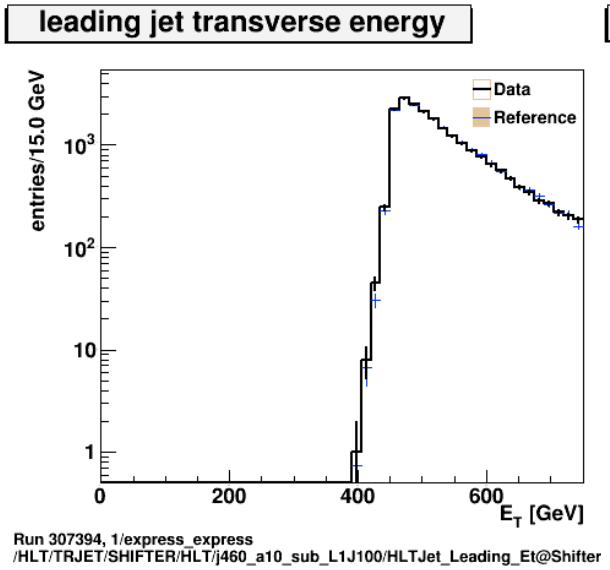


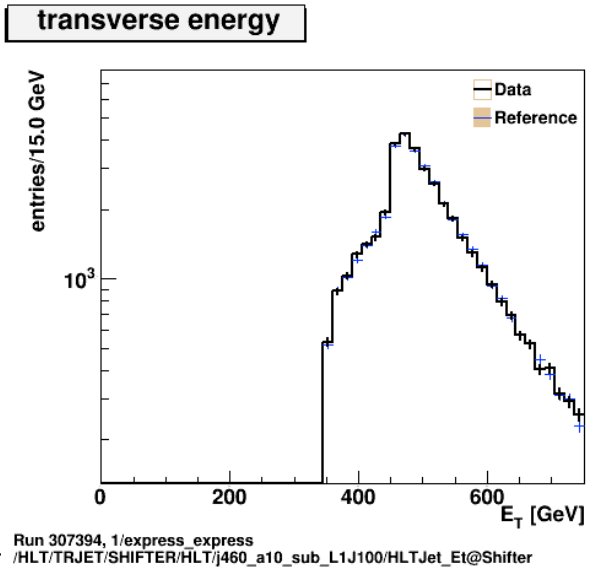


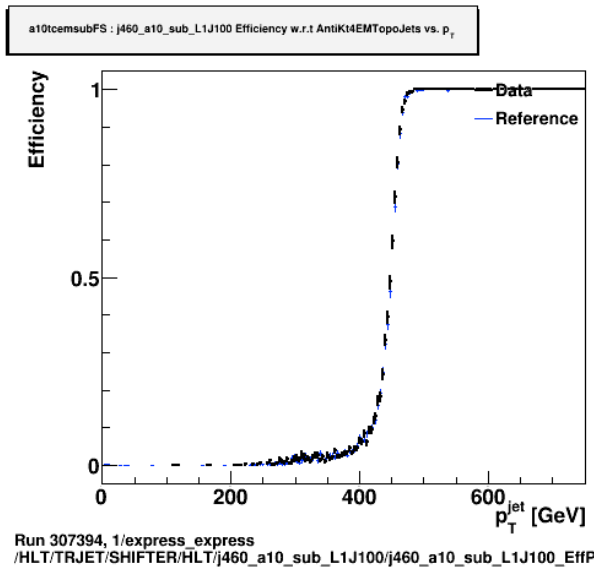
Jets: e.g. run 307394

- j460_a10_sub_L1J100: green
  - Much better jet response than j460
  - To be expected from larger jet radius and calibration more similar to offline



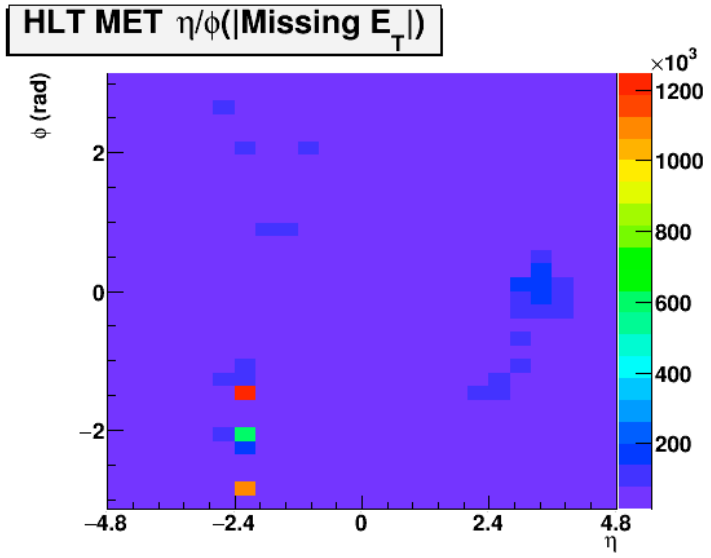


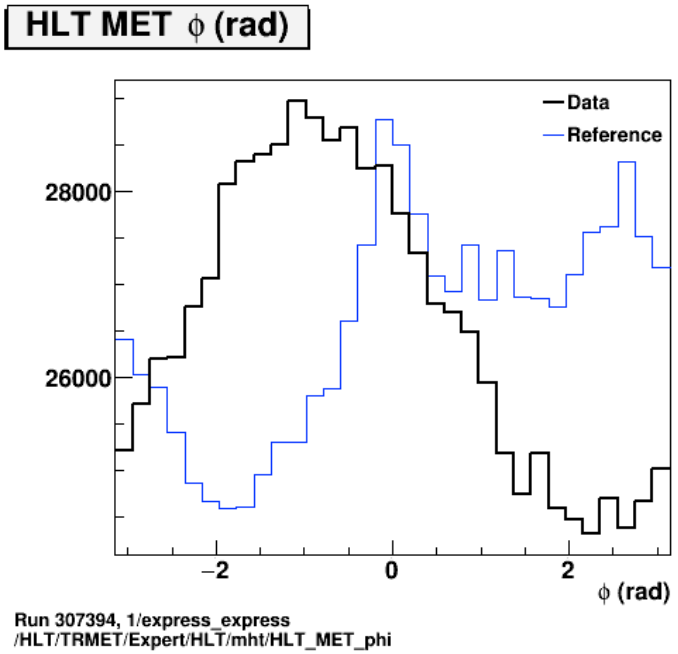




Missing E_T

- SHIFTER folder not totally up to date: data is mht and reference is tc_lcw
- Look here instead: TRMET/Expert/HLT/mht/
- The spikes on the left plot (ET-weighted eta/phi) are due to a few high-ET jets and not important for MET unless the MET eta/phi plot (HLT_MET_etaphi) has peaks
- The wiggle in the phi distribution moves around; the difference in the plot on the right is expected
- Thanks to Koji Hamano for this info!





Missing E_T

- Reminder:
  - New-ish task: fill rates spreadsheet for MET chains
- https://docs.google.com/spreadsheets/d/1XFmykacHZZLkzLPDkcxDy5Qu24DHXKcOZvdH0TDMxWo/edit#gid=0

MET trigger rates vs lumi

File Edit View Insert Format Data Tools Add-ons Help All changes saved in Drive

Comments

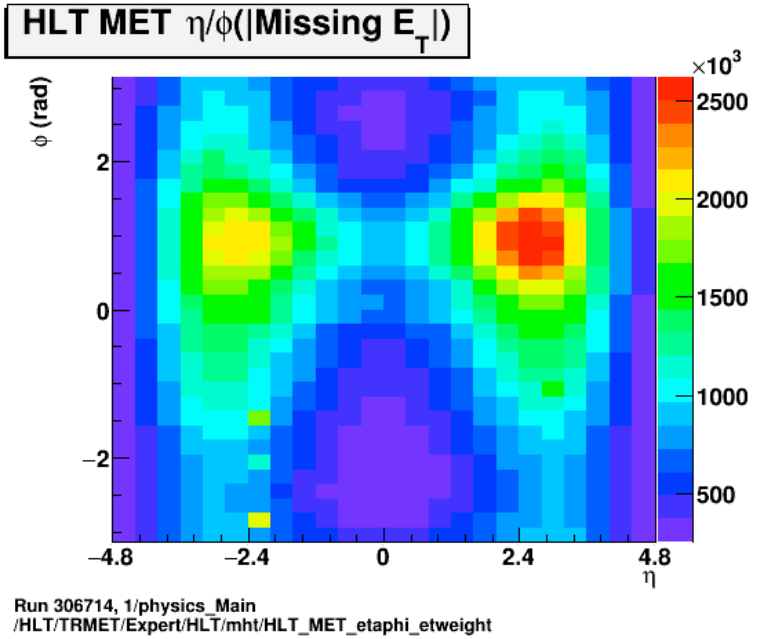
A	B	P	Q	R	S	T	U	V	W	X	Y	Z
				xe100_L1XE50 (cell)					HLT_xe110_mht_L1XE50			
Comment	**RUN**	*av. output*		*input rate (Hz)*	*frac pass (%)*	*output rate (Hz)*	*av. output rate (Hz) TRP*		*input rate (Hz)*	*frac pass (%)*	*output rate (Hz)*	*av. output rate (H*
	305811											
	305920											
cosmic run	306147											
	307394	-		1900	0.68	13	7.6		1930	3.3	65	26.7
	307454	-		5100	0.49	25	7.98		5100	5.1	260	40.1
	307514											
	307539			4850		23	17		4850		235	160
	307569			2500		18	8.9		2500		102	44
	307601			2500		26	12.3		5500		280	82
	307619			3900		19.5	15.5		3900		180	123.7
	307656			4500		27	9.4		4500		220	44.5
	307710			5500		31	18.8		5500		270	182
	307716			6400		30	15.7		6400		330	126
	307732			5600		24	8.2		5600		280	44.7

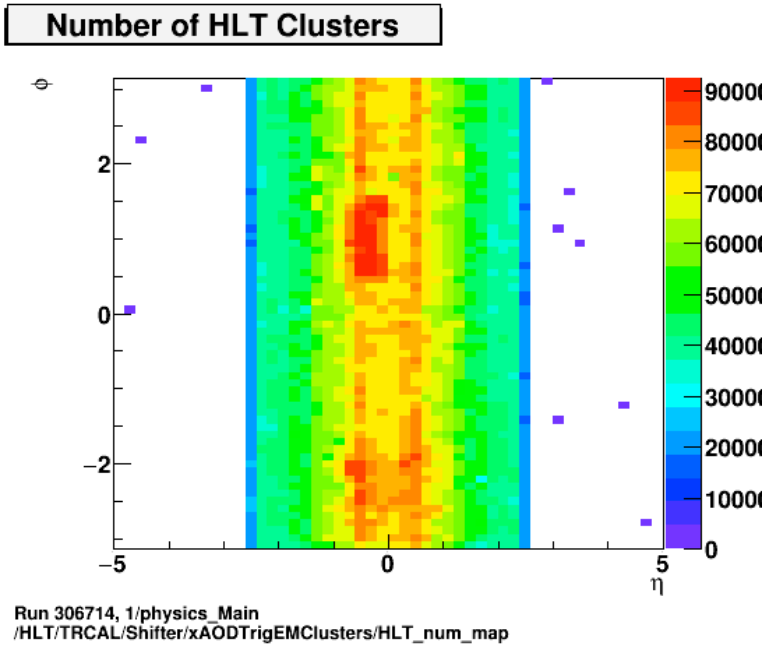
Old Runs Signed Off

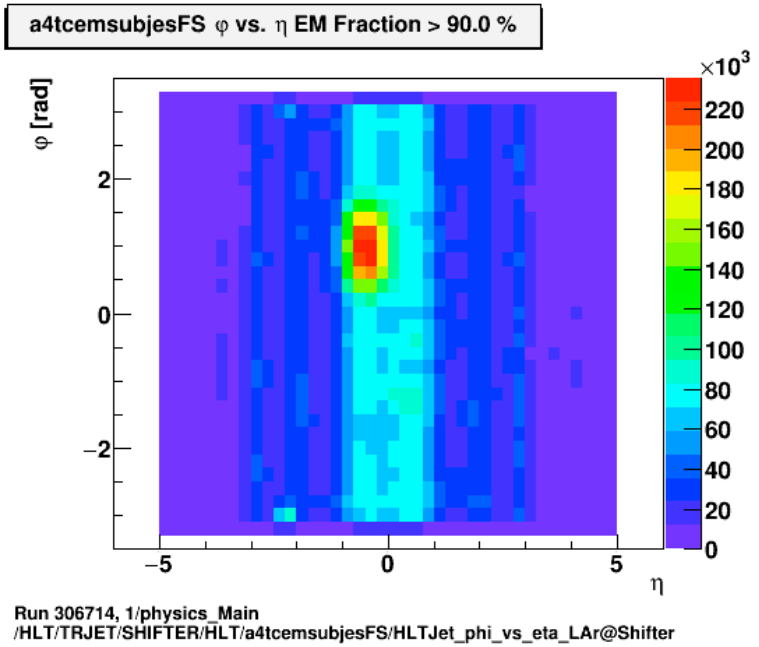
Run	Duration	Events	Lumi	Ended	Obs.
306384	849.1m	41,054,022	0.21/fb	Tue 10:30	Jet hotspot eta=-2/phi=-3 ATR-14862
306419	248.1m	15,227,462	0.09/fb	Tue 17:02	Jet hotspot eta=-2/phi=-3 ATR-14862
306442	402.8m	7,552,841	0.03/fb	Wed 1:03	Jet hotspot eta=-2/phi=-3 ATR-14862
306448	329.8m	15,729,431	0.11/fb	Wed 6:45	Jet hotspot eta=-2/phi=-3 ATR-14862
306451	890.6m	49,769,088	0.35/fb	Wed 22:27	Andy already signed off ATR-14866
306475	46.0m	682,376	0.01/fb	Thu 00:15	Andy already signed off ATR-14866
306499	238.5m	9,098,210	0.03/fb	Thu 06:57	Andy already signed off ATR-14866
306556	883.7m	14,483,931	0.09/fb	Fri 09:36	Jet hotspot eta=-2/phi=-3 ATR-14890
306655	287.1m	12,889,650	0.02/fb	Fri 21:22	Jet hotspot eta=-2/phi=-3 ATR-14890 Clear high-ET hotspots in j460 etc
306657	397.9m	16,188,800	0.01/fb	Sat 04:00	Looks ok; ATR-14890
306714	644.2m	26,250,676	0.15/fb	Sun 06:37	Hot area eta=-0.5/phi=1 ATR-14891

Run 306714

- Checked physics_Main
- Hot LAr region shows in calo, jet (only low ET) and met

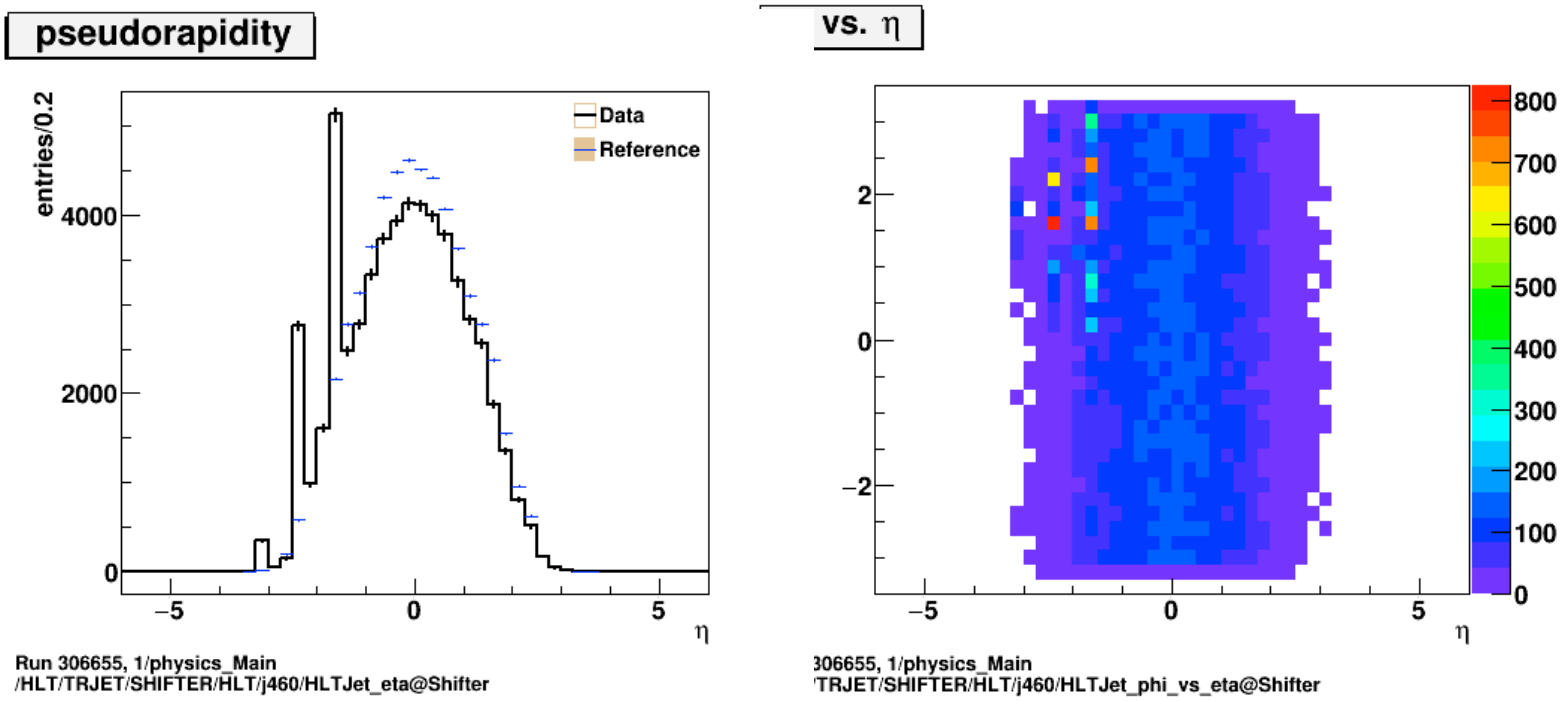






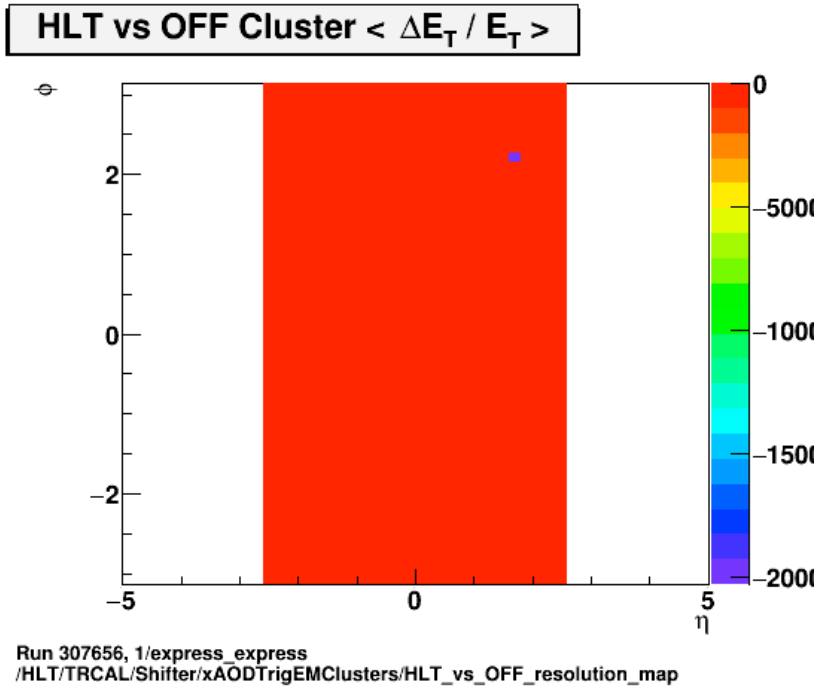
Run 306655

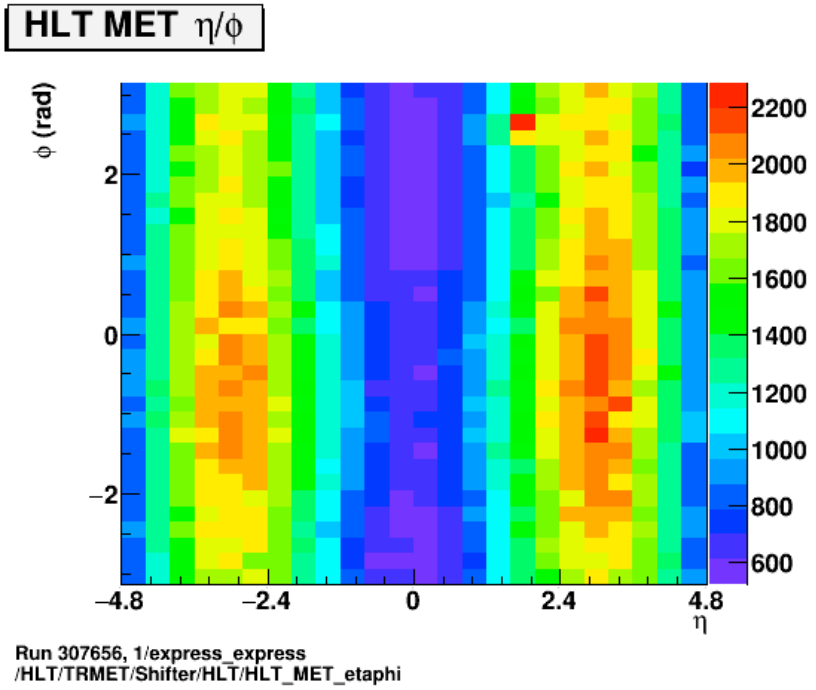
- Checked physics_Main
- High-ET hotspots affecting e.g. j460
- https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_306655/run/HLT/TRJET/SHIFTER/HLT/j460/HLTJet_phi_vs_eta@Shifter



Run 307656

- Calo problematic spot (miscalibration?) at (η,ϕ)= (2,2.5)
- Shows up as MET hotspot? (very localized!)
- https://atlasdqm.cern.ch/webdisplay/tier0/1/express_express/run_307656/run/HLT/TRCAL/Shifter/xAODTrigEMClusters/HLT_vs_OFF_resolution_map



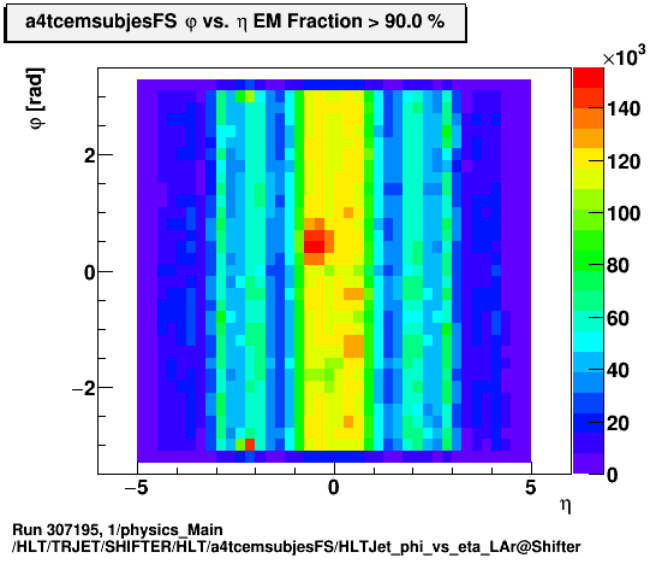


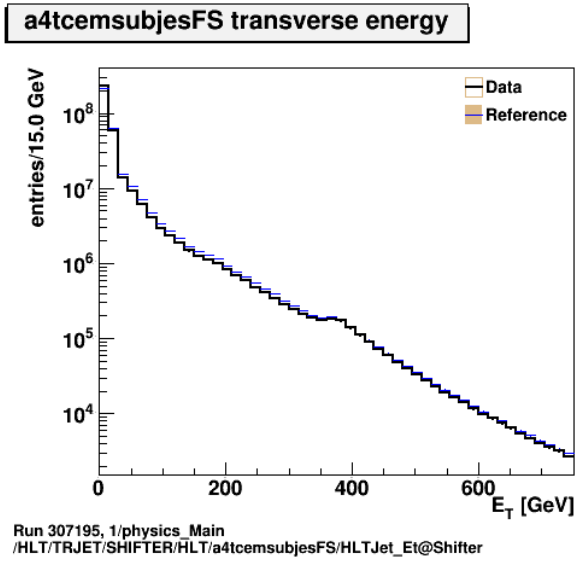
BULK signoffs

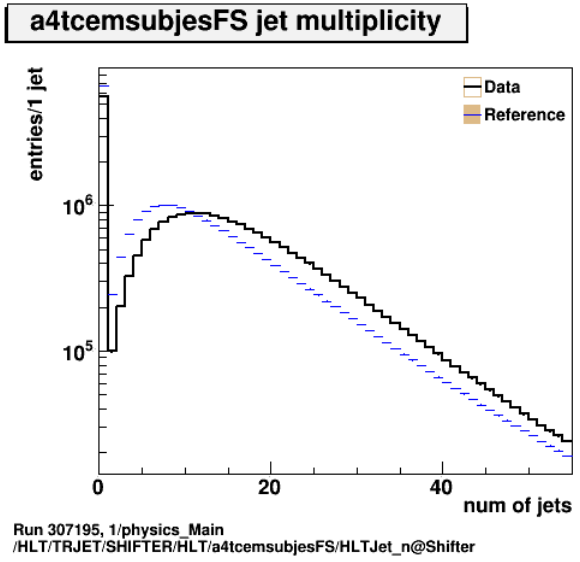
- 306147/f738_h161: all ok
- 307259 BULK:
  - Small hotspots in EM-like jets at eta/phi = -0.5/1.5 and -0.5/-0.5
- 307195 BULK:
  - Small hotspot in EM-like jets (LAr?) at eta/phi = -0.5/-0.5
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307195/run/HLT/TRJET/SHIFTER/HLT/a4tcemsubjesFS/HLTJet_phi_vs_eta_LAr@Shifter
  - jet energy scale different from reference (different calibration?). Can be seen in jet spectrum and number of trigger jets:
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307195/run/HLT/TRJET/SHIFTER/HLT/a4tcemsubjesFS/HLTJet_n@Shifter
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307195/run/HLT/TRJET/SHIFTER/HLT/a4tcemsubjesFS/HLTJet_Et@Shifter
    But doesn't seem to affect high-ET jets.
- 307126 BULK:
  - Small hotspot in EM-like jets (LAr?) at eta/phi = -0.5/-0.5
  - Same jet energy scale difference from reference as above. Can be seen in jet spectrum, number of trigger jets, etc.
  - Effect of trigger jet calibration can be seen in MET trigger, e.g.:
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307126/run/HLT/TRMET/Expert/HLT/mht/HLT_SumEt
- 307124 BULK:
  - Small hotspot in EM-like jets (LAr?) at eta/phi = -0.5/-0.5
  - Same jet energy scale difference from reference as above. Can be seen in jet spectrum, number of trigger jets, etc.
  - 2-3 hotspots probably in Tile (don't match EM-like jets) at around eta=-0.5 positive phi
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307124/run/HLT/TRJET/SHIFTER/HLT/a4tcemsubjesFS/HLTJet_phi_vs_eta@Shifter
    Can be seen also in EMfrac and jet multiplicity:
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307124/run/HLT/TRJET/SHIFTER/HLT/a4tcemsubjesFS/HLTJet_emfrac@Shifter
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307124/run/HLT/TRJET/SHIFTER/HLT/a4tcemsubjesFS/HLTJet_n@Shifter
    But no visible effect in higher ET jets (j60 and above)
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307124/run/HLT/TRJET/EXPERT/HLT/j60/HLTJet_phi_vs_eta
  - hot region in MET:
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307124/run/HLT/TRMET/Shifter/HLT/HLT_MET_etaphi
    https://atlasdqm.cern.ch/webdisplay/tier0/1/physics_Main/run_307124/run/HLT/TRMET/Shifter/HLT/HLT_MET_etaphi_etweight

BULK signoffs for DQ meeting (1/3)

- Meeting on 31 Aug.: https://indico.cern.ch/event/566266/
- Cosmics run 306147/f738_h161 – to be used as new cosmics reference: all ok
- 307195 BULK:
  - Small hotspot in EM-like jets (LAr?) at eta/phi = -0.5/-0.5
  - jet spectrum different from reference
  - Change in calibration? Or simply from hotspot?)
  - Can be seen in jet spectrum and number of trigger jets but doesn't affect high-E_T jets

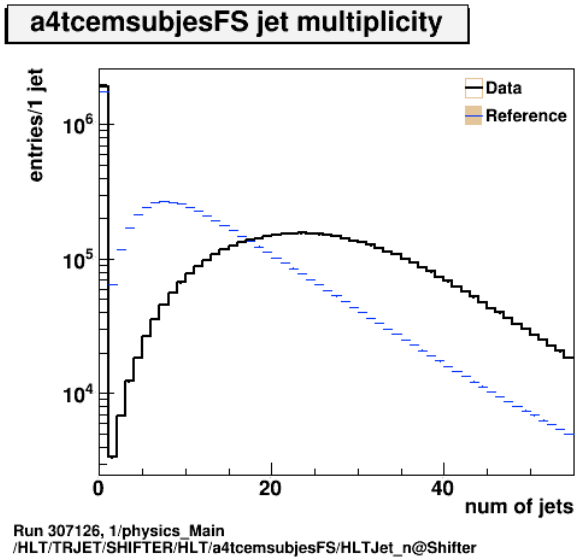


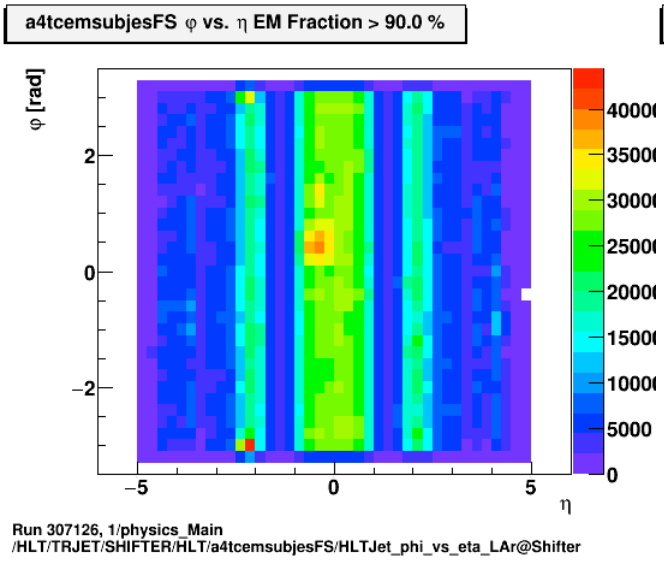


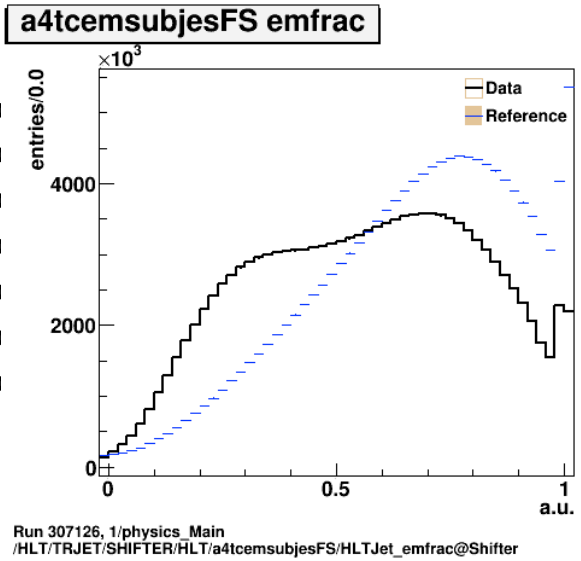


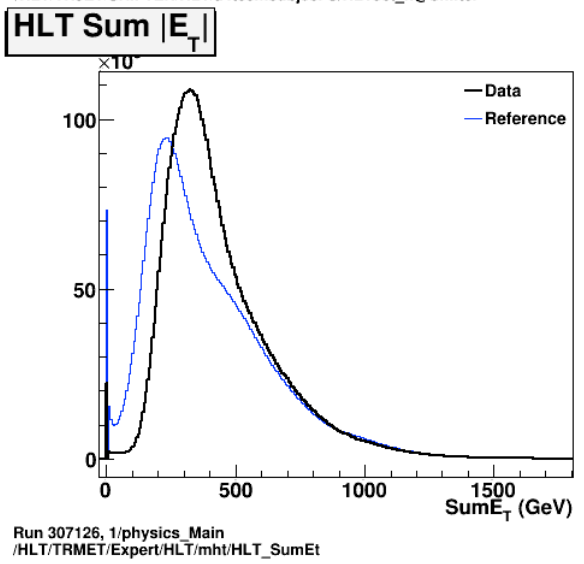
BULK signoffs for DQ meeting (2/3)

- 307126 BULK:
  - Small hotspot in EM-like jets (LAr?) at eta/phi = -0.5/-0.5
  - Same jet energy scale difference from reference as above. Can be seen in jet spectrum, number of trigger jets, etc.
  - Effect of trigger jet calibration visible in MET trigger (mht)?









Reprocessings

- For DQ meeting of 31 Aug.:
  - Checked BULK of runs: 307124 307126 307195 307259
  - Checked BULK of reprocessed cosmic run 306147 with the tags f738-h161
  - Will become reference for cosmics this year.

- ATR-14910:
  - Checked Enhanced Bias run 307126 to validate CAFHLT,20.11.0.25.2

- Ongoing:
  - ATR-14940: Repro of EB 302956 with CAFHLT,20.11.1.3.1, atlas-r2-2015-04-00-00 used in the HLT step
  - ATR-14941: Repro with AtlasCAFHLT,20.11.1.3.1 Physics_pp_v6 tightperf, AtlasProduction,20.7.7.5
  - Rate comparison could be made easier… instructions need checking/reviewing
  - BULK signoffs for 7th September DQ meeting: ATR-14979
    - https://its.cern.ch/jira/browse/ATR-14979

Bonus slides