

Offline Tracker DQM Shift Tutorial

Tracker Shifts Overview

- **Online Shifts at P5** (3/day for 24 hours coverage)
 - One Pixel shifter and one SiStrip shifter for 8h shifts
 - One Pixel shift leader and one SiStrip shift leader covering an entire week
- **Offline Shifts** (CMS CENTRE and at FNAL ROC)
 - One combined Pixel + SiStrip shifter for a CERN day shift and **one remote for a FNAL day shift**
 - One Pixel + SiStrip shift leader at CMS-Center covering an entire week
- A shifter can do either 3 weeks online shifts, or 2 weeks online + 1 week offline (5 days/week)
- Before first shift: make sure to share an overlap shift with previous shifter!
- DQM expert on-call at CERN
- Daily short planning meetings between P5 and CMS-CEN
- Monday commissioning meetings

Summary of Shifter Tasks for DQM

- P5 shifter will watch online DQM GUI (central and expert), as well as TrackerMap
 - Checks pre-defined set of plots in central online GUI and TrackerMap, uses expert GUI for debugging of problems
 - Has help of DQM on-call expert
 - Communicates with online and offline shift leaders
- Offline shifter tasks:
 - Use central DQM offline GUI to:
 - Checks a pre-defined set of plots
 - Checks results of automated data certification (good run flags). In case of bad runs, tries to understand the reason.
 - Runs root macro (either once per shift or per week, tbd.) to fill trend plots from CondDB (historical DQM info)
 - Maybe additional work flows from calibrations group
 - Communicates with offline shift leader
- Overlap with central shifters avoided as much as possible. Expert shifters need to be able to respond quickly to questions by central shifters!

Main tool: central DQM GUI

- <https://cmsweb.cern.ch/dqm/tier-0>
- **'Workspace'**: choose *Everything*
- **'Dataset'**: choose applicable dataset name, ask shift leader
- **'Run'**: choose the run number to investigate, start off where previous shifter has stopped
- **'00 Shift'**: layouts for central shifter, basic plots
- **'Pixel & SiStrip – Quick Collection'**: layouts for Tracker shifters, more detailed. Always check!
- **'Pixel & SiStrip – Detector folders'**: navigate these to debug problems.

Central GUI snapshot: start page

CERN Tier-0 - Summary - CMS data quality - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://cmsweb.cern.ch/dqm/tier-0/session/wXx6TH

Most Visited Latest Headlines DQM CERN CODE Personal INDICO BabelFish Higgs Shiftlist

CMS data quality DQM service CERN Tier-0: Run 98'534 . LS 8 . Event 40'474'152 . Workspace Summary, Page 1 / 1

Subsystem	Summary	Run	Lumi section	Event	Last update	Last event	Processed events	Event rate	Monitor elements
CSC	No DAQ	undefined	undefined	undefined	(Never)	(Never)	undefined	-	419
DT	100.0%	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	1441
EcalBarrel	97.8%	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	2265
EcalEndcap	67.8%	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	1093
FED	80.6%	undefined	undefined	undefined	(Never)	(Never)	undefined	-	16
HLTOffline	100.0%	0	0	0	(Never)	(Never)	0	-1	31915
Hcal	89.3%	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	450
L1T	94.1%	undefined	undefined	undefined	(Never)	(Never)	undefined	-	1747
Muons	11.1%	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	21704
Pixel	100.0%	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	14661
RPC	100.0%	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	35
SiStrip	No DAQ	98534	8	40474152	Fri 19:42:56	Fri 17:30:40	8123	1.73	1111

Info on all sub systems

Pixel Part	Status
Pixel_Barrel	100%
Pixel_Endcap	100%
Pixel_HalfCylinder_mI	100%

Pixel Summary Map



Please file any feature requests and any bugs you find in [Savannah](#). Find [shift instructions here](#).

IGUANA DQM GUI @ vocms34.cern.ch; Jun 11, 2009 at 17:02:34 UTC; session is modifiable

start Inbox for Petra.Mer... DQMSTagCollector... CERN Tier-0 - Summ... Microsoft Office Pict... TrackerDQMMeetings Microsoft PowerPoin... 1:02 PM

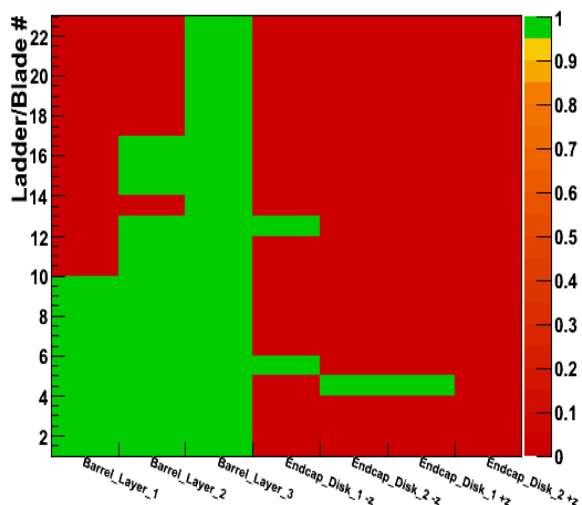
The monitorables – Pixels

Data corruption

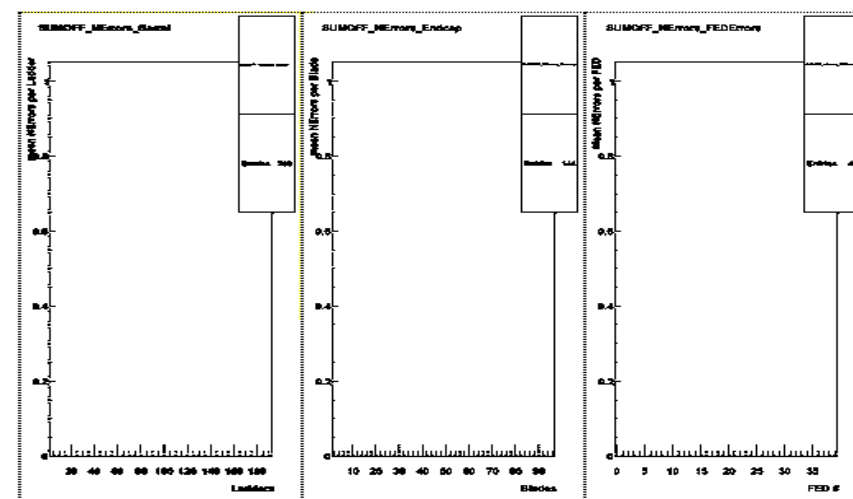
- Errors from FEDs and data unpacking (raw2digi) → NErrors plotted for each FED crate/Ladder/Blade
- ReportSummaryMap on front page shows modules with errors at a glance.
- Summary plots **should be empty**. If not, error codes give more information (linked from shift instructions)

Pixel Part	Status
Pixel_Barrel	100%
Pixel_Endcap	100%
Pixel_HalfCylinder_mI	100%
Pixel_HalfCylinder_mO	100%
Pixel_HalfCylinder_pI	100%
Pixel_HalfCylinder_pO	100%
Pixel_Shell_mI	100%
Pixel_Shell_mO	100%
Pixel_Shell_pI	100%
Pixel_Shell_pO	100%

Pixel Summary Map



00 - Pixel_ERROR_Summary



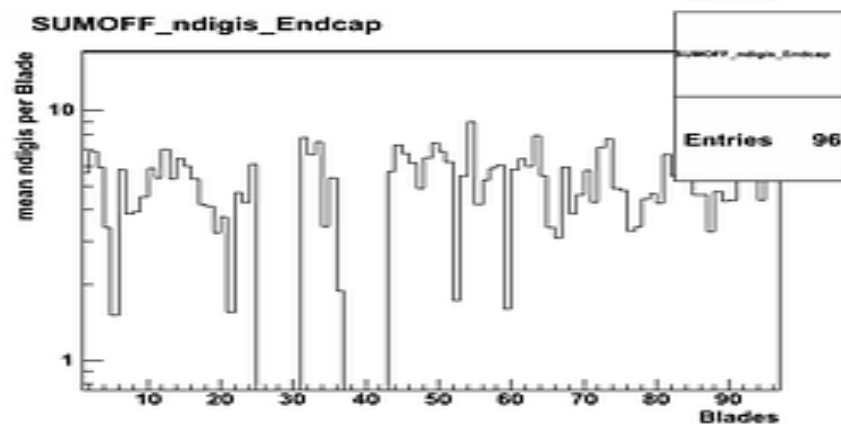
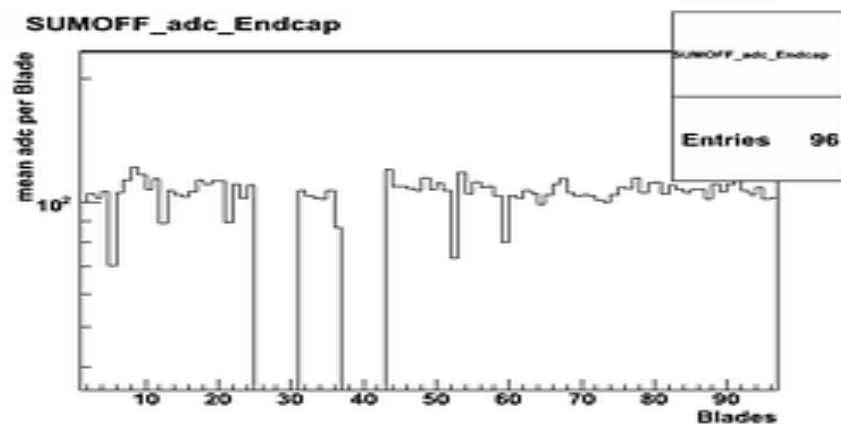
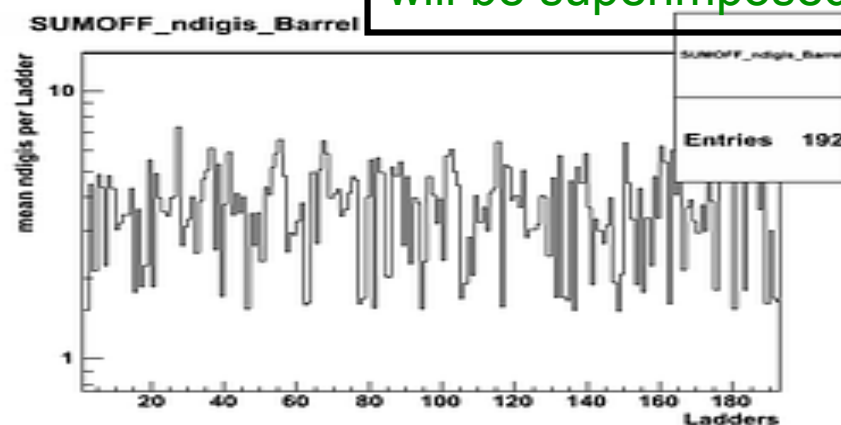
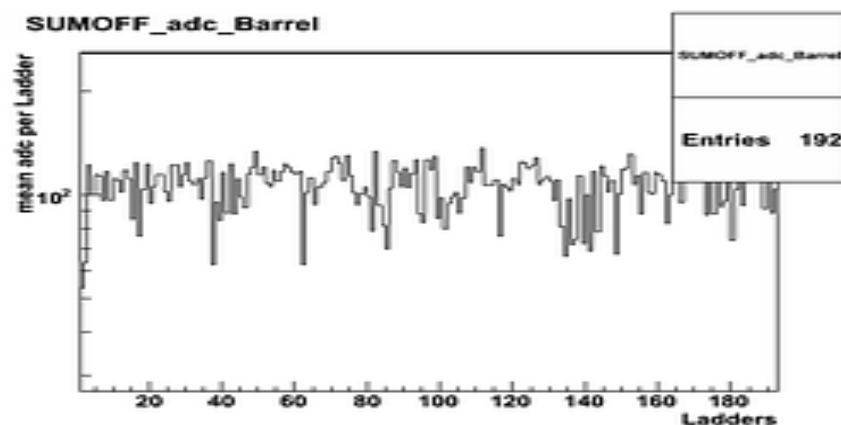
The monitorables – Pixels

Raw charge

- Digis → uncalibrated single pixel charge, amount, occupancy and location

Results from QTests
and/or reference plots
will be superimposed

01 - Pixel_DIGI_Summary

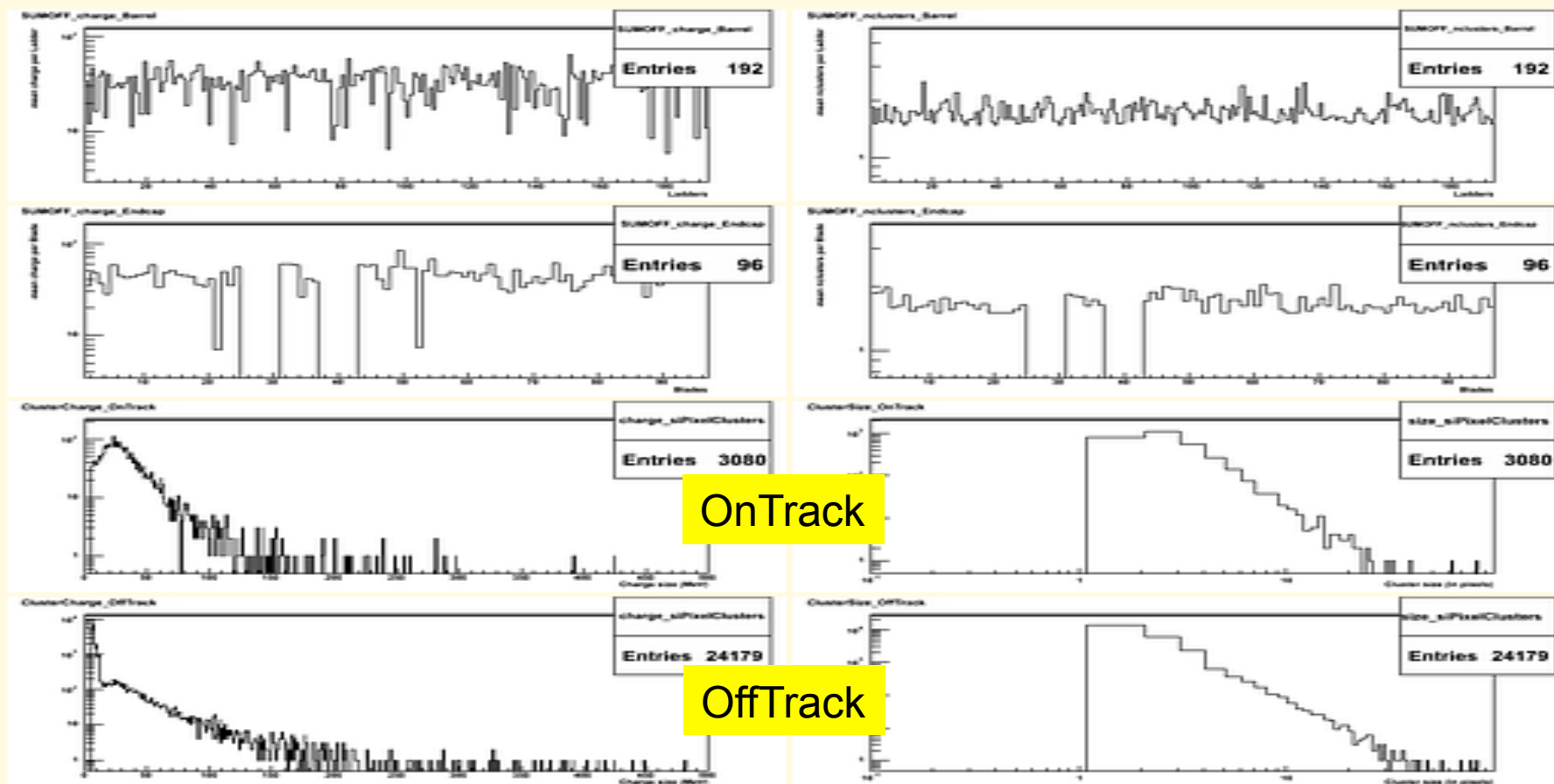


The monitorables – Pixels

Clusters

- Clusters → gain calibrated and clustered charge deposits. amount. size. occupancy. location

02 - Pixel_CLUSTER_Summary



The monitorables – Pixels

Reconstructed Hits

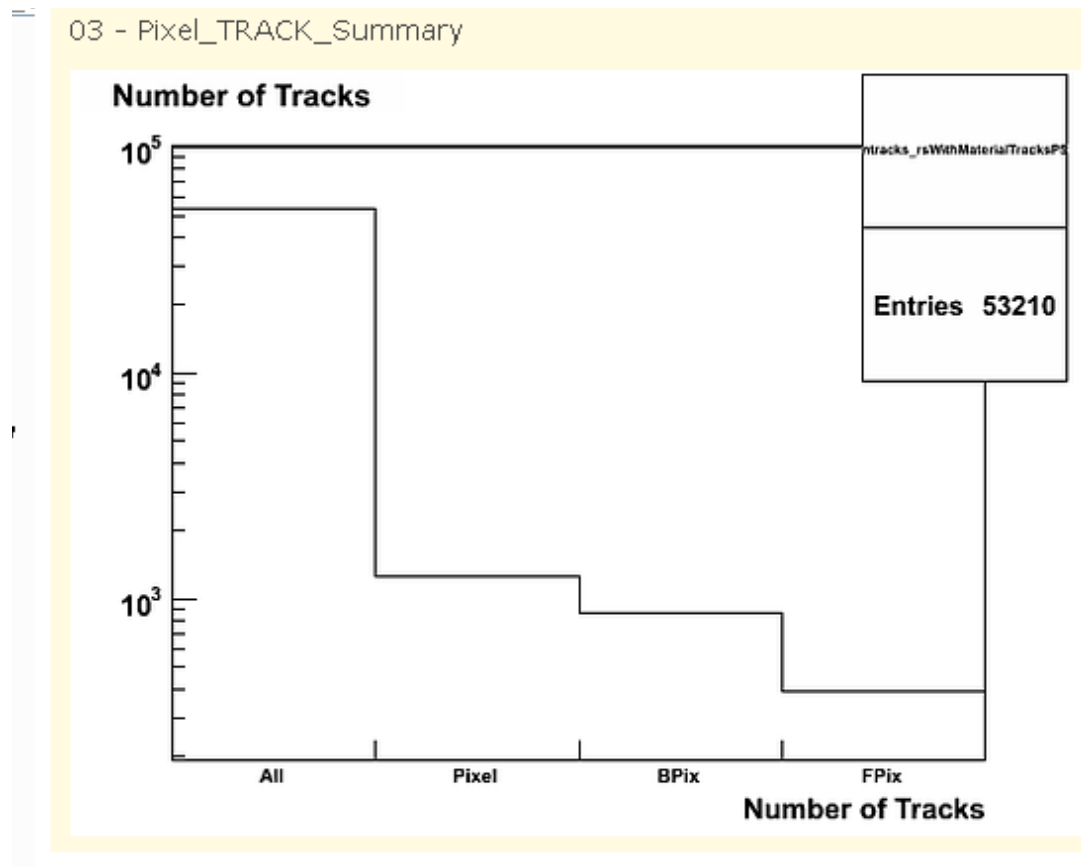
- RecHits → Lorentz angle corrected, weighted hits, occupancy and errors

Sorry, don't have example plots at the moment.

The monitorables – Pixels

Tracks

- Tracks → combined SiStrip + Pixel tracks, hit residuals and OnTrack/OffTrack cluster info, track multiplicities



The monitorables – SiStrips

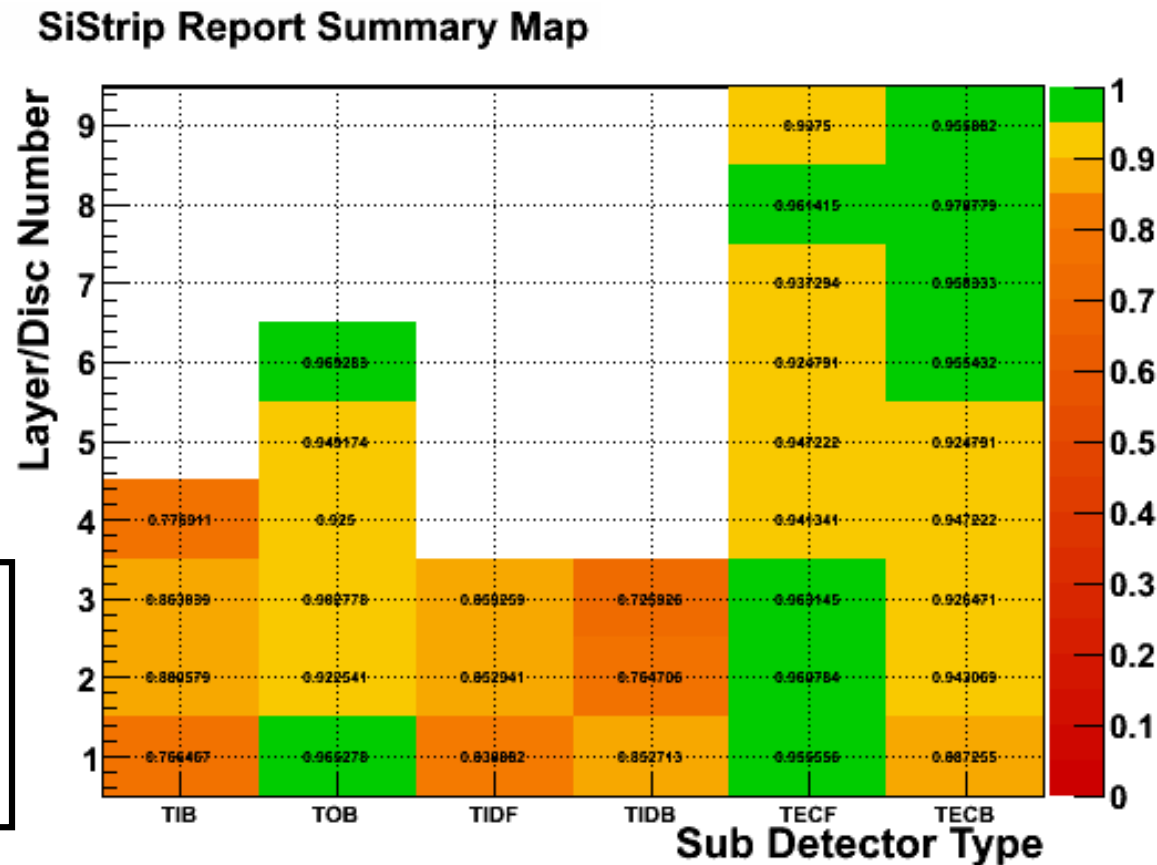
ReportSummaryMaps

- Overview maps reflecting input for data certification

SiStrip	91.4%	72169	7	1003362	Apr 2, 23:12:00	Nov 21, 06:46:08	1168	0.41	1112
-------------------------	-------	-------	---	---------	-----------------	------------------	------	------	------

SiStrip Part	Status
SiStrip_TECB	94%
SiStrip_TECF	95%
SiStrip_TIB	82%
SiStrip_TIDB	78%
SiStrip_TIDF	85%
SiStrip_TOB	94%

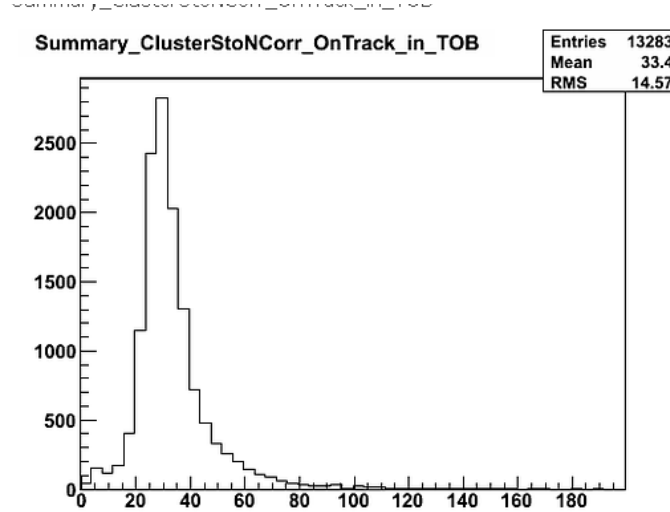
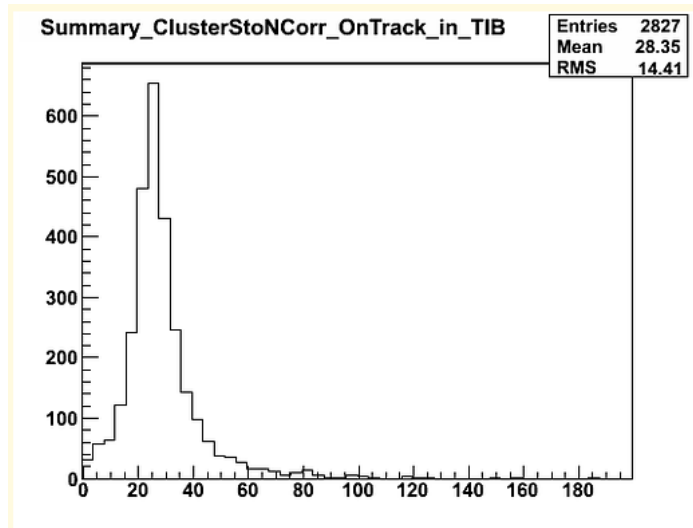
Two additional maps detailing S/N quality and fraction of modules with errors.



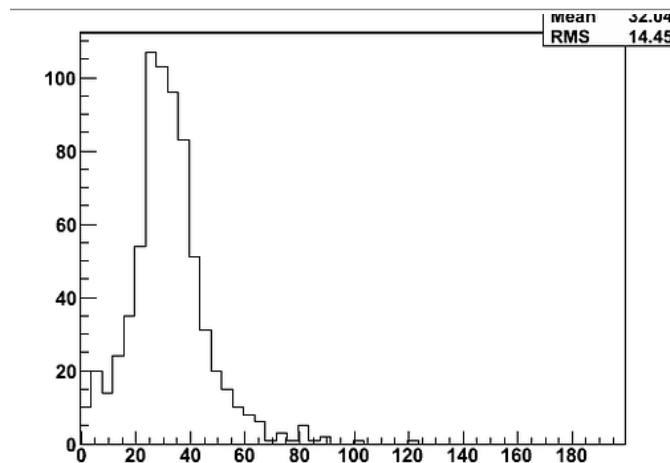
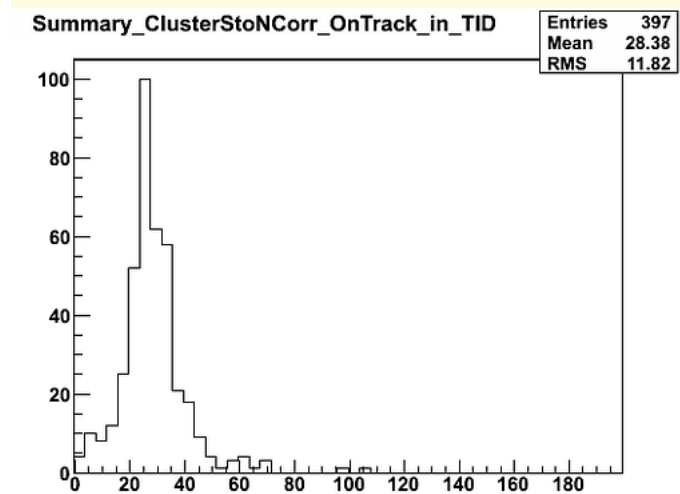
The monitorables – SiStrips

S/N

- Signal-to-Noise for clusters on tracks, for TIB/TOB/TID/TEC

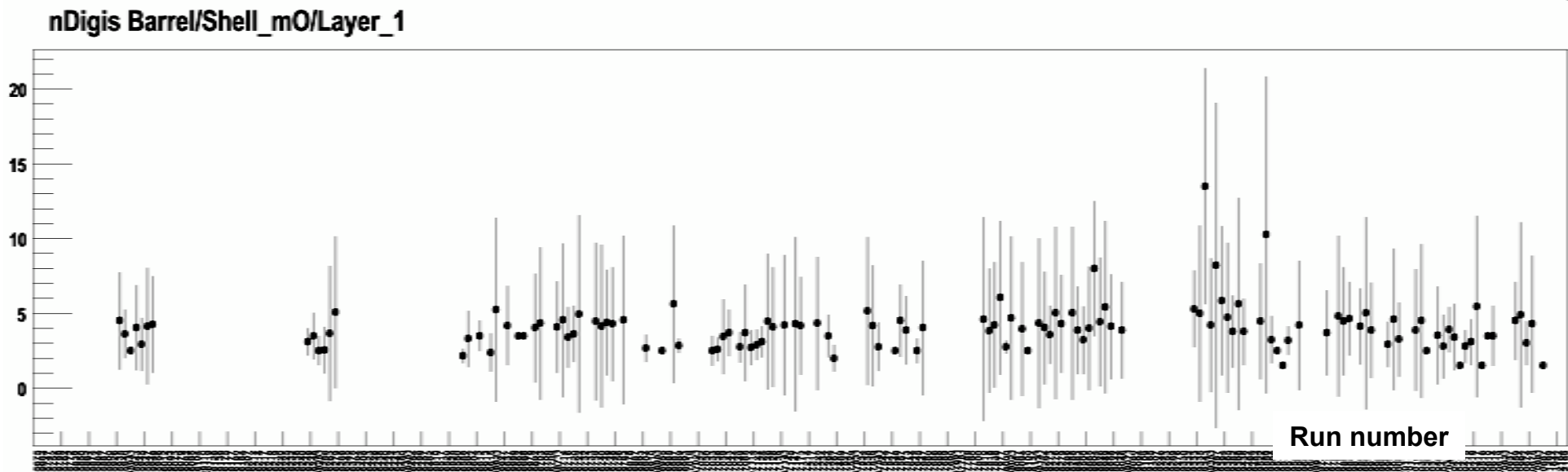


A lower cut is applied to ensure good quality data



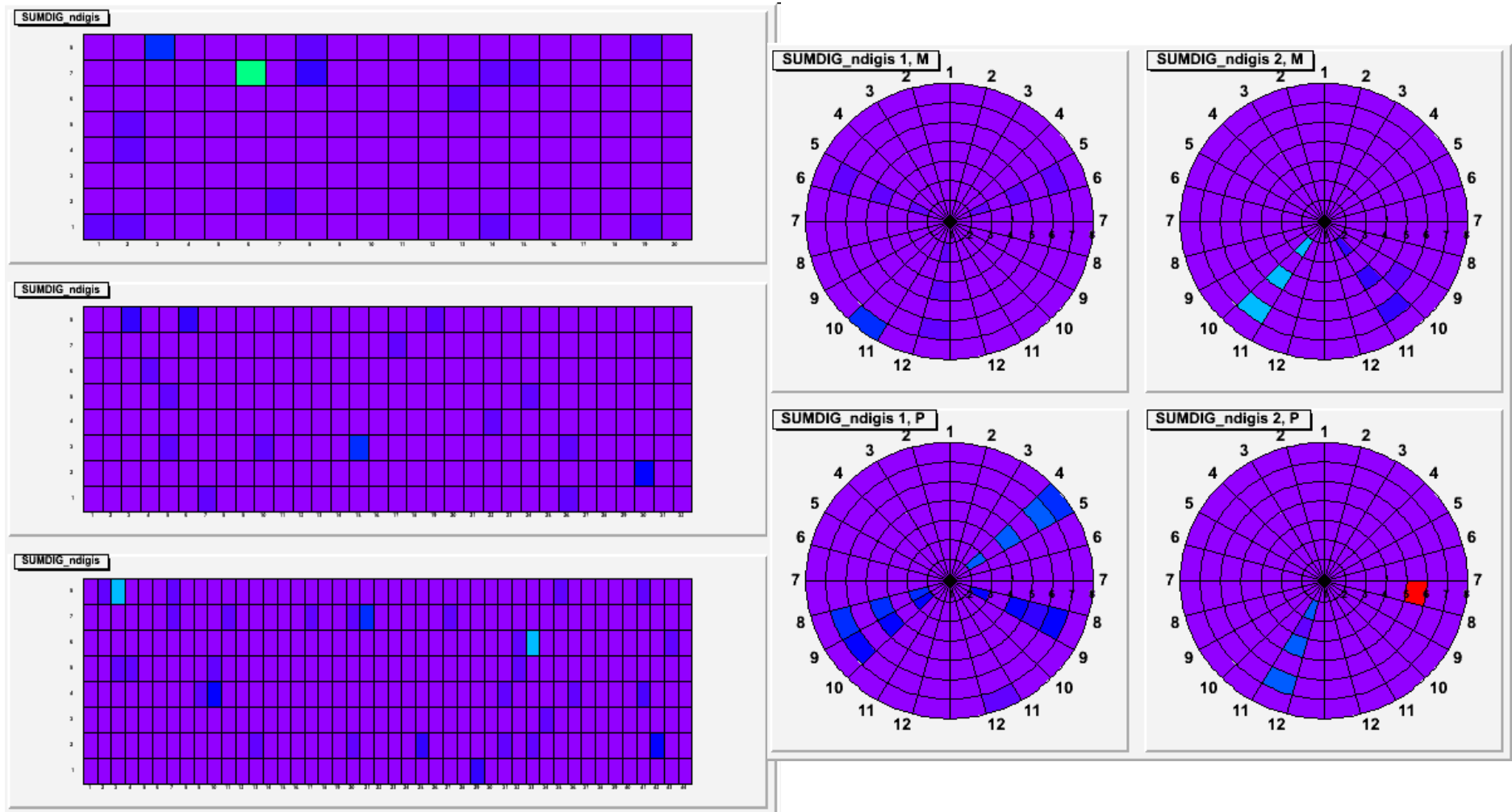
The monitorables – Trend Plots

- The offline shifter will have to run a root macro either once per day or per week needs to be seen, to fill trend plots for some key variables
- For the Pixels:
 - #Digis, #Clusters, cluster size, #barrel tracks/#endcap tracks, mean charge of OnTrack clusters
- For the Strips:
 - #tracks (CKF and CosTF), #RecHits per track (CKF and CosTF), MPV of corrected S/N, #Clusters OffTrack, #Clusters OnTrack (CKF and CosTF), Chi2/ndof for tracks (CKF and CosTF)



Offline TrackerMaps - Pixels

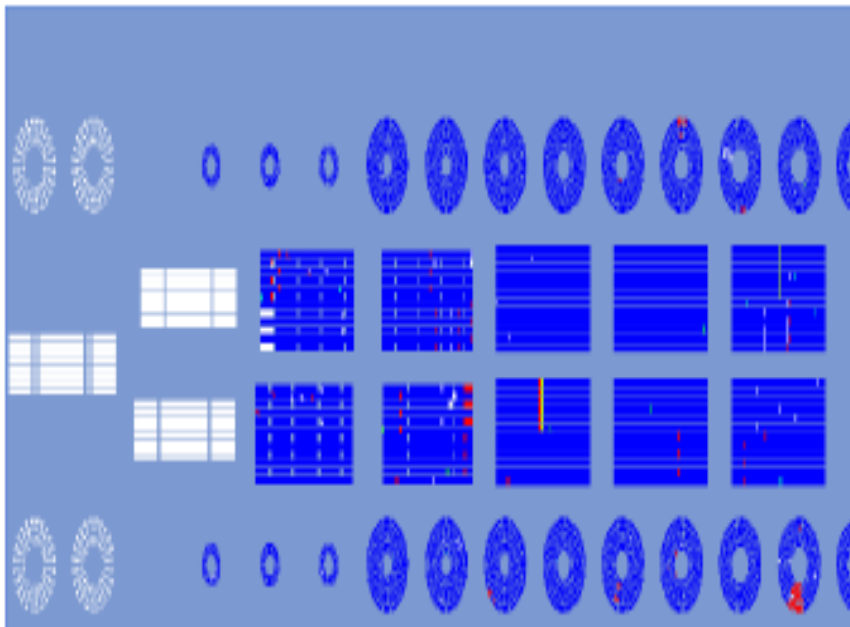
- Static TrackerMap plots of some selected monitorables, viewable with the GUI



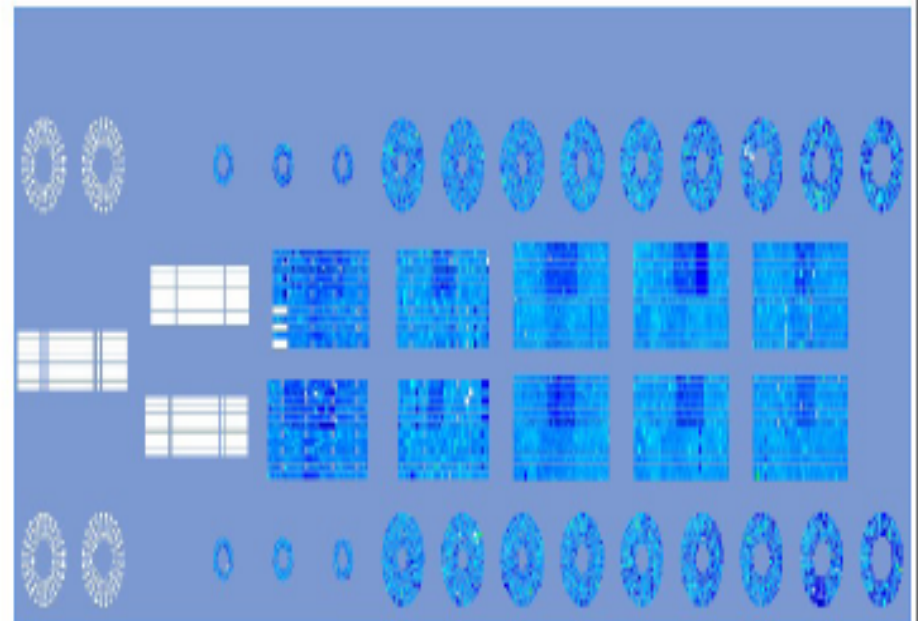
Offline TrackerMaps - SiStrips

- Together with the trend plots a couple of static TrackerMaps can be created for the strips:
 - NDigis distribution for all modules
 - FED error distribution for all modules
 - These will allow for an additional overview of the whole system at one glance.
-

FED Bad Channel



Signal-to-Noise Ratio



When something seems wrong

- If you spot a problem in one of the plots, or you follow up on a problem reported by the online shifter, etc. report your findings in **twiki with DB interface** (currently under development)
- In addition talk to your offline shift leader
- Try to understand from online **elog** if something went obviously wrong.
- If the automatic good run flag is bad, investigate why, what cut failed, what fraction of the modules failed, etc. **Discuss with offline shift leader** your findings.
- Make sure to **communicate with following shifters** via the twiki/DB tool and via the elog if necessary, so not everybody has to re-discover the same problem.

Data Certification

- Verifying this will mainly be duty of shift leader, but everybody should understand the principles...
- The DQM process at Tier-0 is automatically applying a certain set of cuts to some of the histograms. Then an algorithm is combining the cut results to define an overall good run flag (good or bad) for FPIX, BPIX, TIB, TOB, TID, TEC separately.
- The intermediate and final results of this process are stored in the DQM root files, accessible through the DQM GUI under:
 - Pixel(SiStrip)/EventInfo/reportSummaryContents
 - Additional useful input can be found under Pixel(SiStrip)/EventInfo/DAQContents and DCSCContents

Data Certification - Pixels

- We check what fraction of all barrel or endcap modules passes a certain cut. The quantities we cut on are:

- Any FED errors?
- #Digis
- Digi charge (raw charge in ADC)
- Cluster size, #Clusters, cluster charge (OnTrack and OffTrack)
- Mean and RMS for X and Y residuals
- RecHit errors in X and Y

Useful now

Better
with
collisions

Data Certification - SiStrips

- Module level certification based on
 - Any FED errors?
 - #Digis
 - #Clusters
- Layer level certification based on
 - S/N fraction of good layers (per sub system TIB/TOB/TID/TEC)
- Combine the module and layer level results per sub system

Run Registry

- CMS central DQM Run Registry contains all important info on all runs, filled automatically and by hand by the shifters:

— <http://pccmsdqm04.cern.ch/runregistry/index.jsp>



CMS DQM Run Registry

[Dump Data](#) | [Quick Help](#) | [Login](#)

 Manual Refresh

Reset

Edit

All Run Info Data

View in DBS

Run#	Shifter	Status	Started	Events	Rate, hz	Stop Reason	L1 Key	HLT Key	Comment	CSC	DT	ECAL	HCAL	PIX	RPC	SCAL	SIST	TRG
64677	Julia Velkovska	ONLINE	2008.10.07 09:11:46	5,635	100		TSC_000338_080915_MID	basic V3										
64257	Keith Rose	OFFLINE	2008.10.02 23:23:18	948,224	380	end of global run	TSC_000402_081002_MID	/cdaq/cosmic/commissioni										
64254	Keith Rose	OFFLINE	2008.10.02 22:56:17	535,871	374	Ecal requested stop to see	TSC_000402_081002_MID	/cdaq/cosmic/commissioni										
64245	Keith Rose	OFFLINE	2008.10.02 21:37:51	1,480,418	589	after attempting to add ECA	TSC_000401_081002_MID	/cdaq/cosmic/commissioni										
64210	Keith Rose	OFFLINE	2008.10.02 18:16:01	491,105	56		TSC_000399_081002_MID	/cdaq/cosmic/commissioni										
64208	Keith Rose	OFFLINE	2008.10.02 17:30:06	131,109	68	overlap test ending	TSC_000398_081002_MID	/cdaq/cosmic/commissioni										
64189	Keith Rose	OFFLINE	2008.10.02 15:59:51	991	0	requested by expert - test ru	TSC_000397_081002_MID	/cdaq/cosmic/commissioni										
64182	Abideh Jafari	OFFLINE	2008.10.02 14:52:15	2,296	2	Change DT input pipe posit	TSC_000397_081002_MID	/cdaq/cosmic/commissioni	In CSC , cells ME+1/2:3 & 10, b									
64168	Abideh Jafari	OFFLINE	2008.10.02 14:12:44	1,771	2		TSC_000397_081002_MID	/cdaq/cosmic/commissioni	CSC have been put in readout									
64164	Abideh Jafari	OFFLINE	2008.10.02 13:08:26	5,675	2	to put csc in the readout	TSC_000397_081002_MID	/cdaq/cosmic/commissioni	DT and CSC are running, but C									



10

Page 1 of 57



Displaying 1 to 10 of 563 items

Signing up for shifts

- Reminder: only one week of offline shifts possible per person, rest should be online at P5!
- If possible we would like to cover one remote offline shift per day from Fermilab.
- Sign up for 5 shifts in a 7 day week (not one day here and there...)
- Sign up for shifts using official CMS shift tool:
<http://cmsonline.cern.ch/portal/page/portal/CMSonline system/Shiftlist/ShiftSelection>
- Choose “Shift selection” tab (top right), select Shift type “TRK – Off line FNAL” and the Month you are interested in and click on the “Show” button. Then check the blue boxes on the days of your availability; Lino DeMaria will eventually assign the shifts.