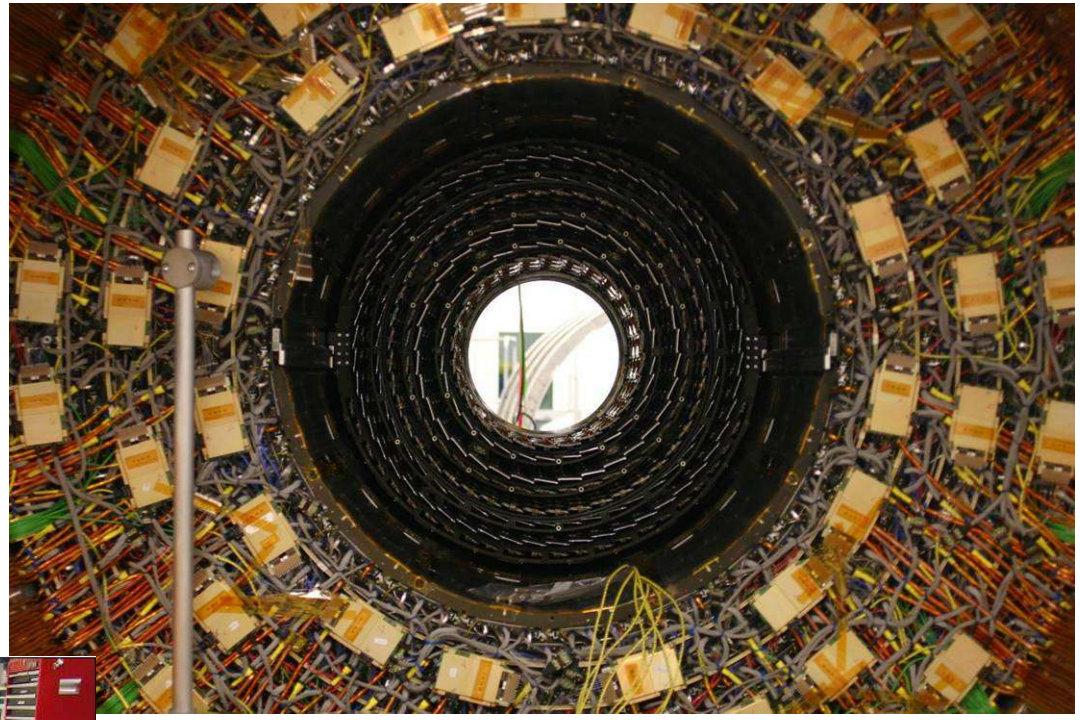
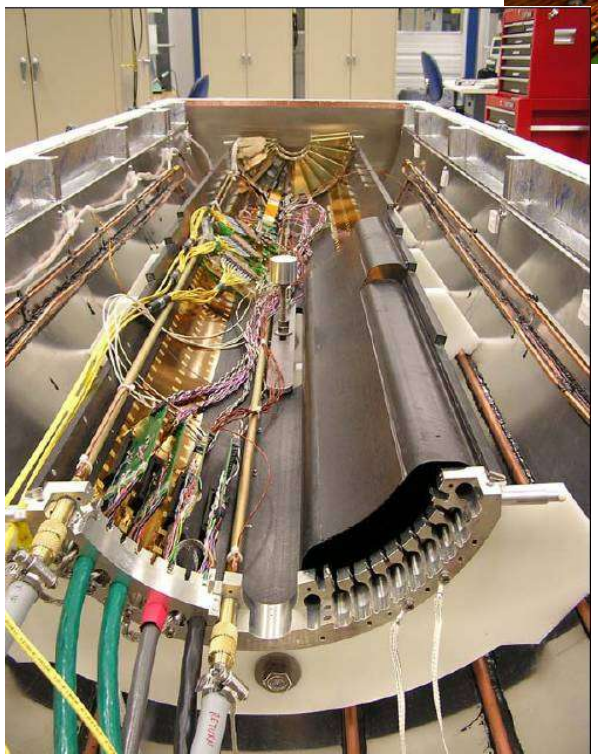
Tracker DPG
status and plans





Fabrizio Palla
INFN Pisa

Outline

- Data taking at the TIF
  - Main ingredients and plans
- Simulation
  - Comparison with data and plans
- Tracking
  - Status of CMSSW to ORCA comparison
  - Cosmic muons tracking
  - Toward tracking in real conditions
- Alignment
  - Status and plans
- Computing
  - Handling of data at the TAC and distribution to Tiers

- N.B. The names in the following slides list only the Italians mainly involved in the items
  - ➨ Apologies for those I will forget !

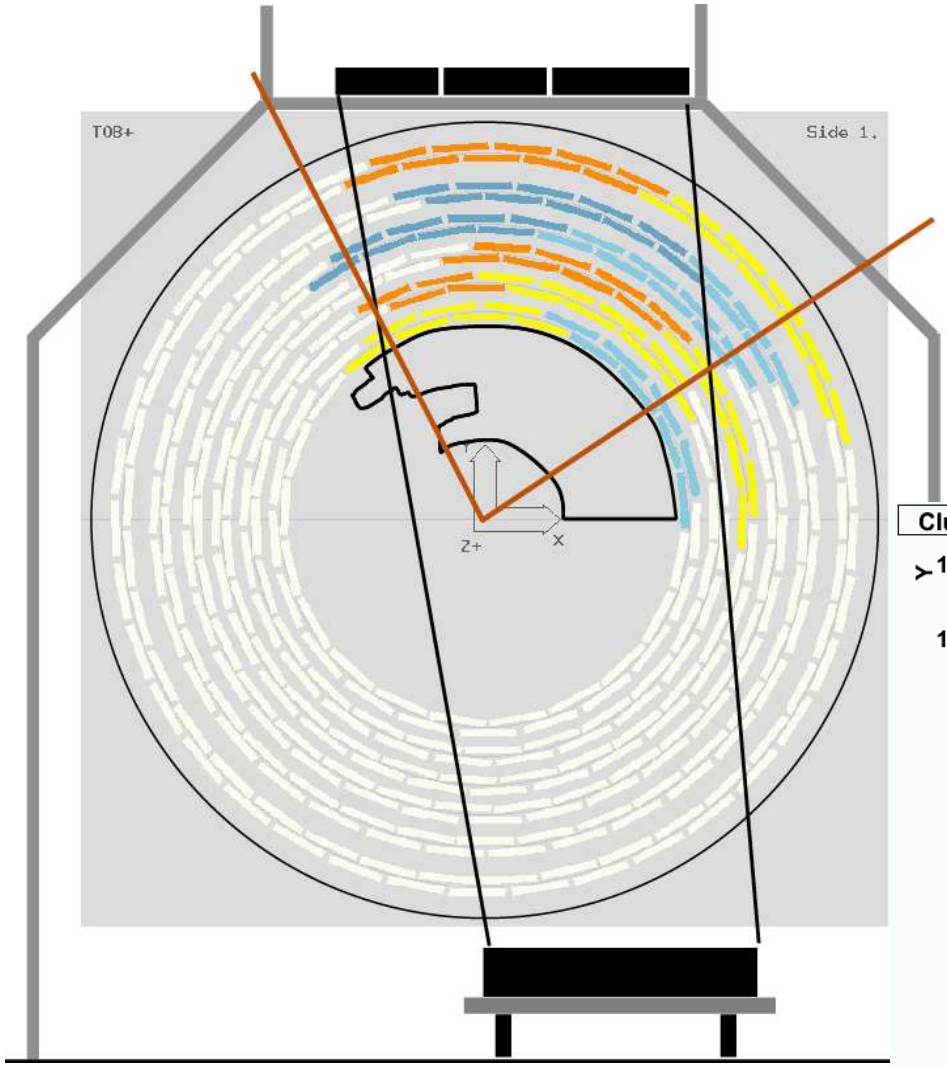
Data taking at the TIF

- **TIB inserted into TOB**
  - **Ready to take combined (TIB+TOB) data this week (software wise)**
  - **Will continue with TEC+ insertion**

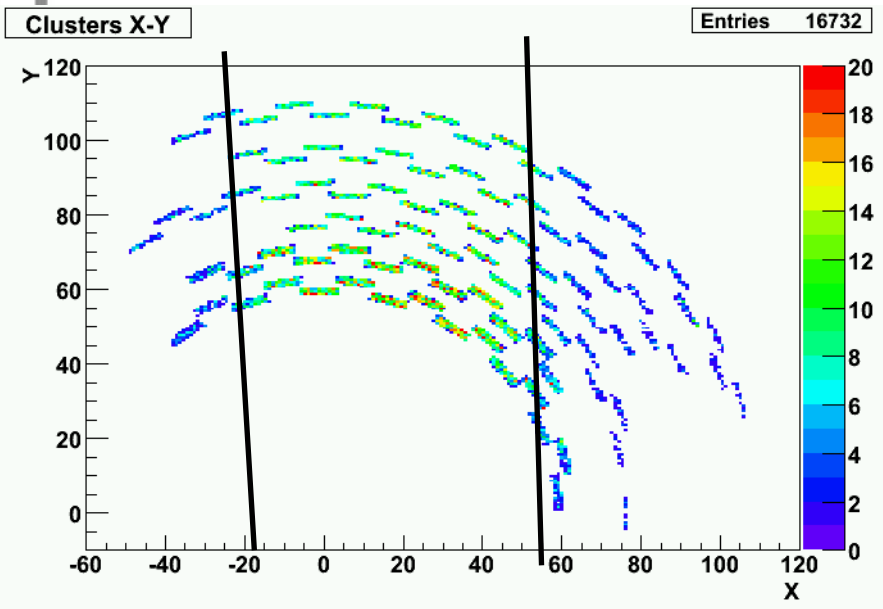
Jan.8 2006

Months	November				December				January					February				March				April				May					June				July				Aug	
Weeks	45	46	47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TIB+ Cosmic Slice Test																																								
TOB+ Sector Checkout				R																																			
TIB+ Installation					R																																		
TIB+Cabling																																							
TOB+/TIB+ Sector Checkout													R																										
TIB- Installation																																							
TIB-Cabling																																							
TEC+ Installation and cabling													R																										
TOB+/TIB+ Cosmic Slice Test																																							
TOB+/TIB+/TEC+ Sector Checkout																																							
TOB+/TIB+/TEC+ Warm Cosmic Slice Test																			R																				
TEC- Installation and cabling																R																							
TOB-/TIB-/TEC- Sector checkout																				R																			
TK+ and TK- Sectors checkout																							R																
TK and Thermal Shield Prepare & Cold																						R																	
TK+ and TK- Cold Sectors Checkout																																							
TK+ and TK- Cold Cosmic Slice Test																												R											
TK Nose Cones Cabling																																							
TK Prepare &Transport																																		R					

Trigger system commissioning

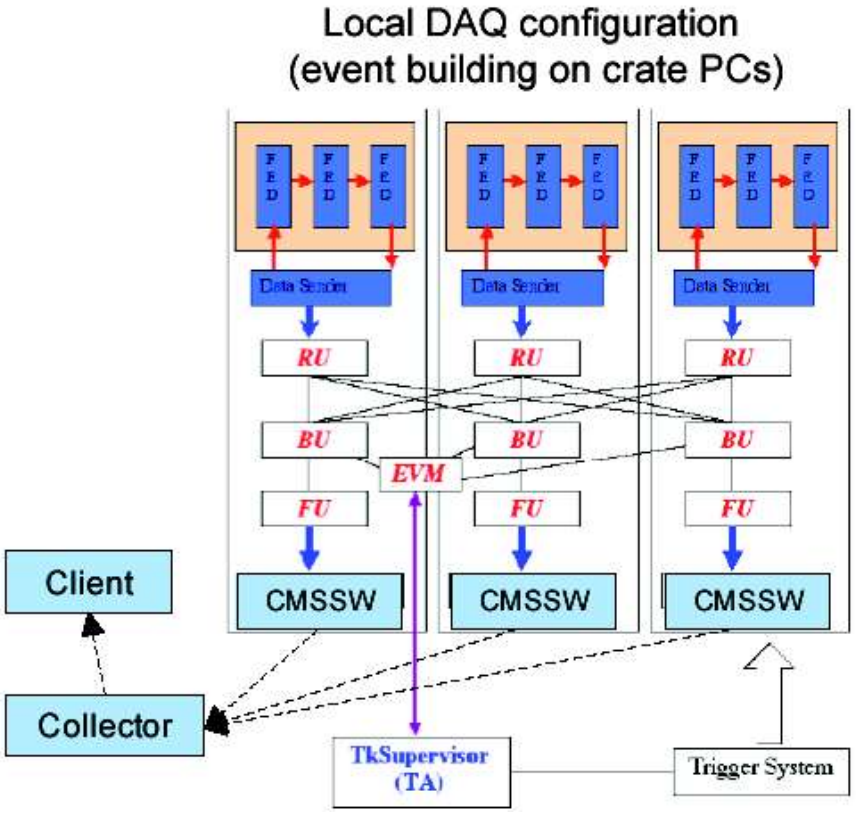


- Third scintillator on left added and connected
- HV for right PMT was too low and is raised now
- Will put some lead bricks (10 cm thickness) below



Getting the data out of the Tracker

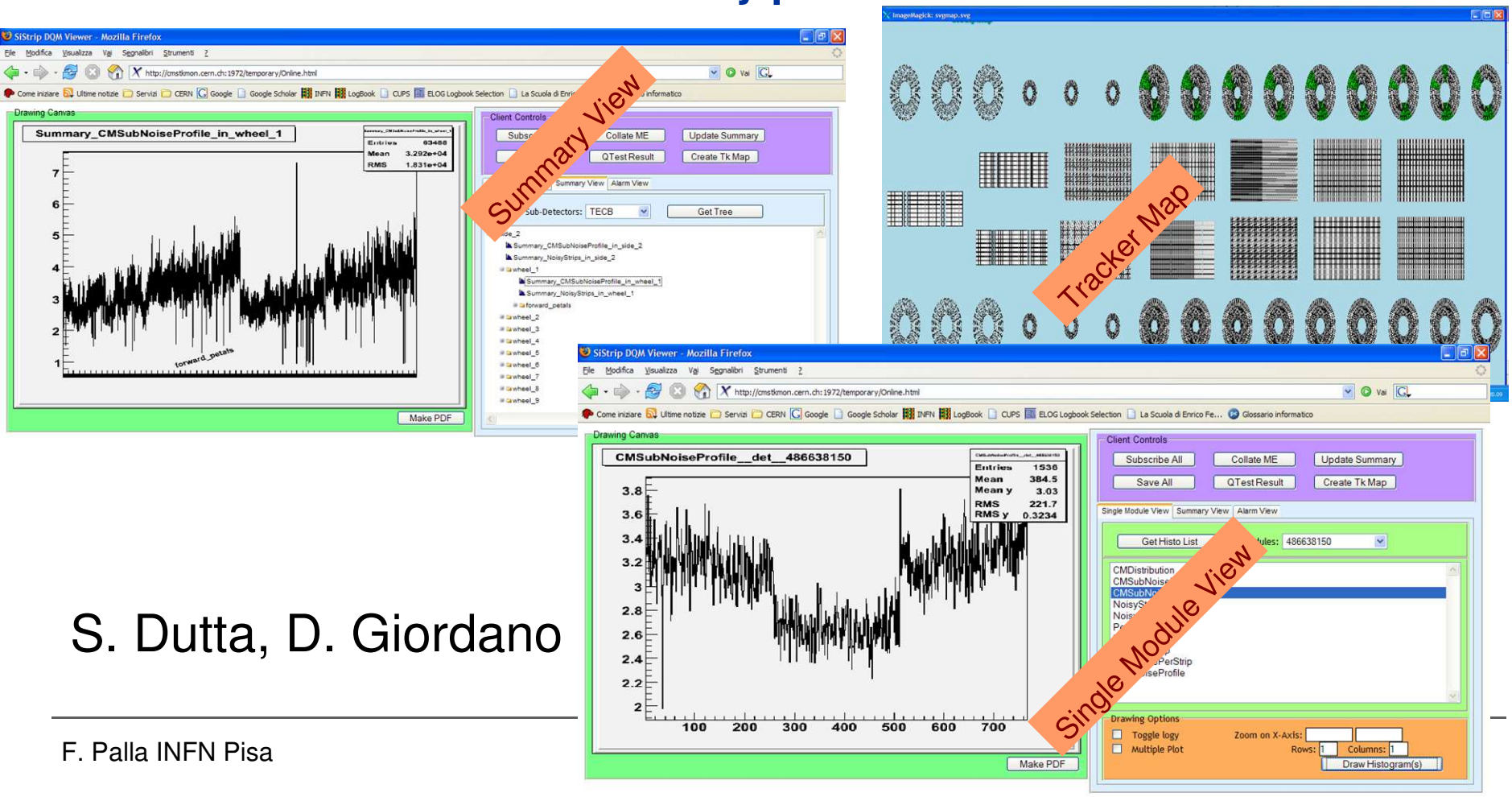
- **Used the Si-Tracker in the TIF to commission the Commissioning Software**
  - **~0.5 M channels, ~2K FED channels on each TIB/TID+ and TEC+/- systems**
  - **Detector readout was achieved using the "standard" DAQ software, comprising several components related to:**
    - **Configuration database, trigger, control and readout. DCS and DSS systems were also in place**
  - **The Event Builder used four FilterUnits, so that the large data volumes (>1MB / ev) could be distributed between multiple processing nodes.**
    - **Each node processed the data using libraries from the CMSSW framework.**



DQM: ~4000 histograms/4M bins

Si-strip data taking and DQM

- **TEC data viewed with DQM**
  - **Once cabling information was in place in configuration DB we could run DQM without any problem**

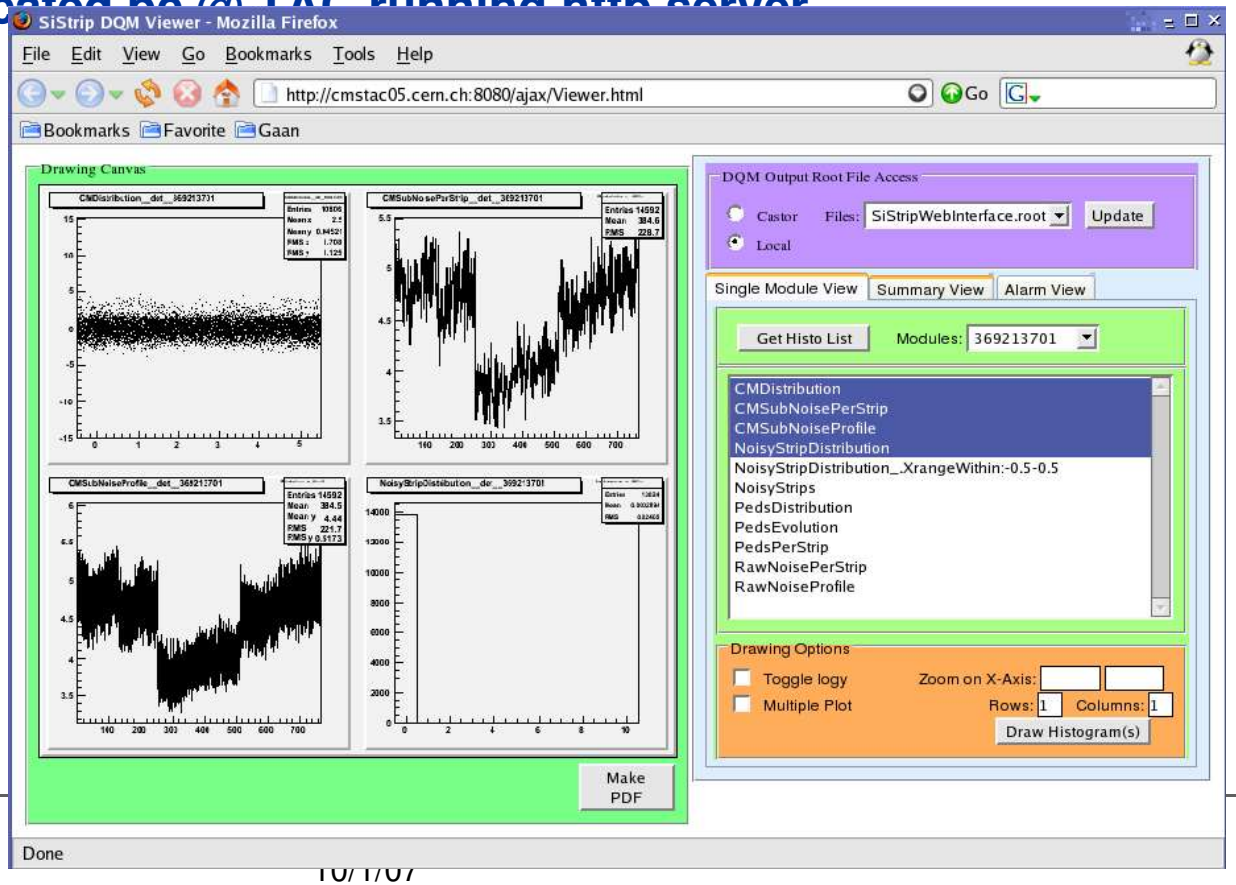


S. Dutta, D. Giordano

Offline Web Interface

- **Output root files produced in DQM can be accessed through Web**
  - **Pure offline usage, no need to run source/collector/client**
  - **Root files are loaded at start and can be selected from drop-down menu**
    - **Access files from local area or from castor**
  - **Requires a dedicated pc @ TAC running http server**

S. Dutta



DQM status and plans

- Offline DQM is working, both on TIB/D+ and TOB+ data.
- Tests of DQM integration into online to be performed this week
- Web interface access outside CERN was successfully tested with Fermilab running DQM at TAC (source/collector/client)
- A first prototype of historic DQM shall be delivered soon
- Plan to include a set of histograms related to tracks (for each running tracking algorithm)
  - number of tracks, number of rec hits per track (and vs. phi/eta), chi2, chi2/ndof (vs. eta/phi), pt, px, py, px, eta, phi
- Pixel DQM closely follows

Analysis Tools

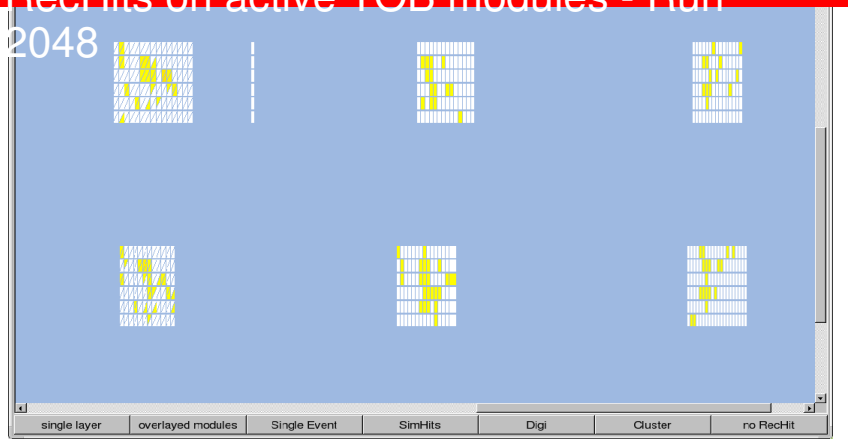
- **There exist three complementary analysis methods on reconstructed events:**
  - **[1] FWLite : acts as a root macro on CMSSW event**
  - **[2] EDAnalyzer: code is developed in dedicate CMSSW analysis modules. It exploits all CMSSW functionalities. Create histograms**
  - **[3] EDAnalyzer+root tree: as [2] but dumps all useful info in a root tree, afterwards accessed with a macro**
- **All of these tools are in some way successful:**
  - **Developed for MTCC analysis, are widely used**
  - **Give feedback on data quality at different levels (e.g. [1] very useful for fast summary plots, [2-3] for more accurate analyses)**
  - **Run also on Simulated Data**
  - **Note: Analysis tools are not a duplication of DQM; but DQM could profit from experience and development on those tools**

P. Azzi, D. Giordano, V. Ciulli & al

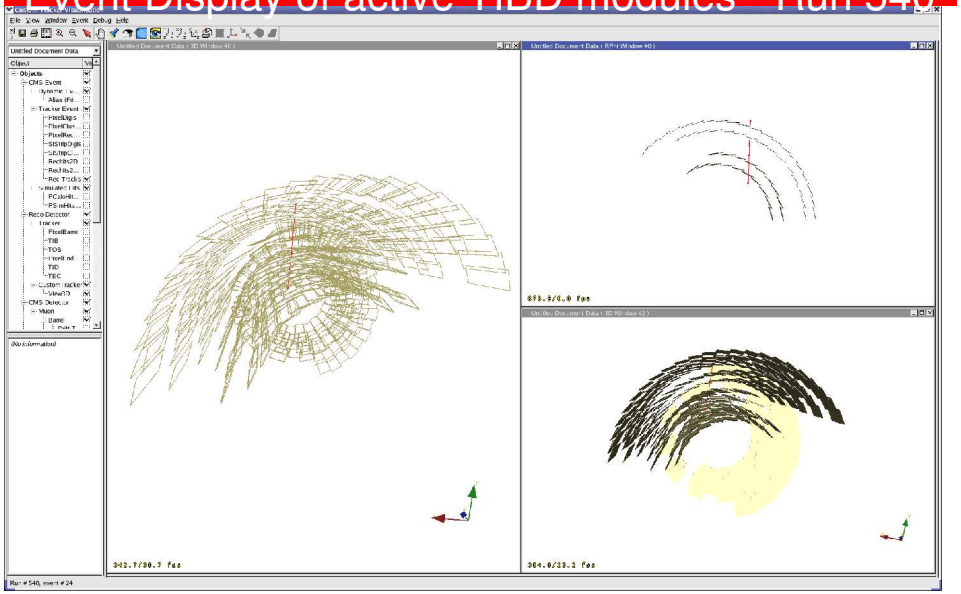
Visualization

- NEW: **Iguana Event Display and Tracker Maps are now able to display active modules only**

RecHits on active TOB modules - Run 2048



Event Display of active TIBD modules - Run 540

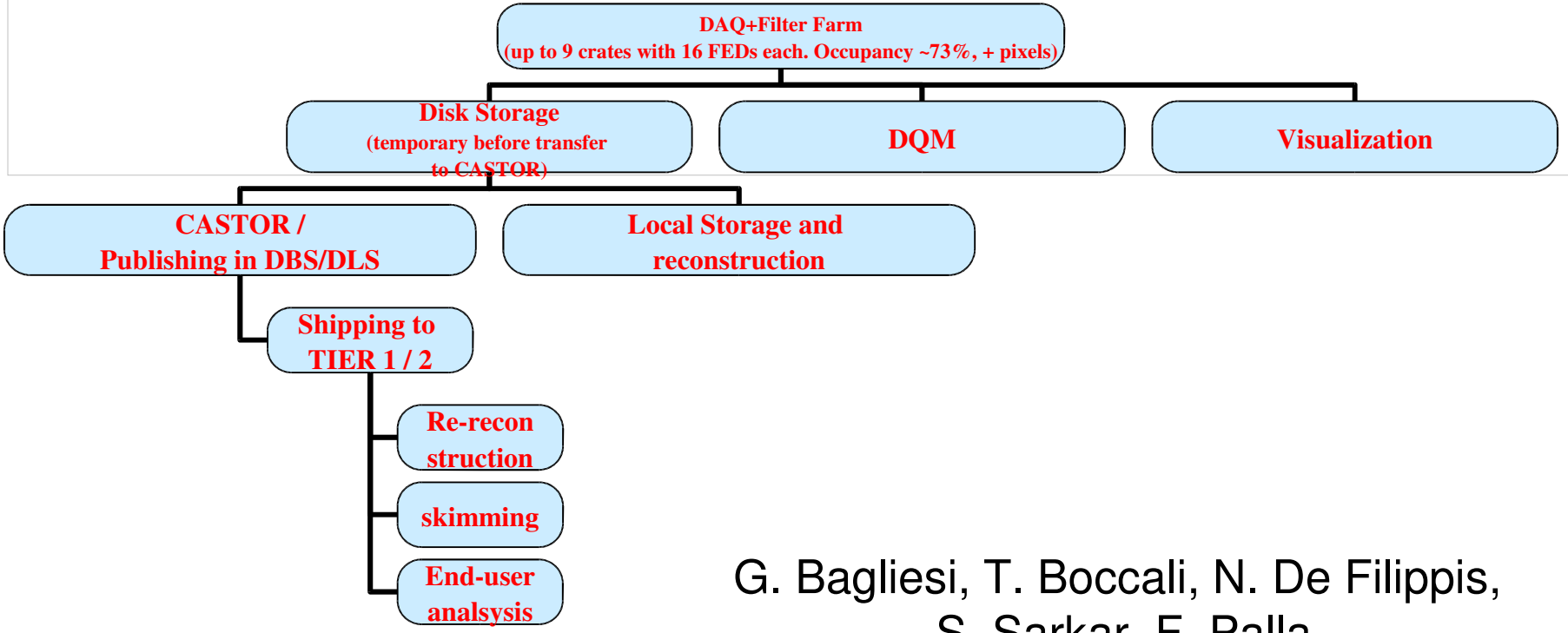


- **Tracker Map**
  - **Readout view is available**
  - **further work in progress: TkMap for DQM**

- **The aim for next weeks is to run the event display online during the data tacking**

Computing facilities at TAC

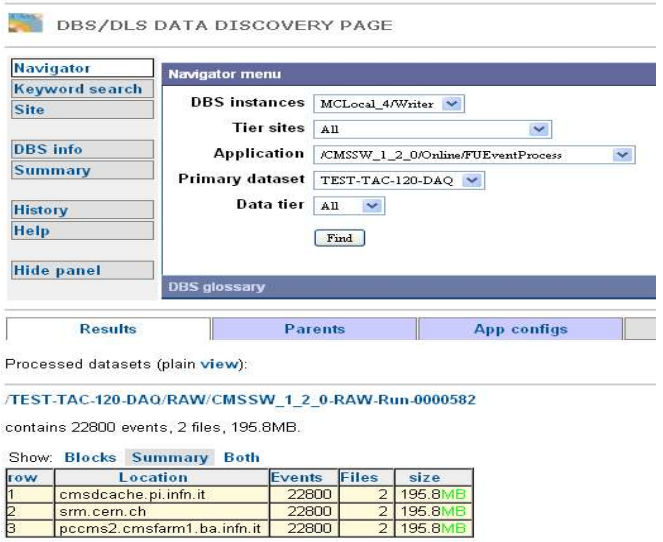
- **The TAC is a dedicated Tracker Control Room at the TIF**
  - To serve the needs of collecting and analysing the data from the 25% Tracker test at the Tracker Integration Facility (TIF) as well as pixels
  - In use since Oct. 1st by DAQ and detector people

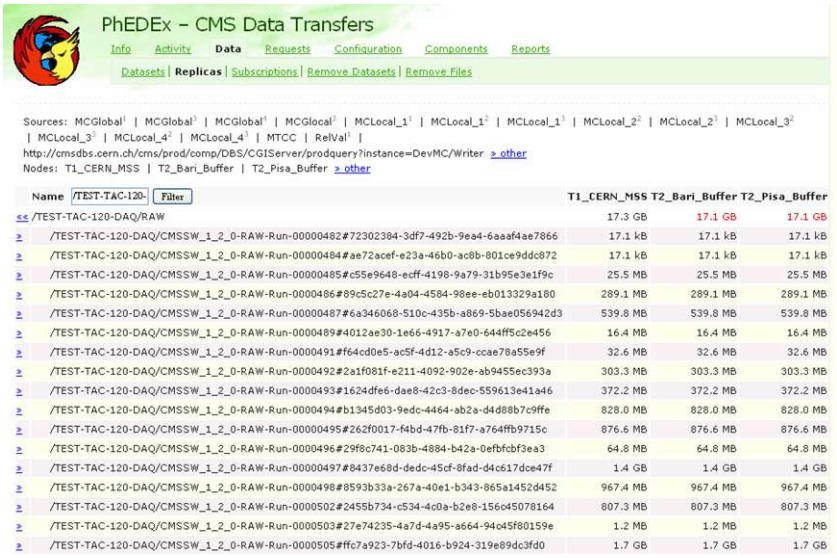


G. Bagliesi, T. Boccali, N. De Filippis, S. Sarkar, F. Palla

Computing operations

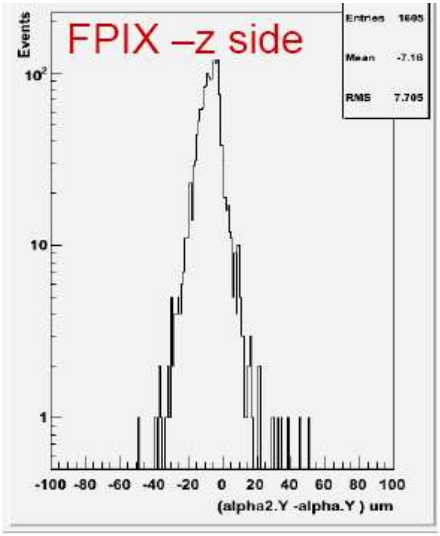
- **On-site (TAC) operations**
  - Temporary storage on a PC
  - Perform o2o
  - Will convert from StorageManager to EDM-compliant files (now from RU)
  - Write files to CASTOR once ready
  - Register files in DBS and DLS
  - Standard reconstruction run with ProdAgent tool and automatic registration of RECO in DBS/DLS
- **Off-site operations**
  - Automatic data injection in PhEDEx
  - Alignment in Tier0
  - Re-reconstruction and skimming with Prodagent, if needed, via frontier
  - End-user analysis via CRAB





Calibration and simulation

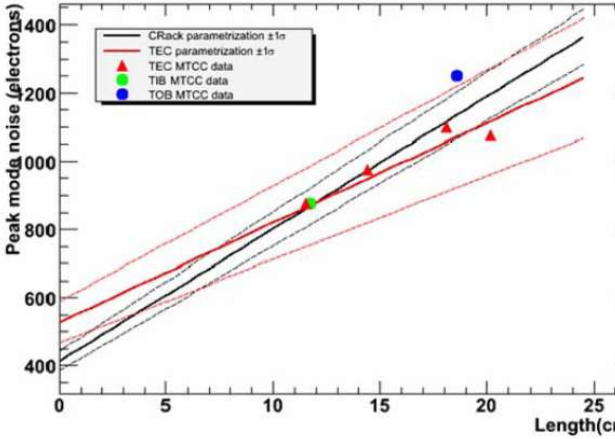
- **Held several "workshops" to tune the simulation with data from Test beams and MTCC**
  - http://indico.cern.ch/conferenceDisplay
  - http://indico.cern.ch/materialDisplay.py
  - http://indico.cern.ch/conferenceDisplay
  - **Some changes done in CMSSW**
    - **Saturation of pixels taken into account**
    - **E•B effects in FPIX**
    - **Noise vs strip length**
    - **Configurable capacitive couplings**
  - **Some will come in 1_4_0**
    - **Geometry fixes**



Mean shift along y
~-7.1μm

Noise Summary (peak mode)

Solid black line is the current value used in simulation



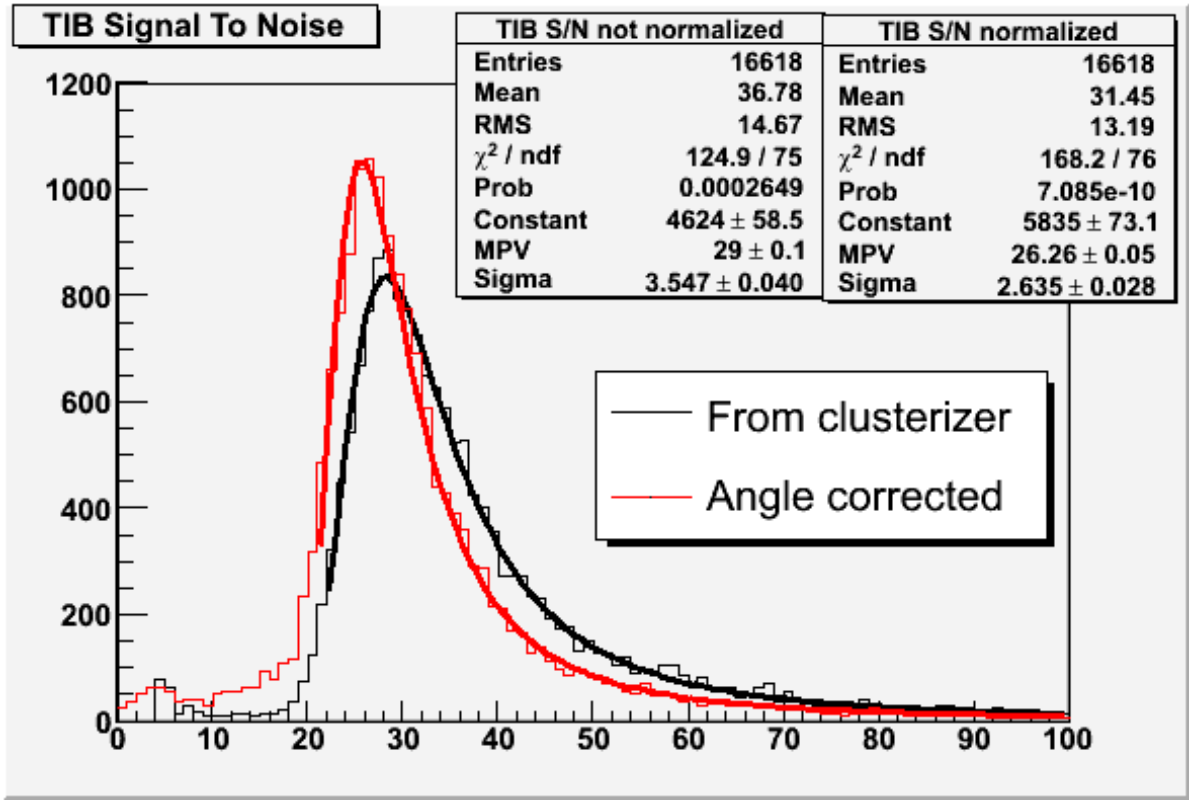
P. Azzi, F. Ambroglini, L. Fano', M. Chiorboli

Calibration

In RED S/N distribution from tracks, corrected for normal incidence

Reco Clusters do not contain gain info. Plot S/N to avoid normalization problems

Using the result of this fit and assuming 1 MIP = 312.5 ADC counts



ENC=1022 e-

1 MIP = 26.2*3.27*312.5 =26834 e⁻ !!

M. Meschini, C. Civinini, G. Lenzi, A. Macchiolo

Material Budget review

- **4 teams of people (Pixel, TIB/TID, TEC, TOB) coherently**
  - **measure in lab and compare with drawings the dimensions, weights and composition of the volumes implemented in the simulation and change/update accordingly**
- **Have all the software in CMSSW to**
  - **Print the characteristic of each Geant volume**
  - **Handle mixed materials**
  - **Print position and orientation of silicon active areas**
  - **A script to run the Geometry Validation Software in one go**
    - automatic check to X/X0 plot and the position/orientation differences with respect to the reference files stored in
      - *<u>/afs/cern.ch/cms/data/CMSSW/Validation/Geometry/reference/Tracker</u>*
    - automatic creation of Material Budget colourful plots (X/X0 vs η)

R. Ranieri, G. Sguazzoni, F. Palmonari, A. Rizzi

TIB/TID weighing

Giacomo Sguazzoni, Francesco Palmonari

- Weight of half of the TIB/TID, by difference
  - [Cradle+TIB/TID]-[Cradle] (2ton dynamometer)
    - TIB/TID+ 240 kg (±10% at most)
    - TIB/TID- 250 kg (±10% at most)
- average of half TIB/TID:

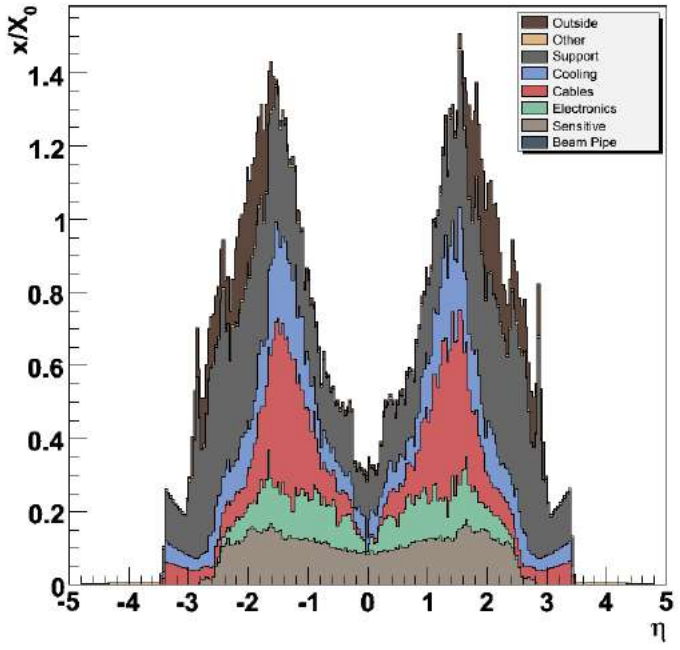
  245 kg (±10%)
  - Assuming forward=backward within the uncertainty
- Estimate (from drawings):

  230 kg
  - (but few kg last-minute addition missing)

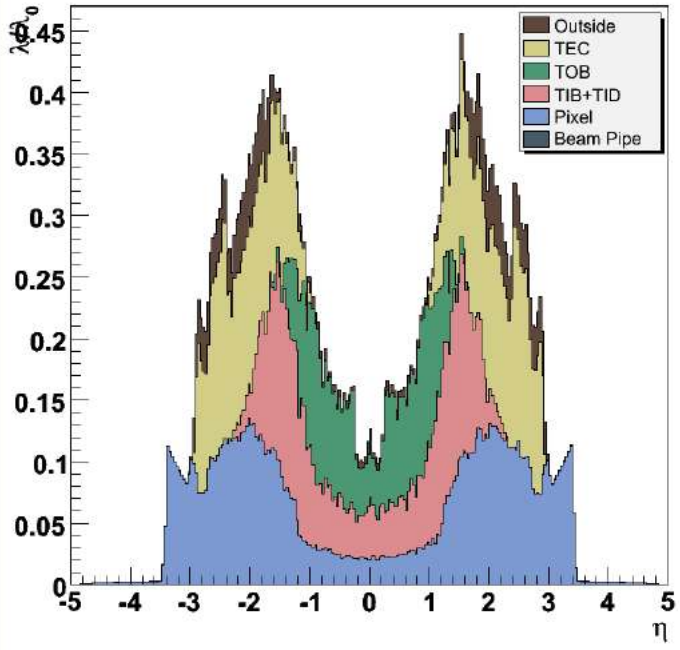
New plots ("old" geometry)

- Actual simulated Tracker in CMSSW, no updates included
  - radiation length x/X_0 (left) nuclear interaction length λ/λ_0 (right)

Tracker Material Budget



Tracker Material Budget

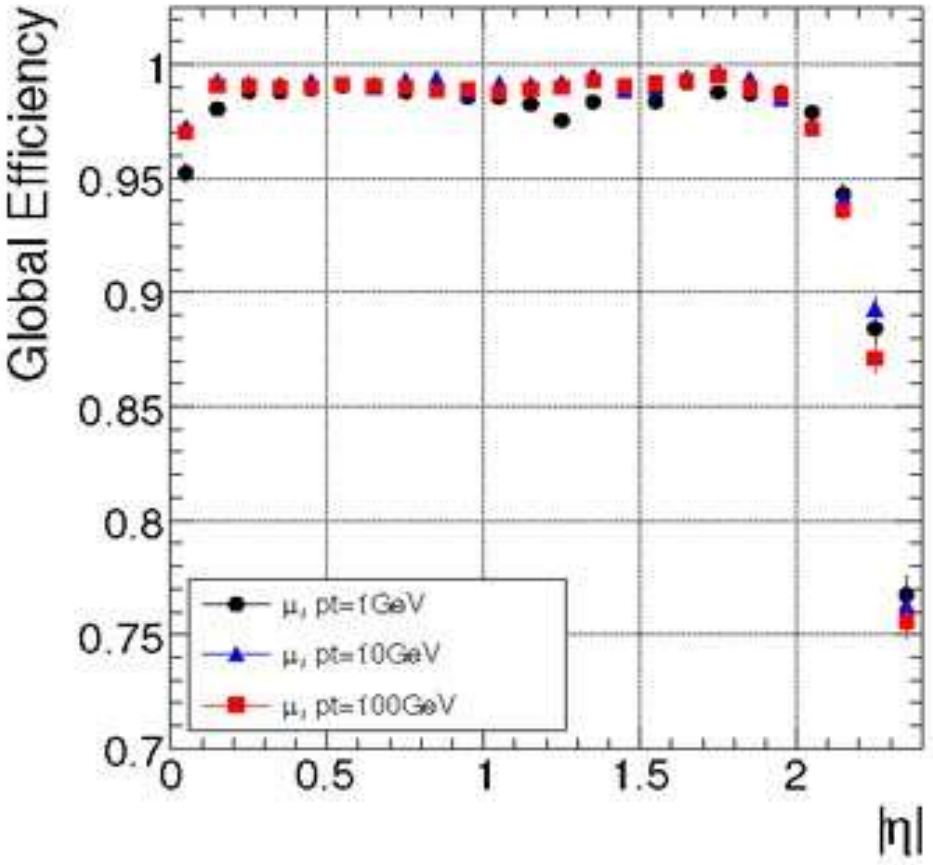


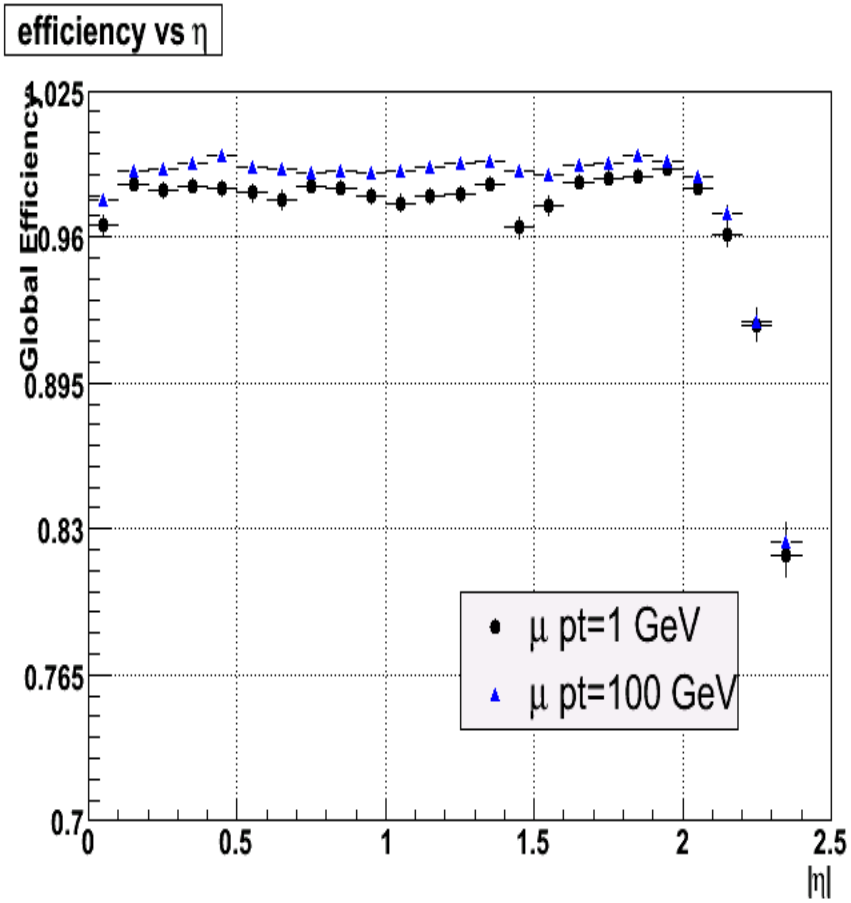
Outlook

	already done	ready for CMSSW_1_4_0 [=end-of-March]	after CMSSW_1_4_0
PXB	material definition (not in simulation)	update of simulation weight comparison	perhaps only services
PXF	materials and volumes	weight comparison service cylinder	perhaps only refined description of services
TIB TID	some measurements whole structure TIB/TID both + and – weighed	active area positions fixed passive volume updates	everything not included in CMSSW_1_4_0
TEC	complete set of measurements simulation: module updates near the end	module updates petal updates	disks and services
TOB	simulation: module updates	rod updates cables, structures and services	hopefully nothing, otherwise what remains from cables, structures or services

Tracking progress (I)

- **Single muon efficiency**



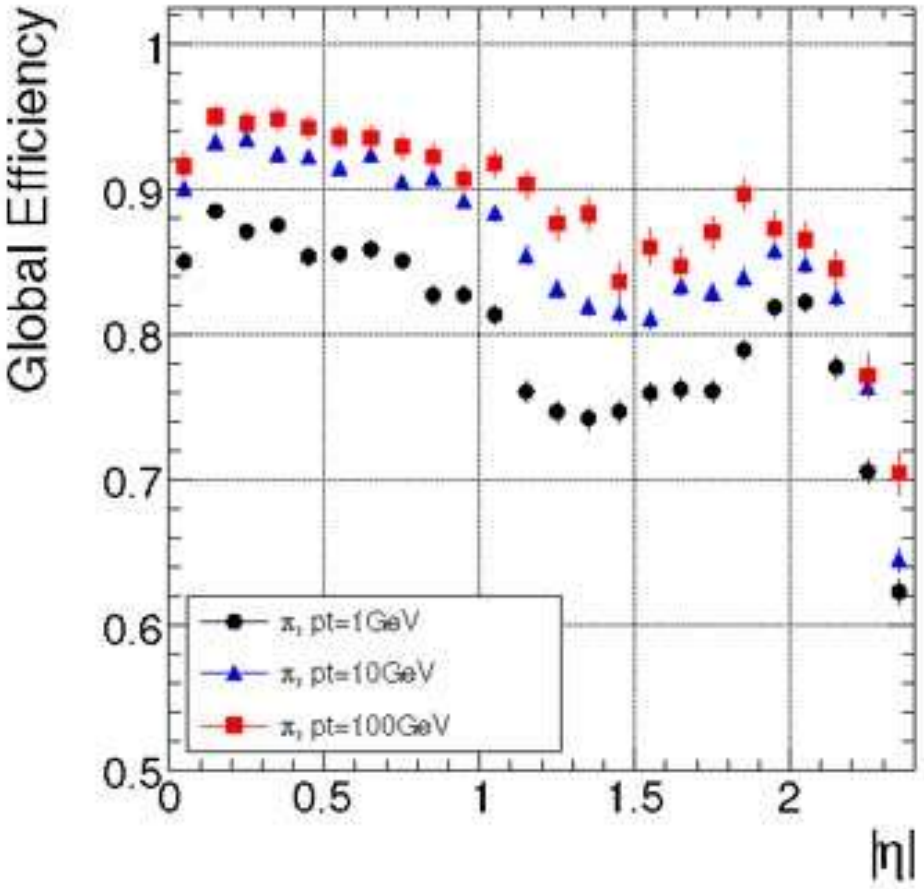


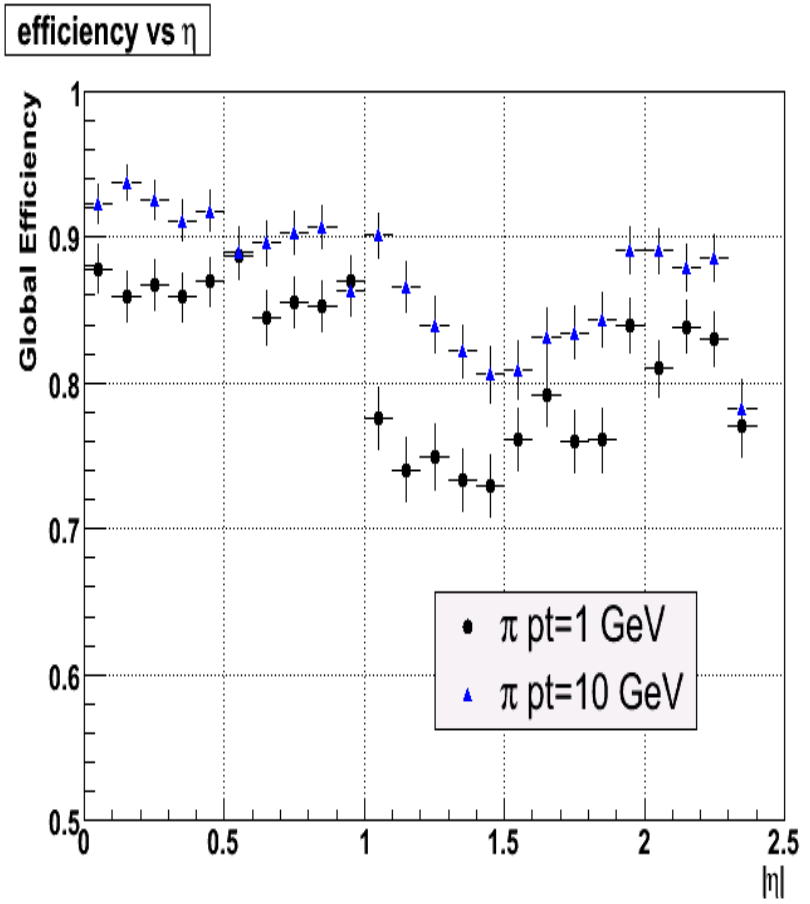
- **About 1% missing for 1 GeV muons**

P. Azzi, G. Cerati, B. Mangano, S. Magni

Tracking progress (II)

- **Single pion efficiency**

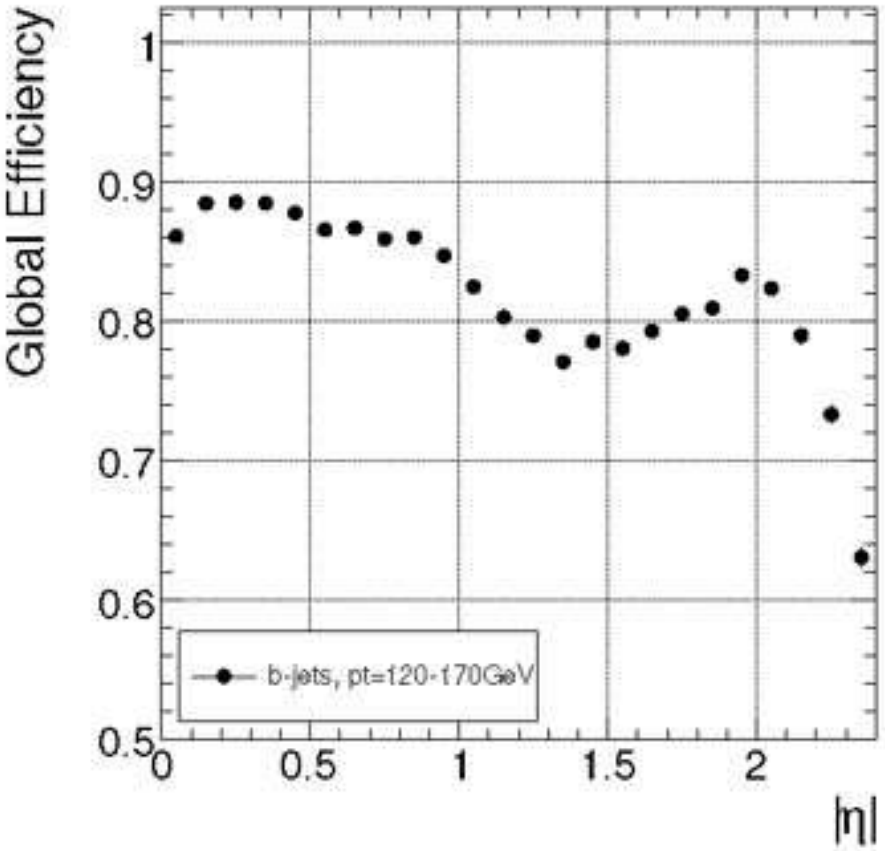


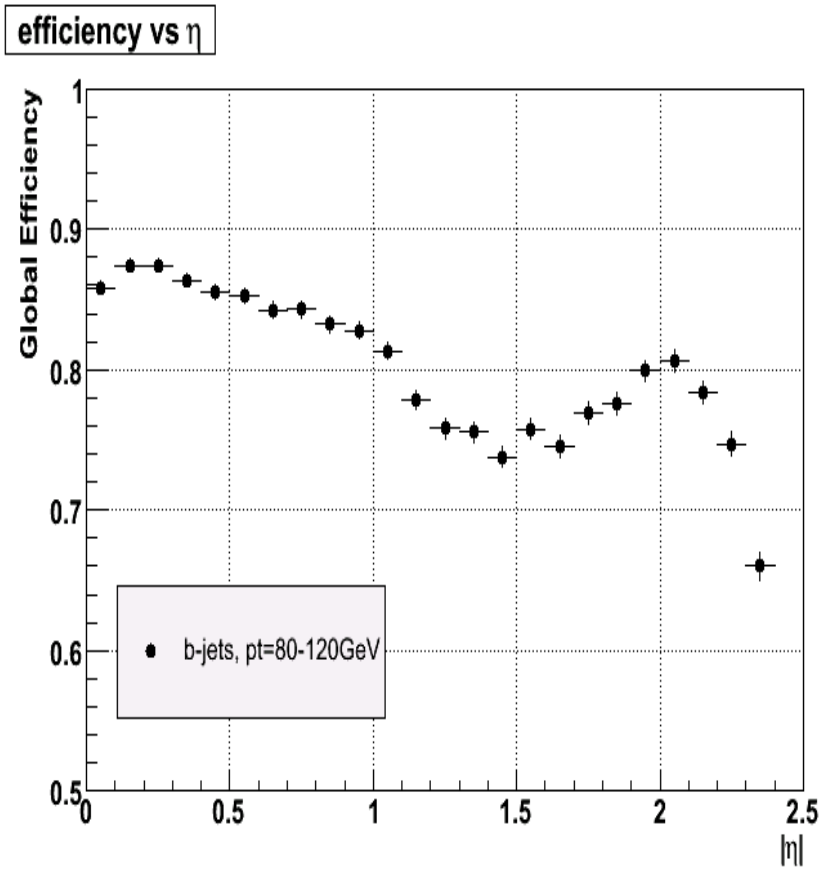


- **More statistics is available and will be included**

Tracking progress (III)

- **Efficiency in jets**

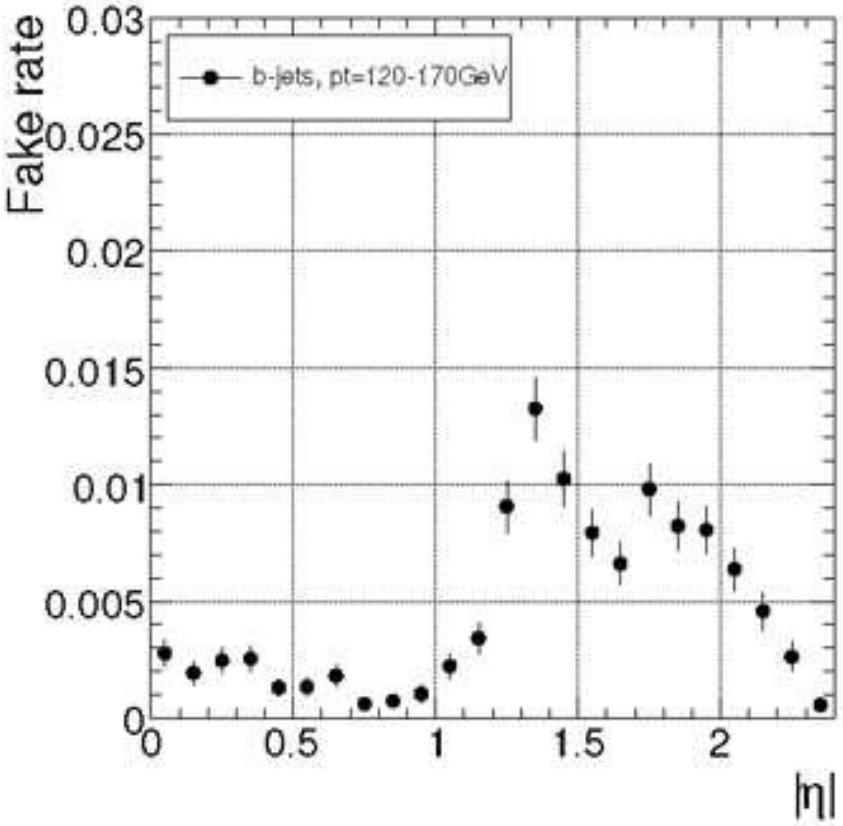


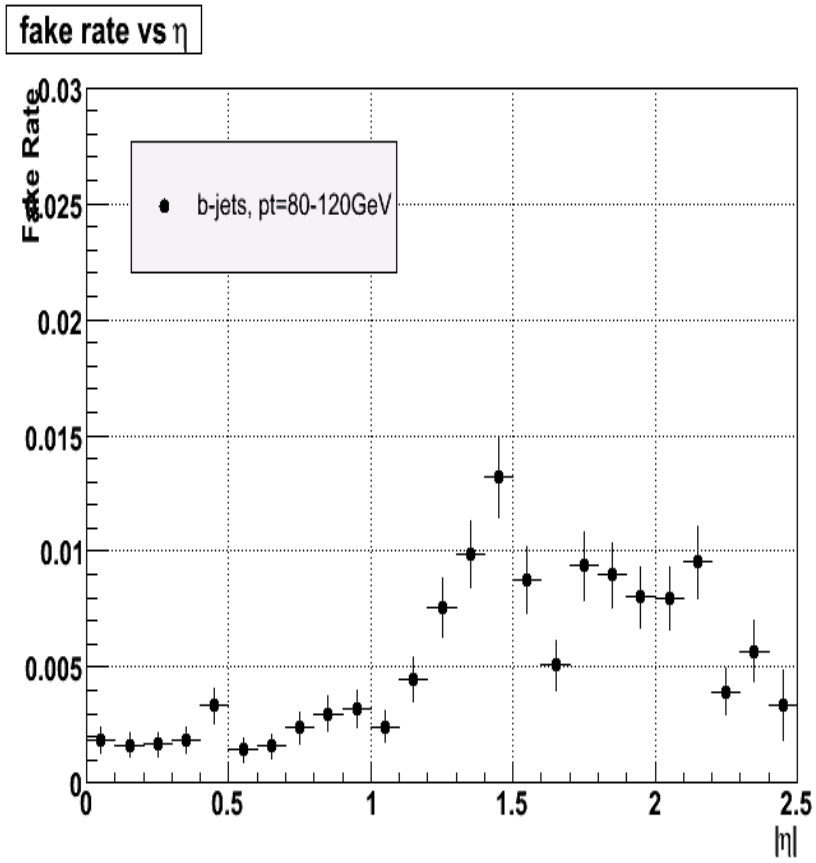


  - **Slighlty smaller efficiency**
    - **But proper p_T bin not simulated (!)**
    - **Missing some MC truth information**

Tracking progress (IV)

- **Fake rate in jets**





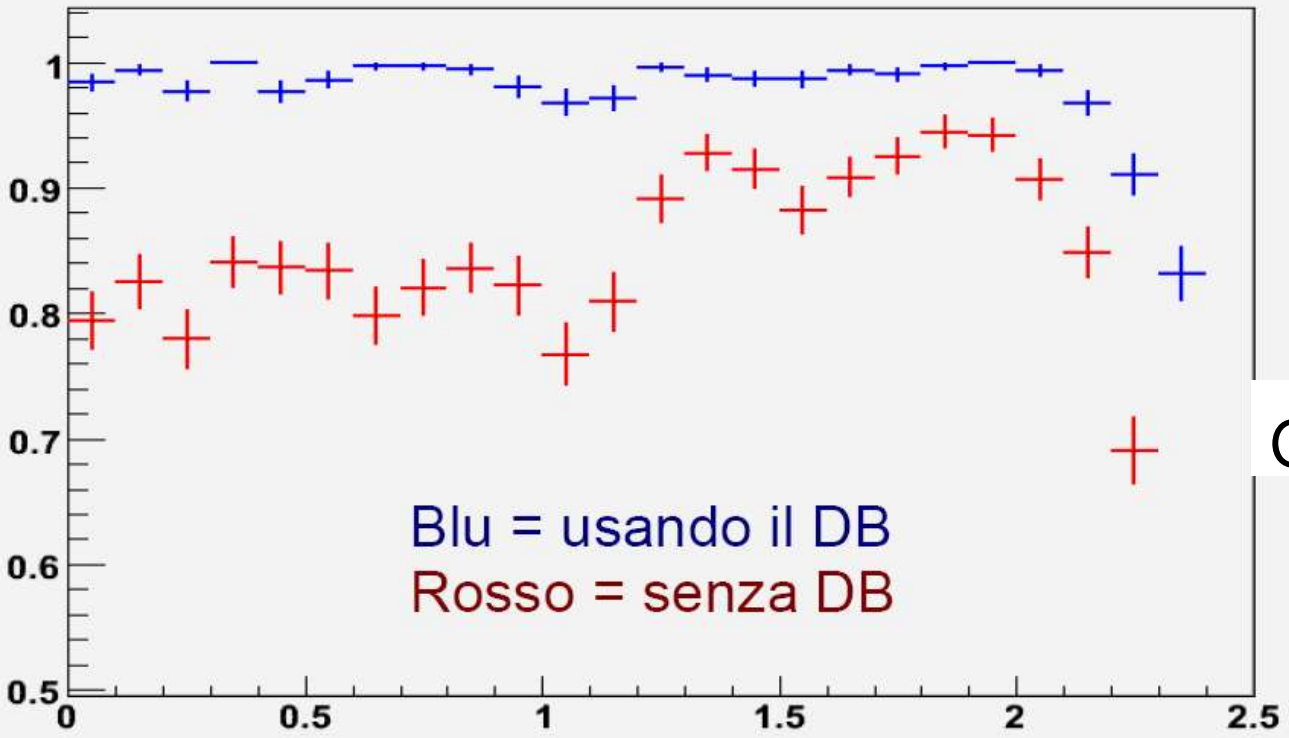
- **Same caveats as for "efficiency in jets"**

Dead modules in Tracking

20% di moduli spenti ?

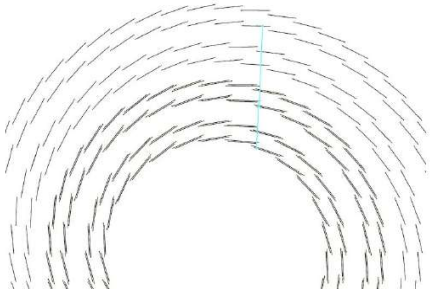
In realta' e' lo 0.3%

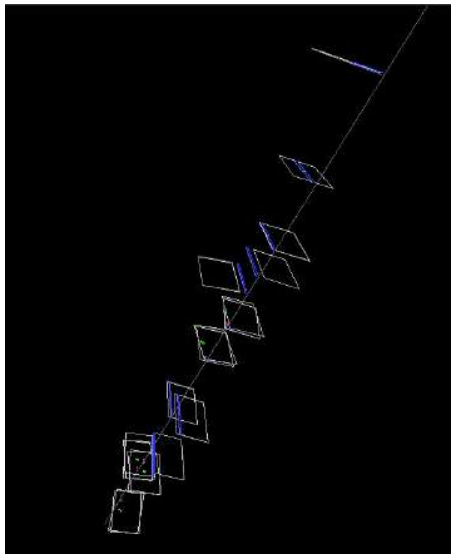
Efficienza su 7500 singoli muoni da 10 GeV

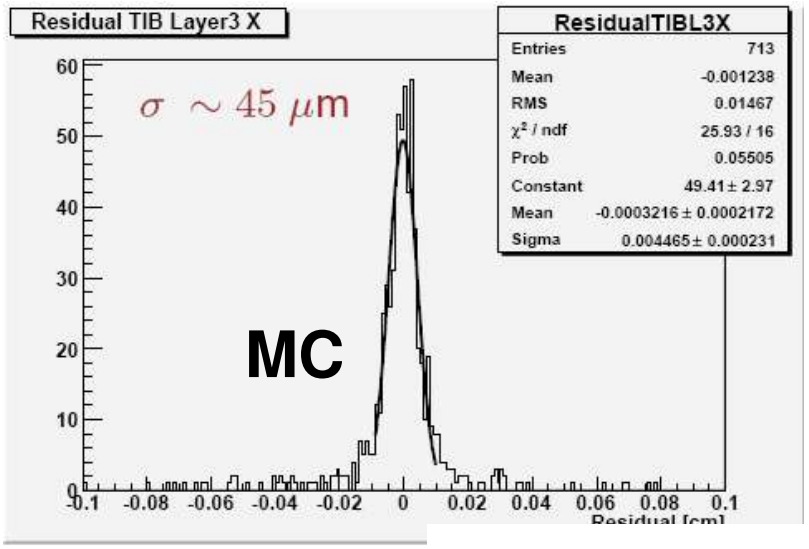


G. Petrucciani

Track reconstruction in TIF

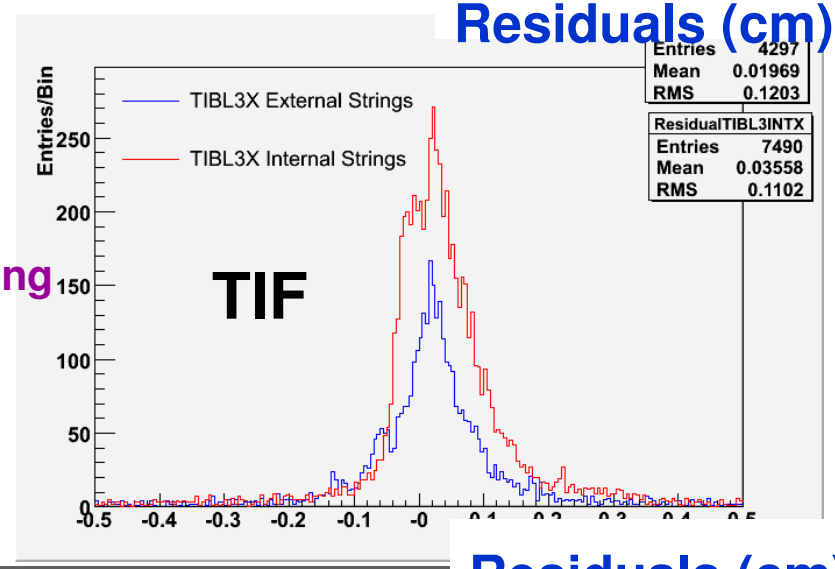






Residuals (cm)

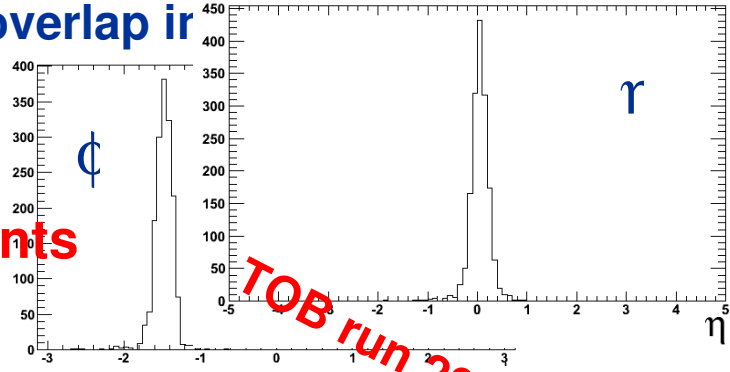
- **Three different algorithms:**
  - cosmic track finder (as in the MTCC)
  - "standard" CKF
    - Several fixes to allow non pointing track reconstruction
  - Road Search



Residuals (cm)

Reco: CosmicTrackFinder

- **Seeds**
  - **from the 3 outermost TOB layers. (2 RecHits or 3 RecHits)**
  - **from the TIB layers (it considers also the overlap ir**
  - **Soon seeds form TEC modules**



- **Efficiency evaluated in Simulated TIF events**
  - **only for events crossing the TOB and TIB**

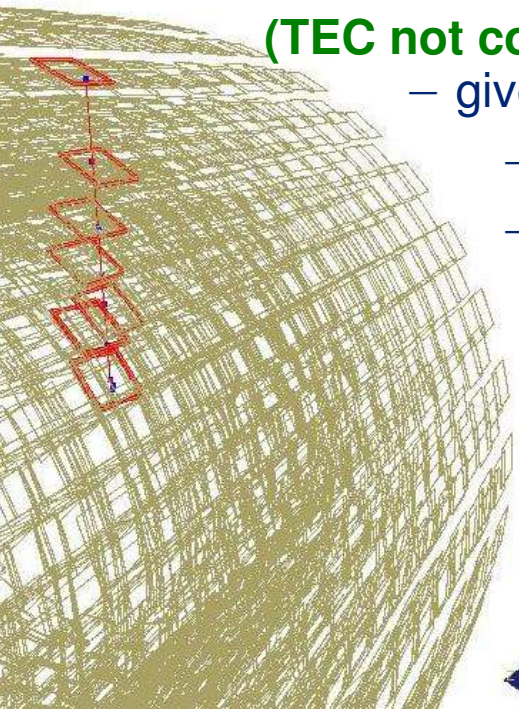
(TEC not considered)

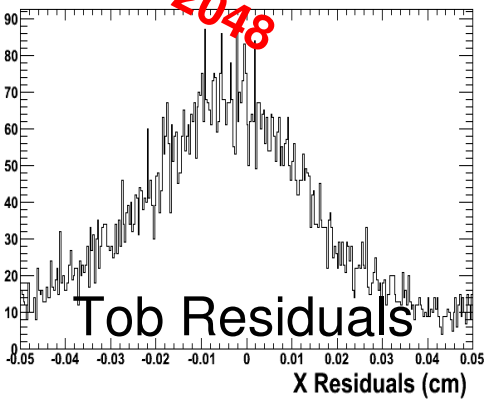
– given at least 4 RecHits:

– Seed efficiency 99.4%

– Track efficiency 98.8%

[99.7% given a seed]



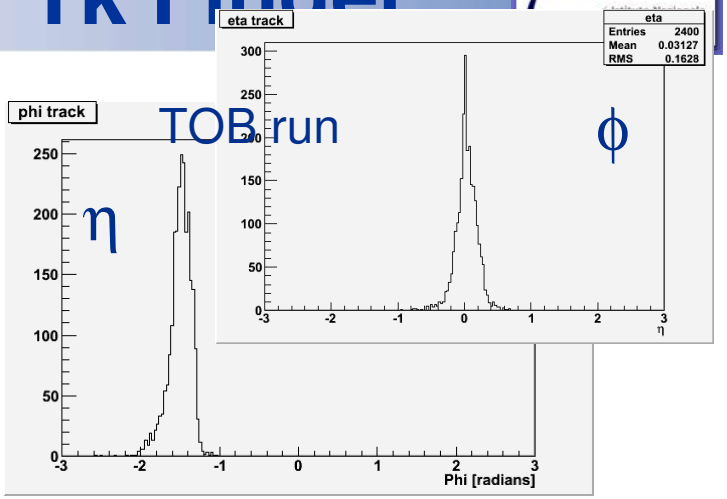


– Event Display running in both CMSSW_1_2_X and CMSSW_1_3_

M. Pioppi, D. Benedetti

Reco: Combinatorial Tk Finder

- **Seeds**
  - TOB only setup
    - hit pairs on layer 1, 2 and 4, 5,6
  - TIB only setup
    - hit pairs on layer 1, 2 and 3, 4
  - TIB+TOB
    - hit pairs on TIB layer 1,2 and TOB layer 4,5,6

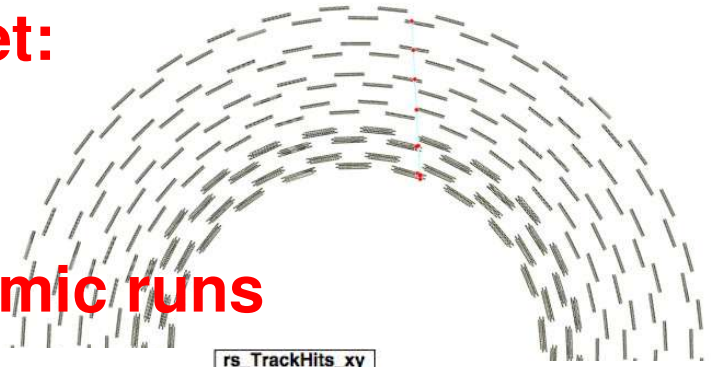


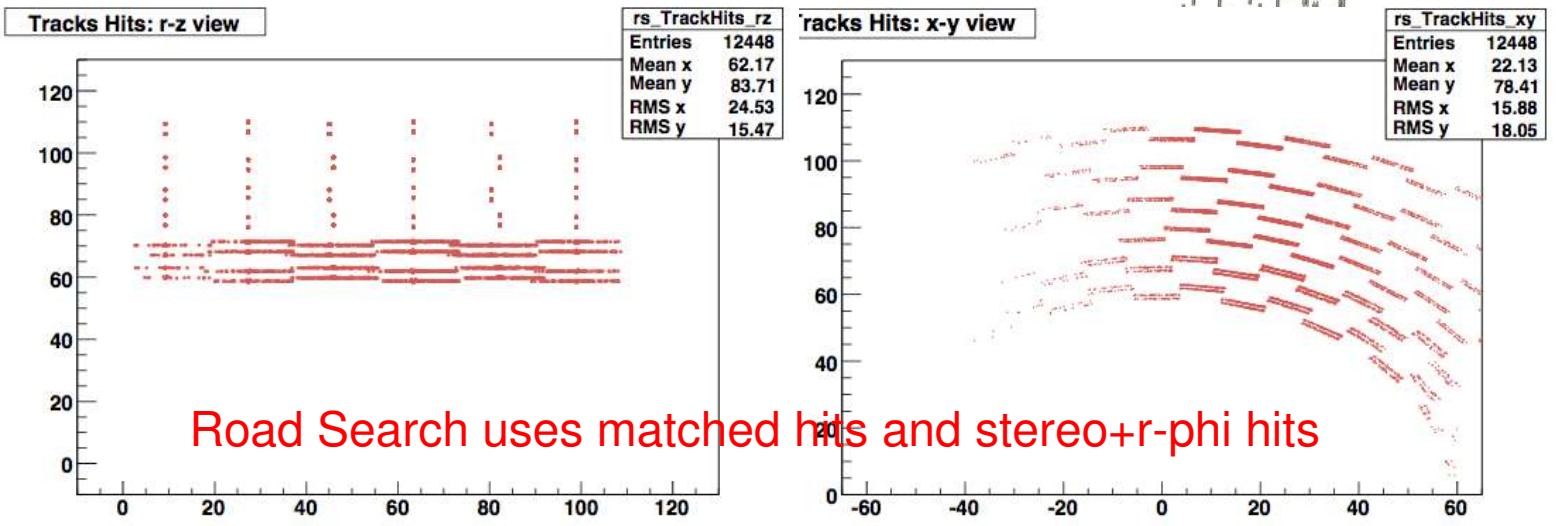
- **all packages needed for CTF are planned to enter soon in a prerelease CMSSW_1_3_0_preX**
  - A dedicated package has been created for cosmic seeding
  - on going studies on data and simulation
- **Allows reconstruction of multiple tracks in the event**

G. Lenzi, C. Genta, B. Mangano

Reco: RoadSearch

- **Road Search Algorithm:**
  - Based on predefined “roads” in the detector
  - Each road is defined by an inner seed and an outer seed and a collection of silicon modules
- **Road definition for TOB+ dataset:**
  - Inner Seed: TOB Layer 1+2
  - Outer Seed: TOB Layer 5+6
- **Running on TOB+ slice test cosmic runs**

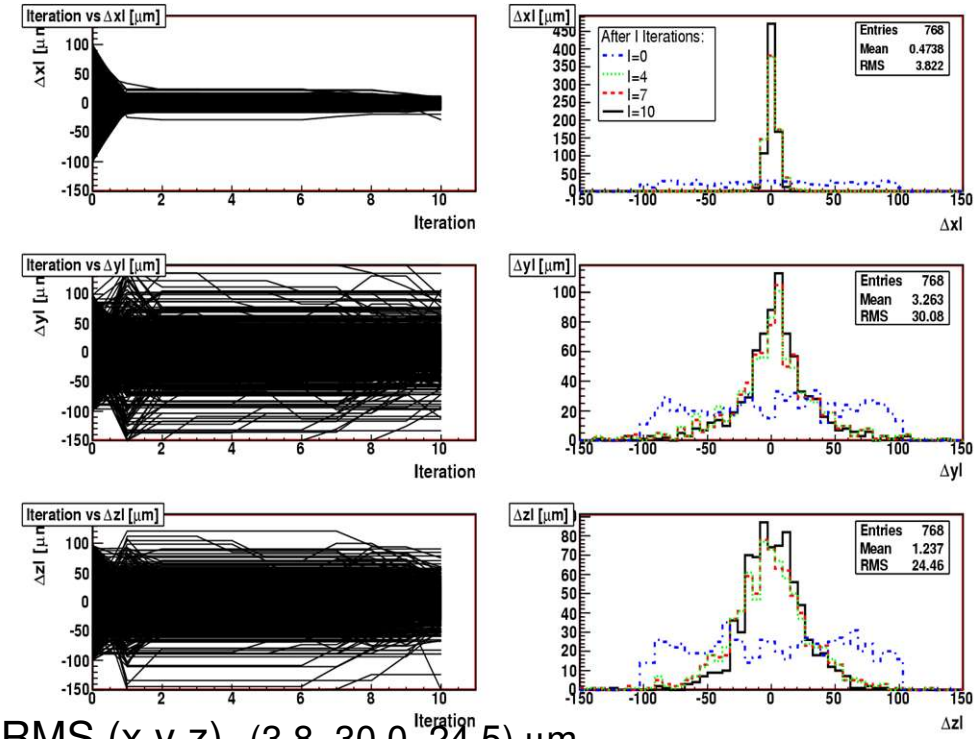


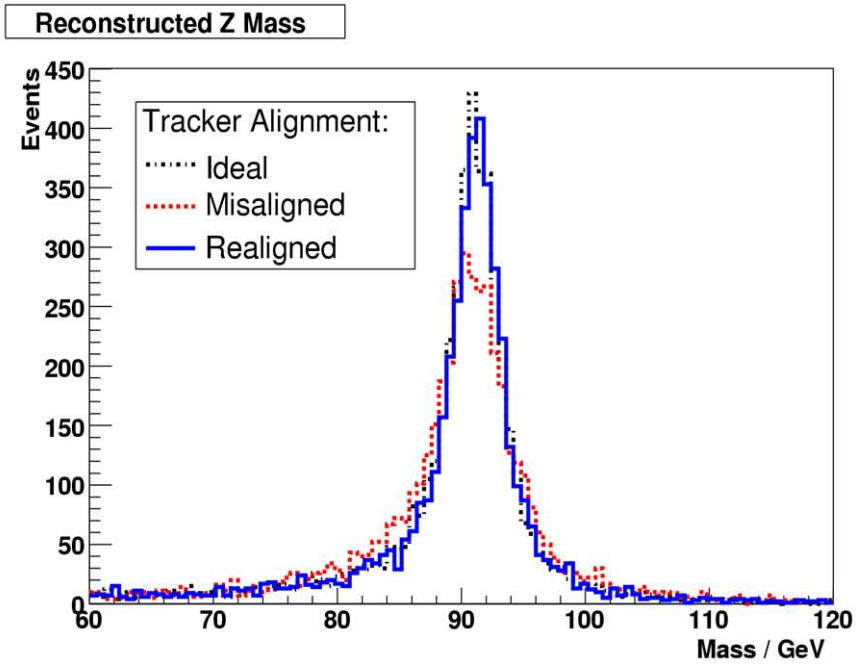


Road Search uses matched hits and stereo+r-phi hits

Alignment exercise at the CSA06

- **Read DB object** to define the initial misalignment
- **Run the HIP algorithm** on ~ **1M Z → μ+ μ– AlCaReco data** in a **parallel way**: 20 CPUs on dedicated cmsalca queue (T0)
- **Output: DB object** with new parameters+ **convergence plots**
- **Process re-reconstructed data** (Z → μ+ μ– reconstructed mass as check)





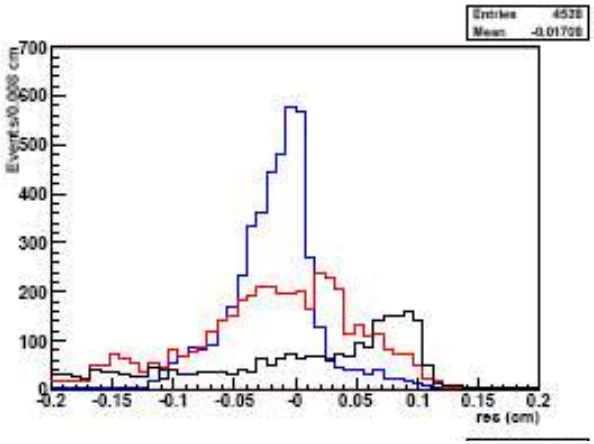
RMS (x,y,z) =(3.8, 30.0, 24.5) μm

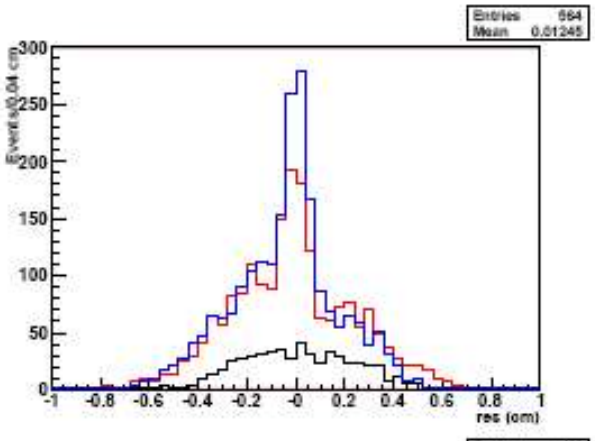
TIB DS modules - positions

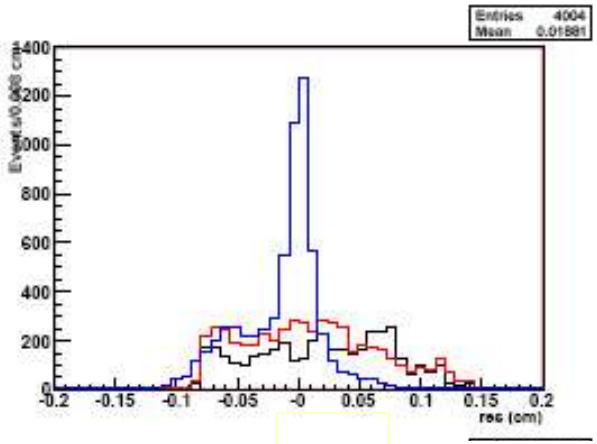
N. De Filippis, L. Edera

HIP alignment algorithm: Residuals in the MTCC

	# rec. tracks	$< \chi^2 >$	TIB2 stereo (μm)	TIB2 (μm)	TIB3 (μm)	TOB1 (μm)	TOB5 (μm)
No ali.	2779	20.0	2598	1023	580	2820	4201
Preali.	4121	16.5	2607	737	560	1150	2603
HIP	4405	12.2	2275	210	140	340	600



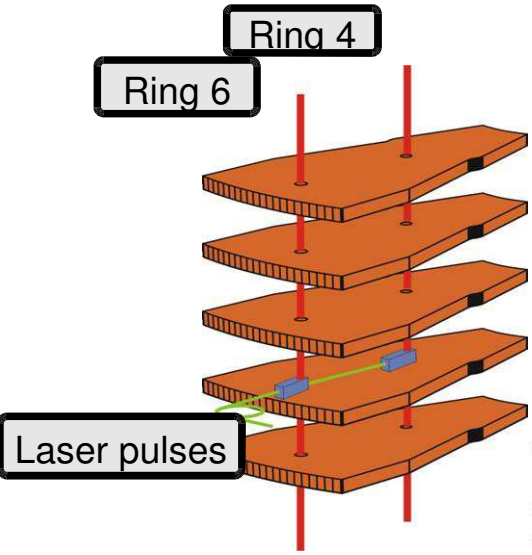




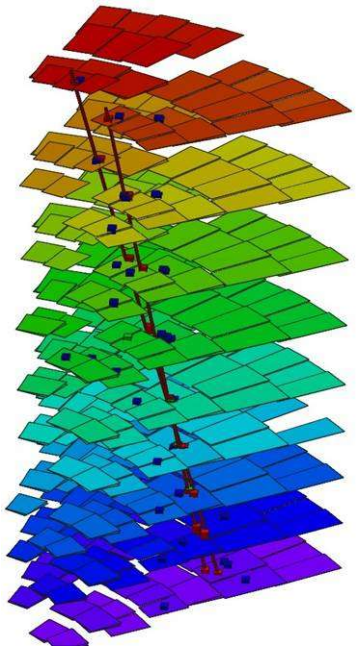
χ^2

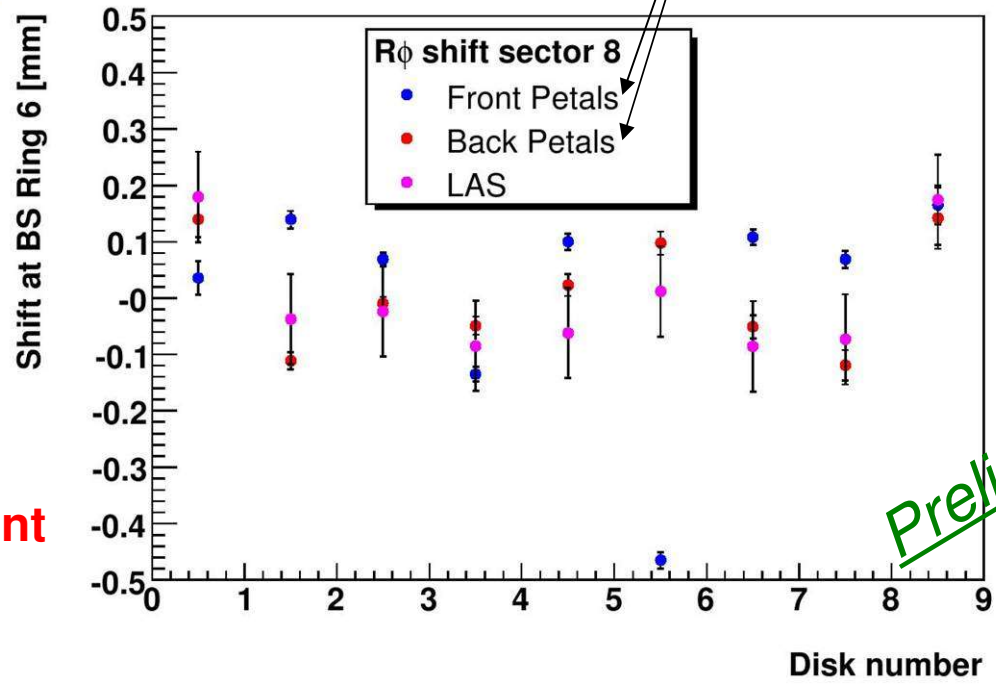
D. Benedetti, M. Biasini, M. Pioppi, R. Ranieri

TEC+ alignment: LAS and cosmics



Tracks
KF alignment algorithm





Preliminary

Excellent agreement between LAS and tracks

Surveys and alignment

Think further

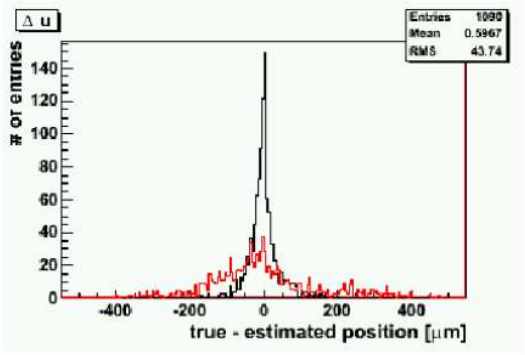
- Discussed up to here: Survey as initial alignment exercise
- How can I use survey in my favourite alignment algo?
  - Implement χ^2-penalty in algorithm
    - Requires knowledge of survey uncertainty
      - DB objects not yet existing
  - Need to make use of hierarchy (survey is done hierarchically):
    - TOB TEC wrt TST, TIB TID wrt TOB, shells wrt TIB, disks wrt TEC, ...
- Studies done with Millepede (M. Stoye) show it helps:
  (100k Z→μμ events, no vertex or mass constraint, rod + string pars)

	RMS	Mean
Δ u	43.7	0.5
Δ v	92.8	23.2
Δ w	232	8.1
Δγ	91.8	-7.4

No survey

	RMS	Mean
Δ u	35.9	1.0
Δ v	95.3	24.4
Δ w	188	8.6
Δγ	74.4	-7.2

With survey



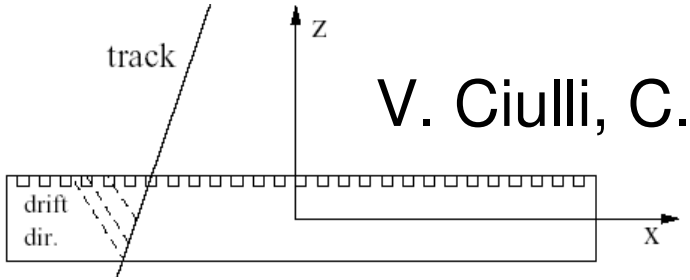
D. Pedrini, M. Rovere, L. Edera, F. Palmonari, R. Covarelli, R. Castello

Lorentz Angle in the MTCC

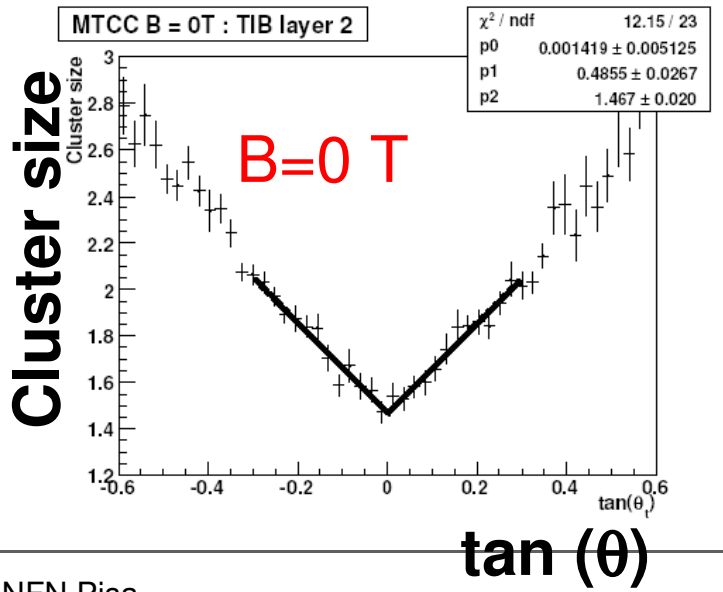
Measure cluster width as a function of the track crossing angle

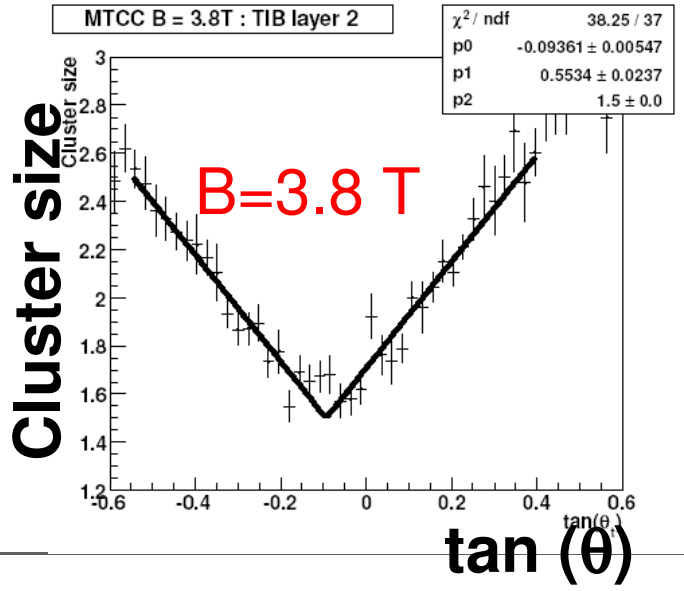
It is minimum for tracks at the drift direction

Corrections made for the orientation of the module wrt the B field



V. Ciulli, C. Genta, S. Frosali



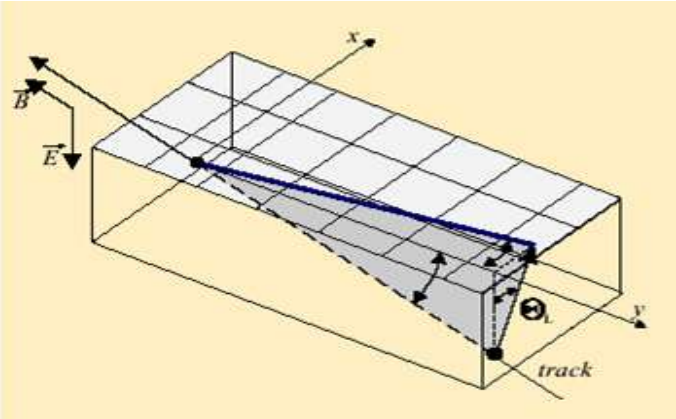


Lorentz angle in Pixel

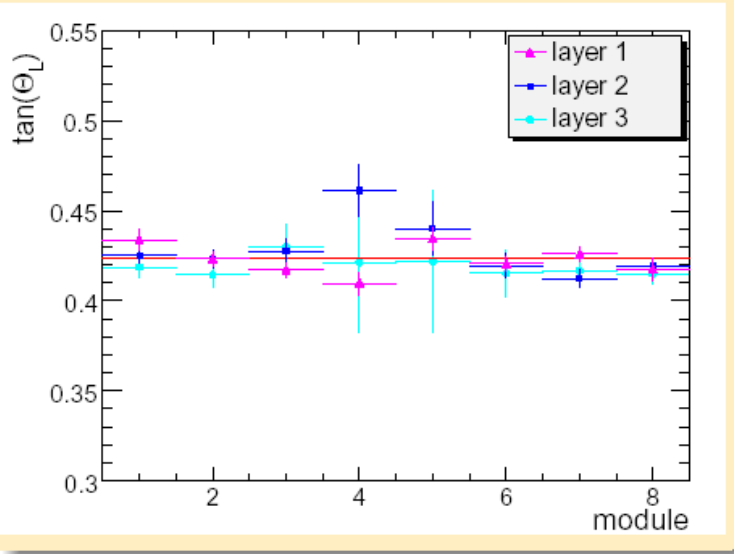
Use fully reconstructed tracks to estimate the angle it makes to the local (x,y) coordinate axes.

An independent estimate of the track angle projected into the (x,y) plan can be made by looking at the distribution in (x,y) of the individual pixels within a cluster.

If there is no Lorentz shift, these two estimates will be consistent.
However, a Lorentz shift will shift the x-coordinate of the hit pixels,
and lead to the two results being different.



$\tan\Theta_L = 0.424$ ($\Theta_L = 23°$)
100'000 events



Can measure with ~2% accuracy with 100k muons. (done in MC)

Plans for the future

Objectives for 2007 – I

- **At the TIF (Strips and FW Pixels) and PSI (BPIX)**
  - Validate
    - Commissioning code
    - Reconstruction code
  - Noise studies
    - Interference between sub-structures
    - DQM running
  - Cluster reconstruction
    - Calibration
    - Deals with dead channels
    - Deals with merged clusters
    - Thresholds optimization
  - Cosmic Track reconstruction
    - Clusters
    - Gain calibration
  - Geometry and Material budget
  - Alignment
    - LAS vs cosmic tracks
    - Make use of surveys
    - Continue tests on DB access and re-reconstruction
- **At P5 before data comes**
  - BPIX commissioning with the rest of Tracker
    - Test/check interference
  - Noise studies
    - Test interference with the rest of CMS.
  - Align with cosmic
    - With (?) and without B field
    - Need triggers from Muons
  - Cosmic track reconstruction
    - Check extrapolation to ECAL, HCAL and Muons
      - relative alignment and synchronization
    - (if B field >0) magnetic field map check

Objectives for 2007 – II

- **Simulation tuning**
  - Use TIF and P5 data to tune simulation
    - Detector geometry
    - Material budget
    - Gain simulation
    - Capacitive couplings
    - (when B field in P5) Lorentz angle
  - Check delta rays cut offs
  - Check time resolutions
  - FAMOS
- **Track reconstruction**
  - Cosmic muons
  - Beam halo muons
  - V0 and photons
  - Low momentum (below 1 GeV) tracks
  - Nuclear interactions
  - Electron reconstruction
  - Tracking in dense jet environments
    - DAF
  - Pixel tracks
  - Regional reconstruction
  - Partial track reconstruction
  - Code profiling

Objectives for 2007 – III

- **Alignment**
  - Data base access of surveys
  - Algorithms
    - HIP and Millipede algorithms ported, KF being ported not yet released
    - Common improvements
      - Use constraint from overlapping sensors
  - Alignment strategies
    - Develop a viable strategy for aligning the full CMS Tracker
      - Before data taking
      - During the 2007 pilot run (only limited part of pixels)
      - 2008 run (full Pixel installed)
  - LAS
    - Compare HW alignment with the cosmics and beam halo muons
- **Vertex reconstruction**
  - Beam spot determination
    - Store in DB
    - Study how it could be updated in FU?
    - Measure profile as a function of z
  - Primary vertex determination
    - With and w/o pixels
  - Reconstruction of distant vertices
    - V0 and photon conversions
    - Nuclear interactions

Objectives for Alignment

- **TIF alignment**
  - R. Covarelli and R. Castello
- **Surveys**
  - F. Palmonari
- **LAS system fully commissioned**
- **Alignment strategy for full Tracker**
  - M. Rovere, D. Pedrini, L. Edera
  - Need help in the beam halo, minimum bias, J/Psi

Objectives for Tracking

- General CTF maintenance
  - B. Mangano, G. Cerati, D. Menasce, S. Magni
- Cosmic reconstruction
  - D. Benedetti, C. Genta, G. Lenzi, B. Mangano, M. Pioppi
- Tracking with inefficient detectors
  - G. Petrucciani, F. Ambroglini
- V0 and gamma conversions
  - M. Chiorboli, C. Genta, N. Marinelli
- Tracking with displaced beam
  - G. Petrucciani
- Low p_T tracks
  - L. Fano', F. Ambroglini
- Track momentum scale, tracking efficiency
  - A. Kraan, F. Ligabue, L. Borrello, started, help needed
- Efficient Tracking for pions
  - C. Riccardi, U. Berzano, J. Bernardini, started
- Passive Layers and material estimate from data
  - A. Bocci, R. Ranieri, G. Sguazzoni, started, help needed

Objectives for Simulation

- **MC tuning vs data**
  - **F. Ambroglini, P. Azzi, M. De Mattia**
- **Geometry and Material Budget**
  - **F. Palmonari. R. Ranieri, A. Rizzi, G. Sguazzoni, may need some help**

Objectives for Data Handling

- **TIF Data taking and analysis software**
  - V. Ciulli, D. Giordano, S. Dutta, P. Azzi
- **Commissioning for pixel**
  - V. Chiochia
- **Unpacking FED**
  - D. Giordano
- **Gain calibration**
  - D. Giordano, M. Meschini, need help
- **DQM**
  - S. Dutta, need help
- **Visualization**
  - M. Mennea, G. Zito

Conclusion and perspectives

- **Porting of the code from ORCA to CMSSW has been the main activity in 2006**
  - Mainly finished, continue to port some algorithms
  - Validation of the PTDR- Vol. 1 plots will be finished by February
- **Successfully ran on real setups at the MTCC and TIF**
  - This allowed to establish
    - Commissioning and monitoring the detector
      - ➨ Increasingly good interactions between online, offline, detector and DCS/DSS groups
    - Data handling and shipment to Tier2 centres for offline analysis
      - ➨ Allows the involve the whole community to analyze Tracker performances
    - Check geometries and fix bugs
    - Improve simulation comparing MC to real data
      - ➨ Calibration of the noise, Lorentz angle and gain studies
    - Reconstruct cosmic muon tracks and start align procedures

Work to do

- Year 2007 will continue to test the Tracker and its SW
  - At the TIF and PSI
    - On separate setups
    - On combined and increasingly complex setups
    - Cosmic ray data taking
  - At the P5
    - As a whole assembled detector and using cosmic rays
    - Preparation for the 2007 pilot run
- Need to increase the track reconstruction capabilities
  - Recover efficiency for pion tracks, V0, photon conversions, nuclear interactions etc
- Need to establish an alignment strategy for startup
  - Internal Tracker alignment and wrt the outermost CMS systems
- Need to establish a strategy for determining
  - Track efficiency from data
  - Momentum scale
  - Material budget
  - Position error determination

Backup transparencies

From Channels to Global Coordinates

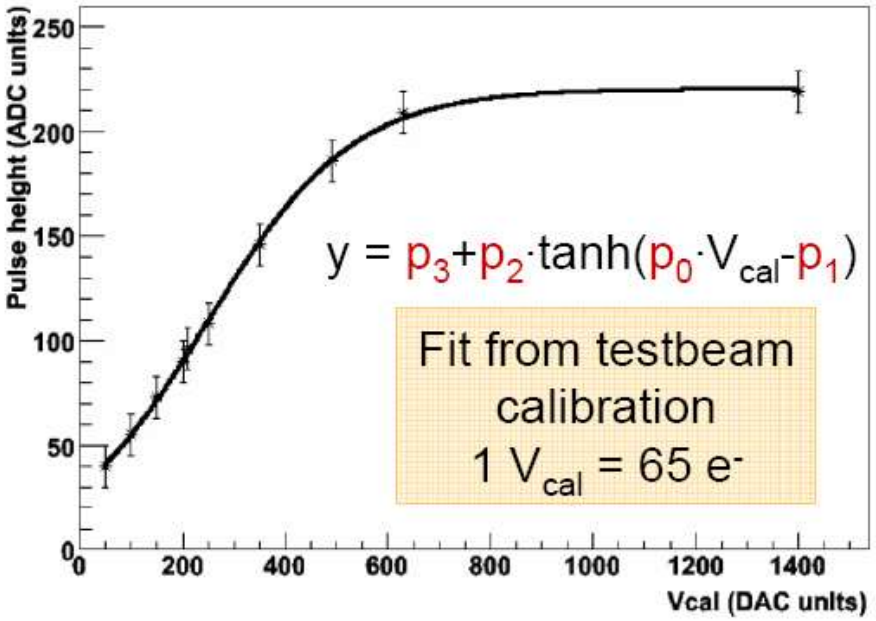
- **Need to know a given channel its position in global coordinate system**
  - ~45 k connections between APV pairs and FED input channels
    - Need to know where APV pairs are placed in space
- **How is it done?**
  - Detect automatically connections
    - Performed during commissioning procedures and stored in online DB
  - Match DCU ID and geometric position done once for all from construction DB and put to online DB
  - Transfer cabling information to offline DB
    - Final cabling object in offline DB
      - ➨ Data rearrangement and Online DB to offline DB software developed
    - Geometry files know where each structure is positioned in space

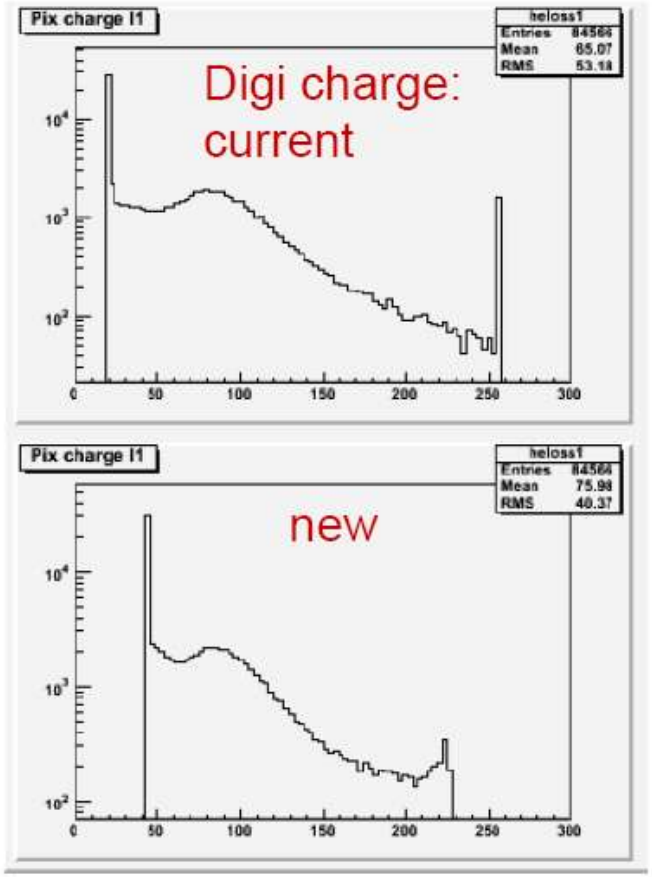
Local (cluster) reconstruction

- **Clusterizer module ported to CMSSW since long, however it still miss calibration data for optimal reconstruction in real setups**
  - **Pedestals, Noise, bad strips**
    - **Computed during commissioning**
    - **Transferred to offline DB with scripts. Now are executed "by hand". Need to make the transfer automatically**
      - **Read/write to offline DB very performing (<1 s) using BLOBs**
  - **Gain correction**
    - **One discrete parameter per APV computed and set in hardware during commissioning runs using tick marks height**
    - **… or gain calibration from pixel online**
    - **Final correction by using MIPs with data**

Saturation in pixel taken into account

- Goal: more realistic simulation of A/D conversion in digitizer
- Simple linear parameterization replaced with functional form





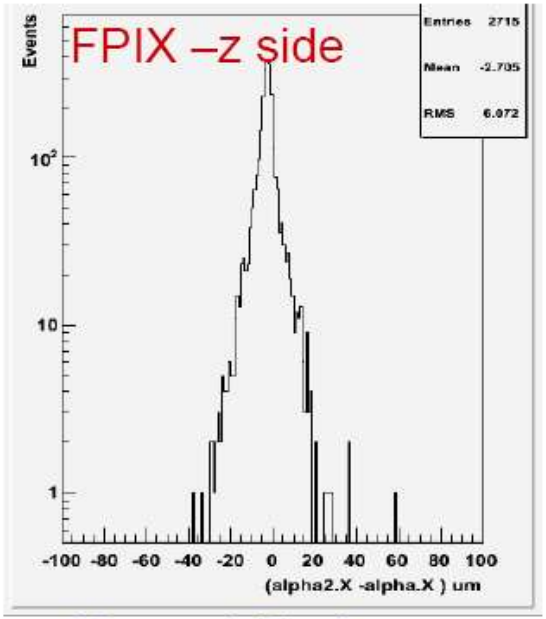
E •B effect in pixels

- Charge carrier velocity:

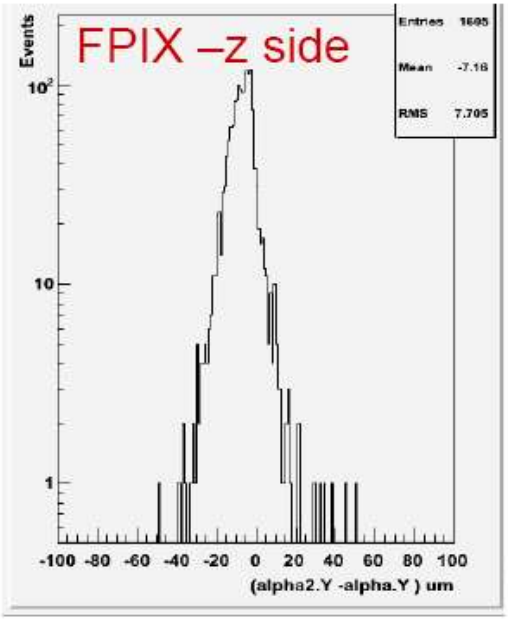
$$\vec{v} = \frac{\mu\left[q\vec{E} + \mu r_H \vec{E}\times\vec{B} + q\mu^2 r_H^2 (\vec{E}\cdot\vec{B})\vec{B}\right]}{1-\mu^2 r_H^2 |\vec{B}|^2}$$

E·B≠0 for FPIX due to the 20° rotation w.r.t. the magnetic field.
E·B=0 for BPIX

- Expect ~-3μm shift along local x and ~±7μm along local y

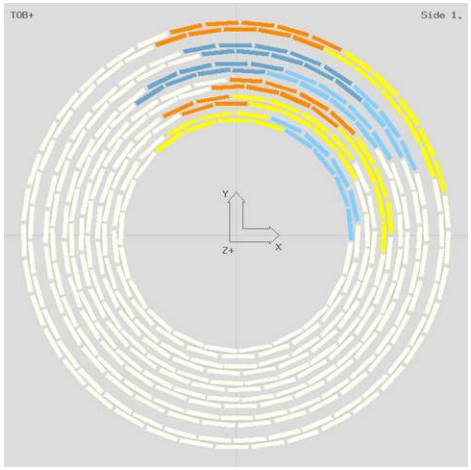


Mean shift along x
~-2.7μm



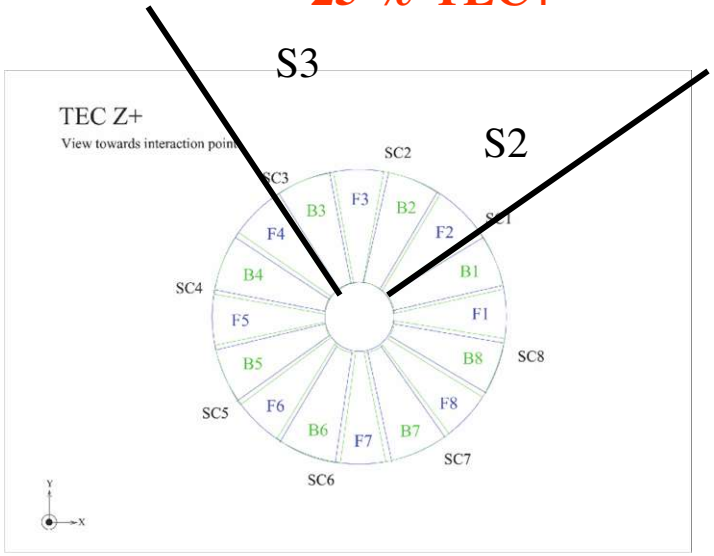
Mean shift along y
~-7.1μm

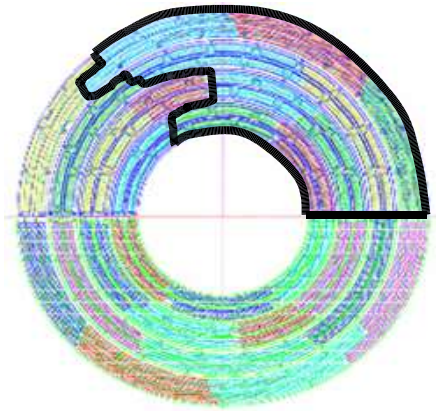
TK Sectors participating to the Slice Test



TOB+ Sector
720 Modules.
28% TOB+

TEC+ Sector
800 Modules.
25 % TEC+



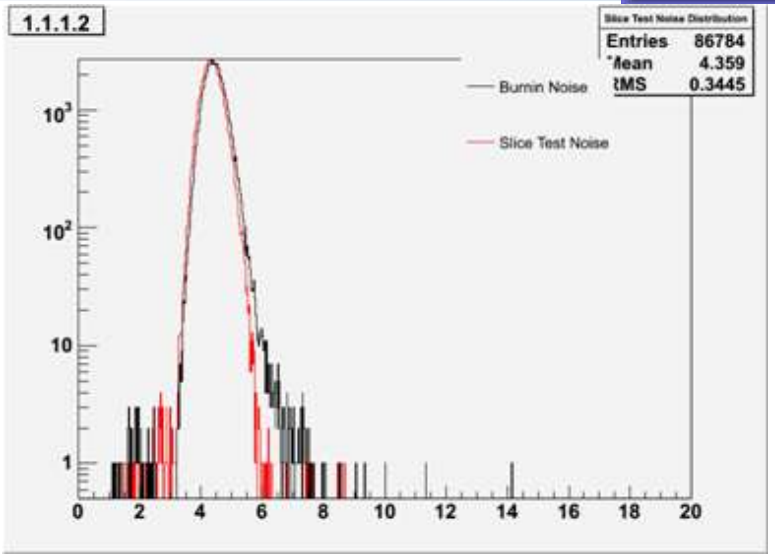


TIB+ Sector and 50% of TID+ (not shown)
640 Modules.
36% TIB/ID+

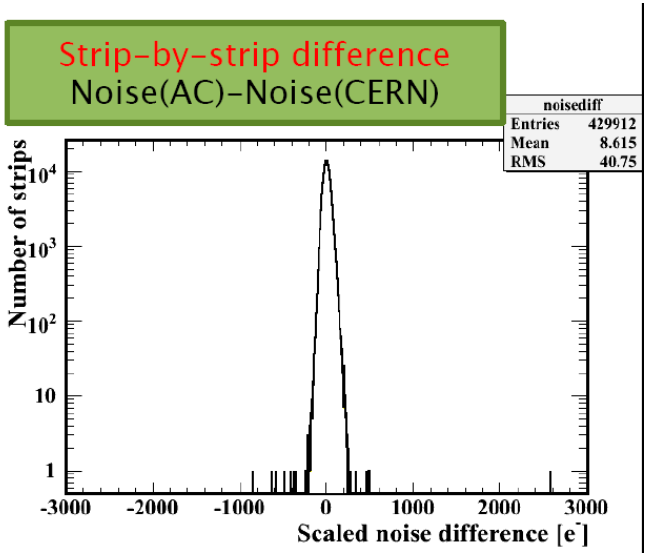
Service Installation completed for TOB+ Sector, started for TIB/ID+ Sector, to be done for TEC+

QA in the TIF

- Tested separately all substructures with excellent results
  - # Defective channels <0.2%
  - Reproducible noise behaviour (TIF vs system tests)



- TIB/D+ inserted in TOB+ and in TST
- TEC+ test finished
- TEC- cold test started
- TOB/D- cabling finishing in Jan.
- FPIX start being shipped to CERN this week. (both 2007 and final, in quarters)
- BPIX on test at PSI



Documentation

A detailed documentation on procedures for TIF Analysis can be found in the dedicated twiki page

https://twiki.cern.ch/twiki/bin/view/CMS/TIFDataAnalysis

- The web page contains all the details necessary to run reconstruction algorithms (from FEDBuffers to Tracks), DQM, Event Display and some standard analyses
  - Using stable code
- Dynamic page: new information appears quickly, following the development
  - last tags to be used
  - new analysis tool available
- Allows feedback from users (very welcome!!!)

Condition Data from DB

- **Condition Data Access from Offline DB concerns the low level reconstruction, DQM, Visualization**
  - **Condition Data: Cabling, Pedestals/Noise/Bad Strips, Gain**
  - **synchronization of CondData with event data is automatically provided by CMSSW framework**
  - **CondDb could be the best place where ship other "Condition" data: from DCS, Error Diagnostic System, ..**
    - **Reduce load on ConfiguratioDB**
    - **Support on this DB it guarantee from IT; Frontier cache allow data access outside cern**
- **An Online-to-Offline (O2O) procedure takes care of data manipulation and transfer from Online to Offline DB**
    - **Acts at the beginning of a new run, if Conditions have been changed respect to the previous run in the Configuration DB (Online DB)**
    - **It's under integration in the RunControl: automatic procedure running at the Configure Step**
    - **Backup solution in case of troubles on the automatic procedure: a standalone CMSSW process can be executed "by hand"**

Condition DB Web service

- **Tool provided by Z. Xie to browse the Condition DB tables**
  - **Currently is a prototype under development: only IOV and Metadata tables accessible**
  - **could be extended to other Condition Data**
  - **It's an useful tool to discover ConditionData already uploaded in the OfflineDB**

ond/CondWeb/IOV_tag_man.php