

ITS Offline – Status Report

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Outline

- Geometry coding (a.k.a. v11)
- Dead/noisy channels treatment in reconstruction
- Alignment
- ITS Plane efficiency
- Specific subdetector issues

Not covered here:

- ITS tracking → next talk
- QA → Piergiorgio's talk
- ITS commissioning: 3 talks at the commissioning workshop last week.
- DA & preprocessor: 3 dedicated talks on Friday

Geometry: V11

- The v11 Hybrid geometry has been extensively tested and several bugs have been found and fixed in the last months
- Modifications to allow mis-alignment have been done where needed
- At the last ITS alignment and offline meeting (last Monday) has been decided to adopt this geometry as default in Config.C
- However there are still some outstanding issues

Geometry: to do

- Still missing:
 - Patch panels and cable trays (RB24 and 26 sides).
 - Task 2200. New proposed date: May, 16th
 - SPD/SSD cables on the the cones
 - SPD – task 1301. New date: Apr 30th
 - SSD – task 2199. New date: Apr 30th (my estimate)

Geometry: overlaps

- Up to 267 overlaps/extrusions inside ITS mother volume ITSV
 - 115 extrusions cured by changing ITSV from real volume (PGon) to VolumeAssembly (< 1% time increase in generating 100 Hijing events)
 - 144 overlaps due to missing alignment correction in AliITSv11GeometrySSD (by E. Cattaruzza)
 - 4 disappeared after SDD cable in TGeo
 - ... but a few other overlaps appeared in the process

M.Sitta @ ITS align/offline meeting

Geometry: overlaps

- Still remain 22 overlaps
 - no extrusions
 - 12 overlaps inside ITSV between TGeo volumes
 - 2 overlaps between Geant3 ITS volumes and TPC volumes
 - 8 overlaps between Geant3 ITS volumes and Absorber volumes

M.Sitta @ ITS align/offline meeting

These overlaps must be fixed with high priority. Coordination with TPC and MUON may be needed

Bad channels treatment in reco

- This issue has been discussed at length in several meetings
- Last time: during and after ITS alignment & offline meeting. Experience gained with commissioning runs was fundamental

PLAN

- SPD+SDD: Noisy pixels and anodes will be masked before local reconstruction
- SSD:
 - Mask noisy strips
 - CF will create fake clusters ($Q=0$) at crossing of 2 bad strips (or 1 bad+1 firing)

Bad channels... Plan

- The tracker will own an instance of a new class (AliITSCheckStatus) which will:
 - Be initialized starting from AliITSCalibrationSXD objects (hence from OCDB)
 - Have a bitmap containing the status of the channels (good or bad)
- The tracker will also store bad modules and bad chips info (in AliITSdetector objs)
- These info will allow the tracker to prolong a candidate track in absence of a RP on a layer with bad channels on the “road”

Bad channels: implementation

- Chip number treatment:
 - Needs mods to AliITSsegmentationSXD and AliITSCalibrationSXD.
 - Done for SPD and SDD
 - To be done for SSD. Task 2205.
- Switching off channels in SPD/SDD CF
 - SDD: done. Details later on. (task to be added)
 - SPD: prototyped. To be committed in this week. (task to be modified)
- Fake clusters in SSD
 - Task 2207. Due date Apr 30th

Bad channels: implementation

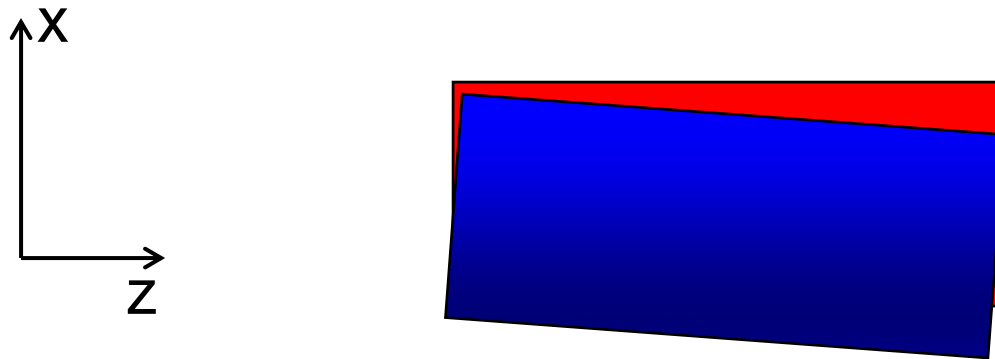
- Tracker:
 - The task and the deadline must be defined in detail. It will take a couple of months.
 - The AliITSChannelStatus class will be protoyped shortly
 - Its methods will evolve with the tracker
 - People in charge have been found

Alignment

- Important activity on this subject by several people (Cern, Padova, Trieste, Nikhef, OSU)
- Several strategies. ITS standalone and ITS+TPC
- Regular meetings (alignment+offline) at Cern → Slides on Indico as ITS/offline
- Commissioning data not enough to do real business... However we have first hints

SPD alignment: indications from data

- Some indication of SPD Half Barrel-to-HB misalignments
 - $\Delta x = -600 \mu\text{m}$
 - $\Delta\phi$ (around z) = -4 mrad
 - $\Delta\theta$ (around y) = -3 mrad



ITS plane efficiency

- Plane efficiency measured using high quality tracks by removing one layer at the time from the tracker
- Implementation
 - new virtual class in STEER: AliPlaneEff
specific implementation for detectors (and subdetector) inherits from it, e.g. :
 - AliITSPlaneEff
 - AliITSPlaneEffSPD
 - AliITSPlaneEffSDD
 - AliITSPlaneEffSSD
 - new methods/data members in AliReconstruction to perform (on demand) plane efficiency evaluation
 - Tracker(s)
 - AliDetTracker (e.g. AliITStrackerMI) upgraded to perform plane efficiency evaluation
- Work in an advanced state: task(s) to be added

Detector specific issues

07 Apr 2008

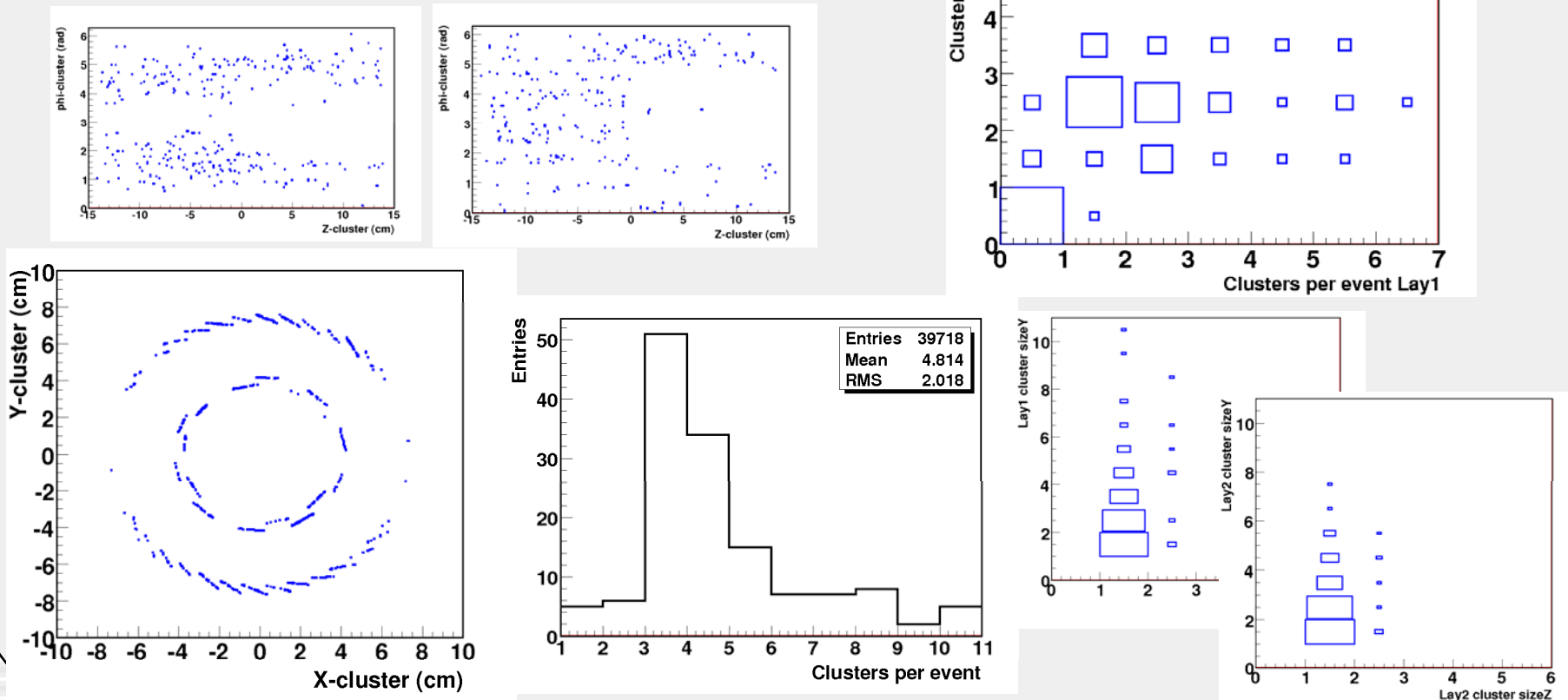
ITS Offline status

SPD

- Lorentz drift in the silicon sensor (G.E. Bruno):
 - effect estimated to be sizable (10 μm shift)
 - potential impact on the performance (and alignment)
 - implemented in the code (presently OFF by default)
- firing SPD chips per layer in the ESD:
 - member in AliMultiplicity fFiredChips[2] to be filled (J.F. Grosse)
 - useful info for Fast-OR (high multiplicity) studies from ESD
 - code to be finalized within the next week

SPD: Cosmic run analysis

Cluster distributions:



SDD: Zero suppression in Aliroot

- Zero suppression algorithm in AliITSsimulationSDD was no longer corresponding to the one actually implemented in the CARLOS card
- The treatment of raw signal in the cluster finder was tuned on the old suppression algorithm, so it doesn't work properly with real raw data
 - Bias on the cluster charge, not on the position
- Correct zero suppression algorithm implemented in AliITSsimulationSDD and correct treatment in AliITSClusterFinderV2SDD
 - Committed to the trunk on March 19th

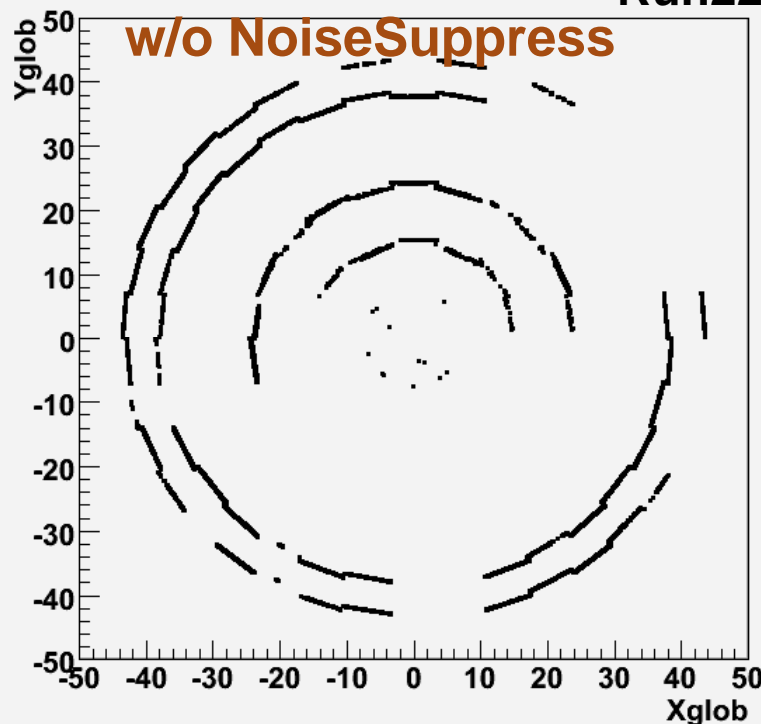
SDD: commissioning run data analysis plan

- Implement a method for noise suppression in the cluster finder to reduce the number of noise clusters due to the use of low zero-suppression thresholds
- Include SDD points in the ITS tracking
 - Tune time offset
 - Parameter to be used to convert from measured drift time to drift coordinate (accounts for trigger and electronics delays)
 - To be tuned from the residual between track reconstructed from SPD (and SSD) and cluster position
 - Extract (if possible) some info about alignment (at least for the z coordinate measured by anodes)
 - Tune ADC to keV charge conversion constant
 - To be tuned from the charge deposit by a cosmic muon (MIP)

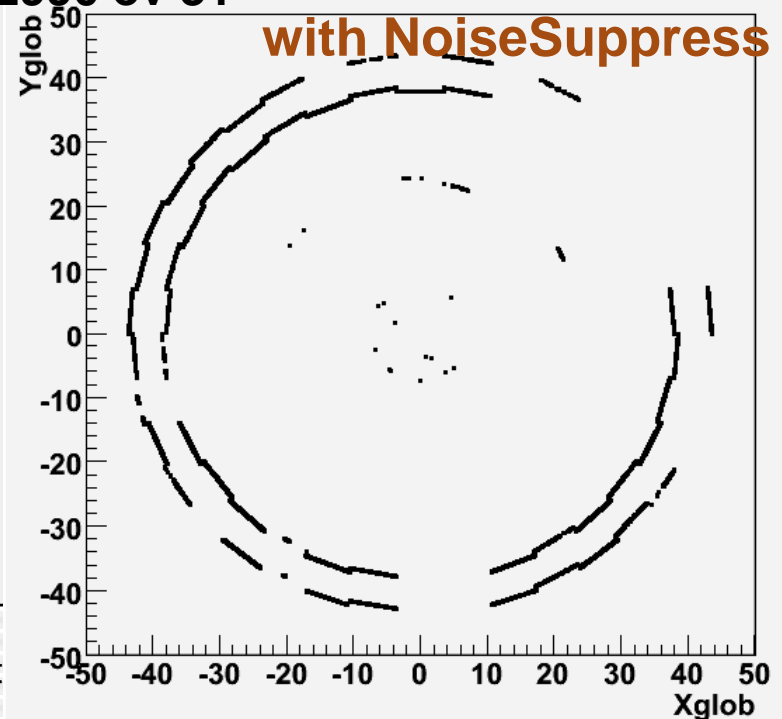
SDD: noise suppression

- **Noise suppression method implemented in AliTSClusterFinderV2SDD**
 - Called before starting the cluster finding
 - Same algorithm as implemented in the hardware acquisition card
 - Threshold set specifically for each anode on the basis of its noise
 - Online only a threshold at the hybrid (256 anode) level could be set

Run22252 012.2990 ev 31



line stat



SSD: Noisy clusters

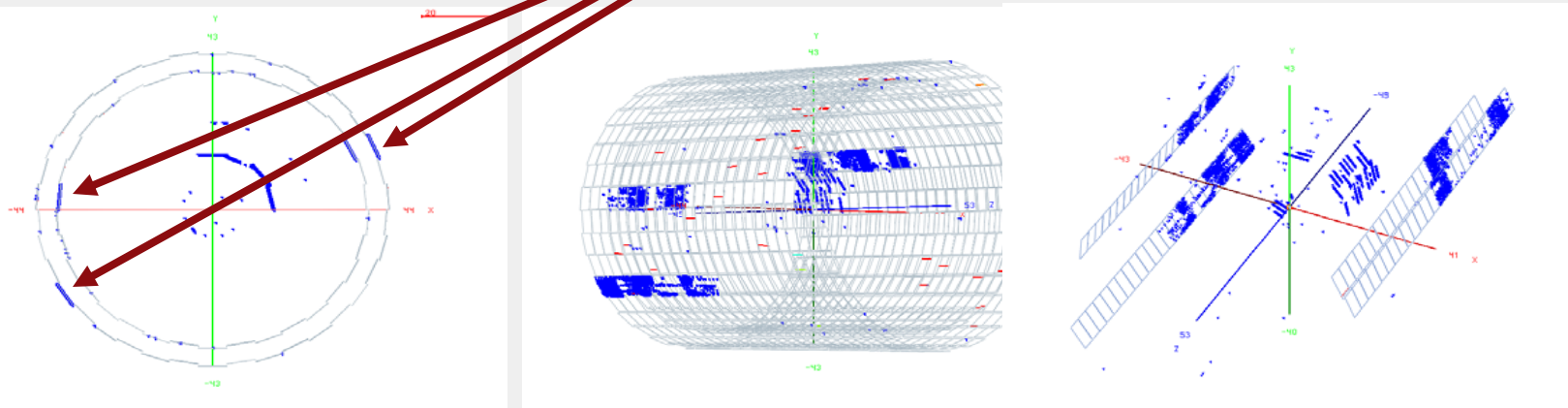
Before calibration run - OCDB objects

A-Side noisy clusters disappeared

We still see noisy clusters in several C-Side modules:

- Ladder 502 - Modules 15 to 18
- Ladder 516 - Modules 14 to 22
- Ladder 602 - Modules 14 to 25
- Ladder 622 - Modules 13 to 25

Include them in the bad channel map?



After calibration run - OCDB objects

SSD: noise suppression

- In order to include SSD in the standard reconstruction, it is mandatory to remove the C side noisy clusters
- Update the list of noisy channels in the OCDB
- Switch them off in C.F. (see previous slides)
- Estimate the influence of the dead/noisy strips to the efficiency.