Run2 reconstruction status and plans

R.Shahoyan for PWGPP, 02/07/2015

Pass1 of LHC15f

Runs in pass1: V0 + AD + TPC + Full ITS + TOF + TRD (except "golden run" 225105)

225000 225011 225026 225031 ***225035 225050 225051*** 225052 225105 225106
225576 225578 225579 225580 225582 225586 225587 225709 225716 225763
225768 226115 ***226444 226445 226466 226468 226472***

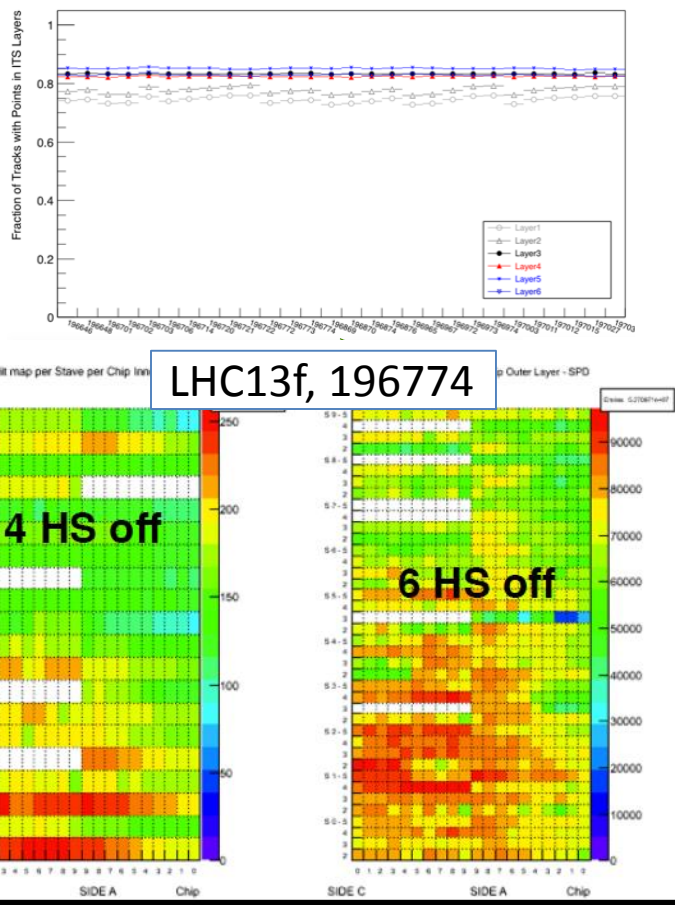
V0C incomplete / Low TPC multiplicity/ *EMCAL mult. low* / B=0 run

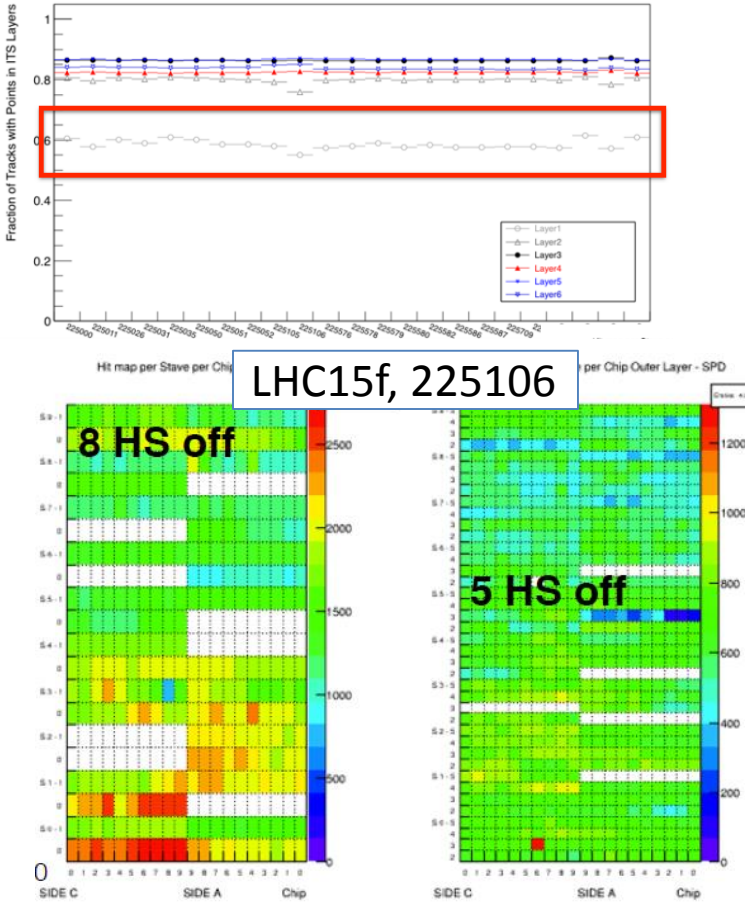
27 runs: 17M MB triggers → 15M for B≠0 → 13 M for good runs

- Rejection statistics (runs with TPC):
  - 62 runs (58M MB) started CPass0
    - 15 runs (9M MB) did not survive reconstruction (mostly PHOS crashes in Minuit fits, **fixed**)
  - 20 runs did not survive CPass0 calibration (makeOCDB)
    - few due to the low statistics but mostly due to the TRD validation (main reason: run1 settings are not good for run2)
    - TRD updated makeOCDB, most of failed runs will be recovered in next pass

ITS:

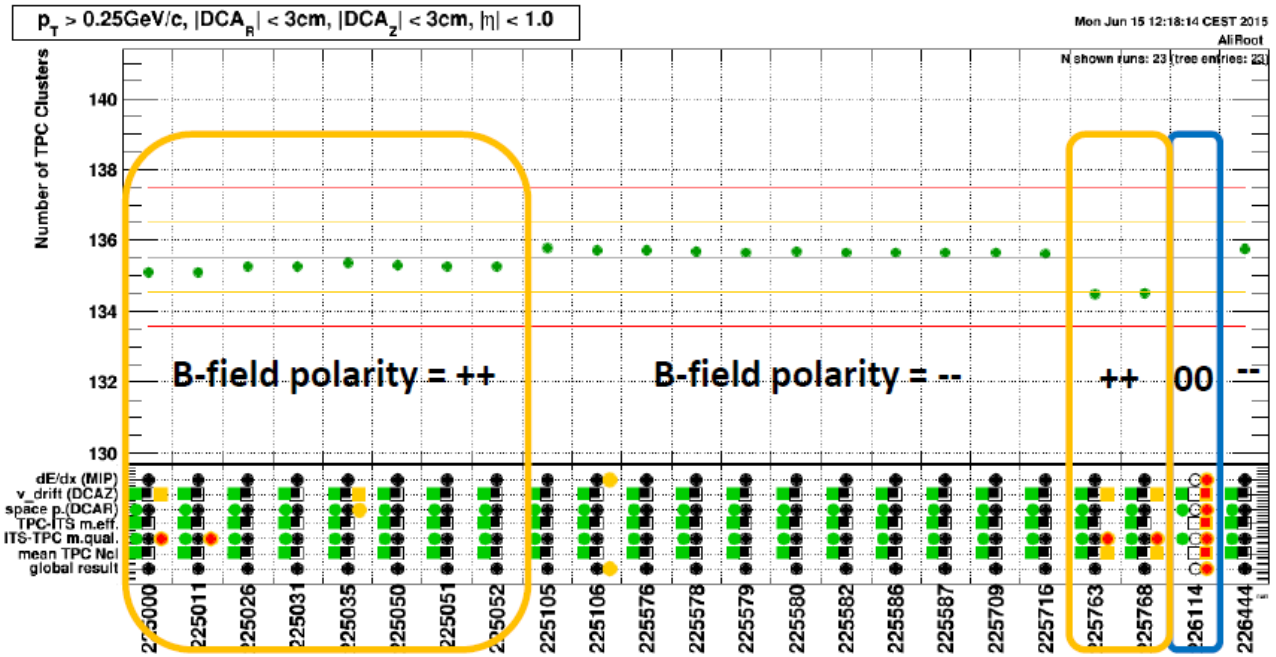
- Low fraction of tracks with SPD clusters: less active staves than in 2013
- 7 of nominally active half-staves send (mostly) wrong data (mismatch between FOR and hits, MEB problem suspected, investigated) → current OCDB maps are not good for MC
- Must be masked in the OCDB before next pass/MC
- Problem seems to be self-cured in the end of LHC15f, stability to be confirmed





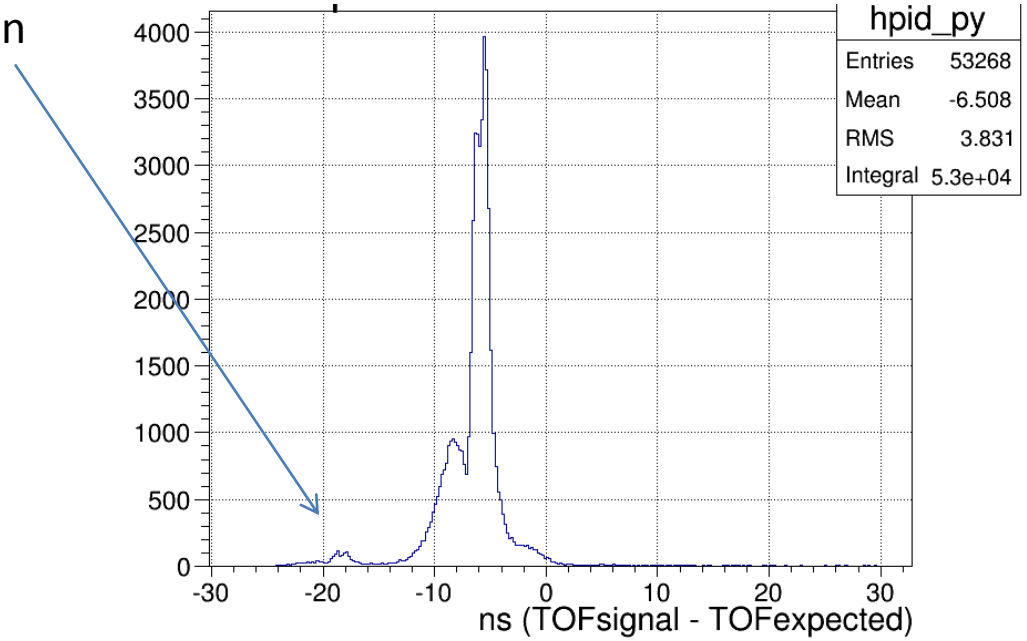
TPC:

- Full sector C08 missing (+ ½ IROC A15, already repaired)
- Higher gain with new gas → mean number of clusters/track higher (~136 vs 132 in Run1)
- MIP is currently shifted to ~56 (should be 50): effect of different weighting between OROC long/short pads, calibration procedure being revised
- Mean multiplicities are OK
- QA of B+ runs are somewhat worse than for B-, in terms of DCA bias, clusters/track, mean multiplicity.. **To be understood**.
- Old correction maps are used: the new ones should be produced with new alignment



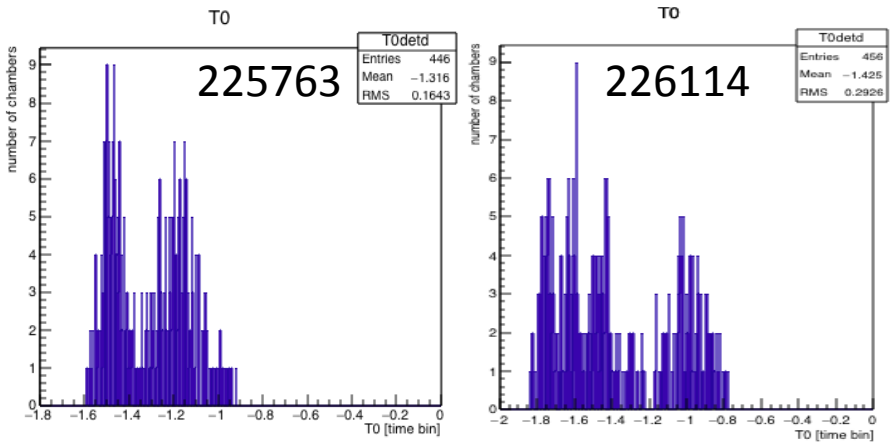
TOF:

- Shift by 30ns in raw t0
  - Due to the overflow of calibration histograms → 7ns shift after calibration. Now fixed in the OCDB, will be at ~0 already in Cpass0.
  - Since BC tagged by TOF-expected time difference is used to tag the pile-up, significant fraction of primary vertices were tagged as pile-up → loss of statistics used in CPass
- Some channels need manual calibration

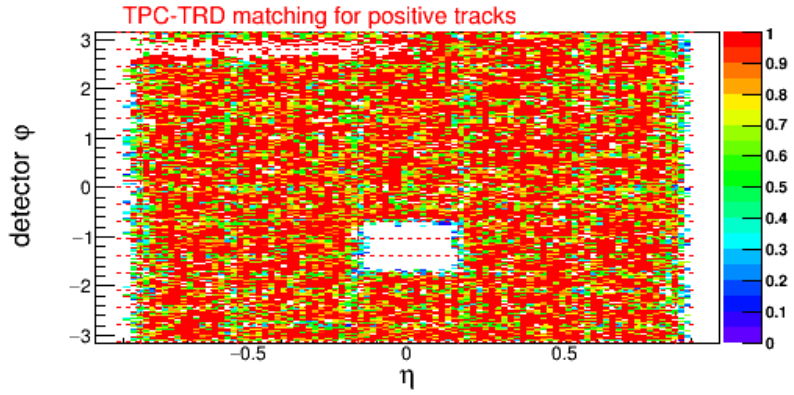


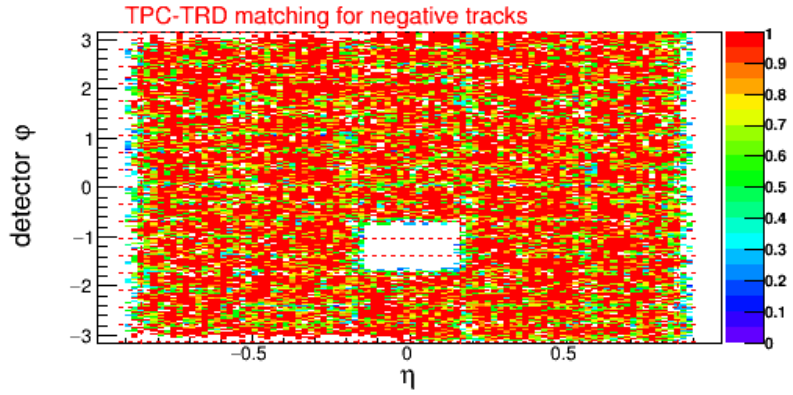
TRD

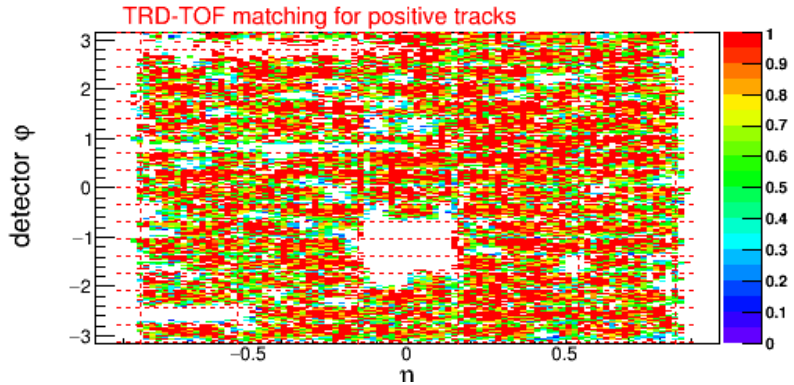
T0 shows grouping in chambers, changing from run to run,
trigger configuration dependent
→ being investigated (not a blocker)

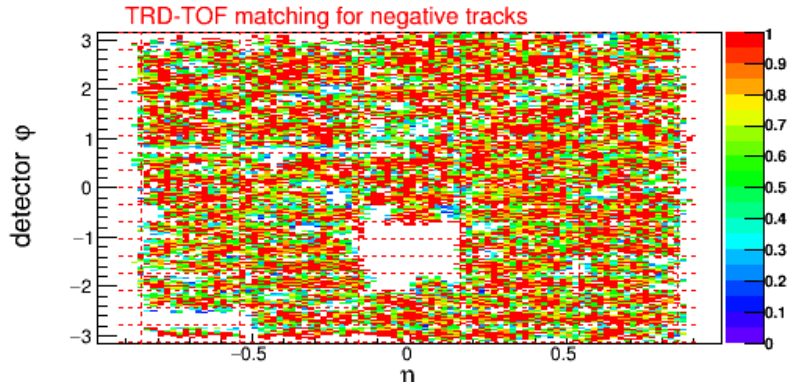


Matching efficiencies are good in all sectors





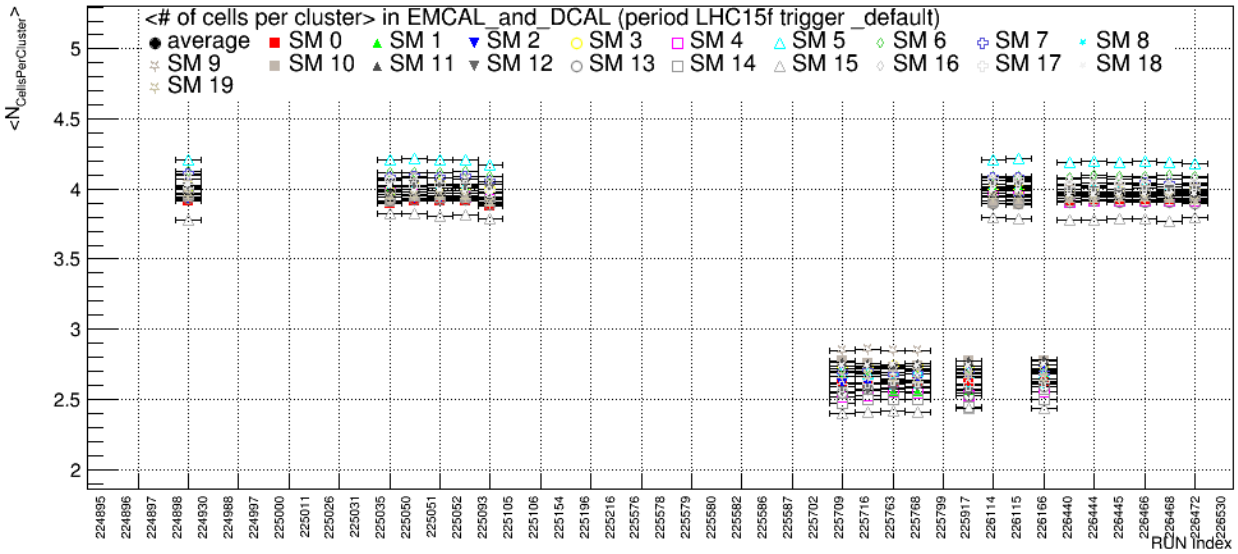


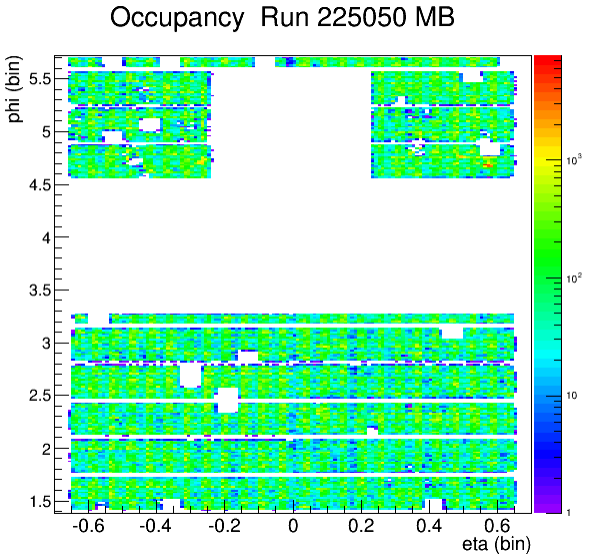


Quality of LHC15f pass1

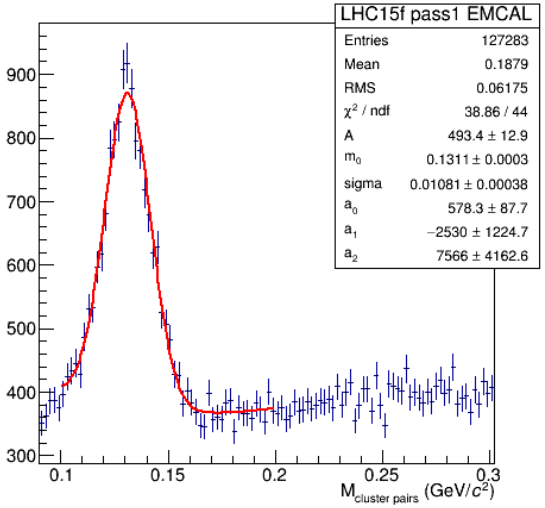
EMCAL

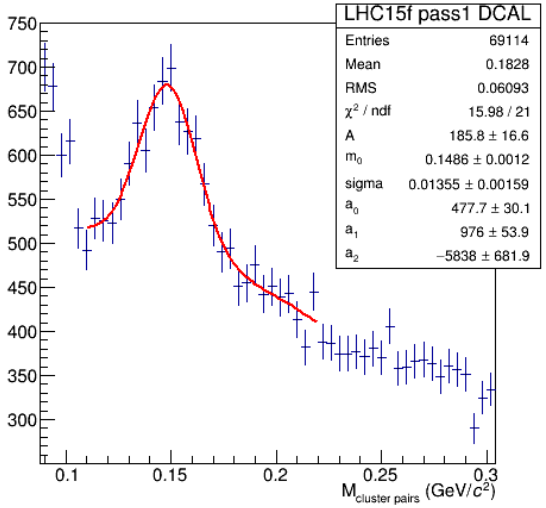
- Timing, occupancy maps ok.
- Number of clusters/event, cells/cluster drops in some periods
  → under investigation (loss of configuration?)





- π^0 peak seen both in EMCAL and DCAL





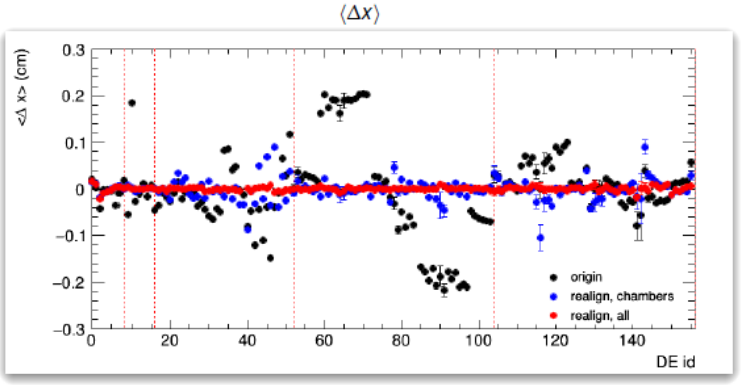
MUON

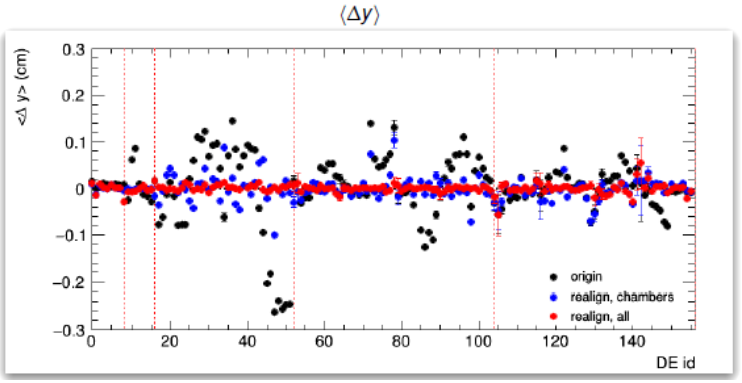
- Some holes in MCH (*e.g.* 1 full CH4 quadrant due to LV overheating problems)
  - Fixed in TS1
- MTR not properly aligned (clock phase issue), low efficiency in Ch.11
  - Fixed from fill 3855 (June 12th)
- (reconstructed) statistics low in Pass1 (losses due to the failures CPass)
  - muon_calo reconstruction is setup for >= LHC15g

LHC15f won't be our golden period (L.Aphecetche ©)

Muon Alignment

- Best alignment is now in OCDB, ready for LHC15g
- Used 13TeV field-off data (226111, 226113, 226114, 226115), and 13 TeV field-on data.
- + Some manual fix regarding vertical tilt of chamber 6L
- Final validation will come from a (real) J/Ψ peak. Need more stat. for this…





V0

- Problems with DCS due to the AD using V0 namespace, affecting data taking
- Data is good except for a few runs with some channels OFF

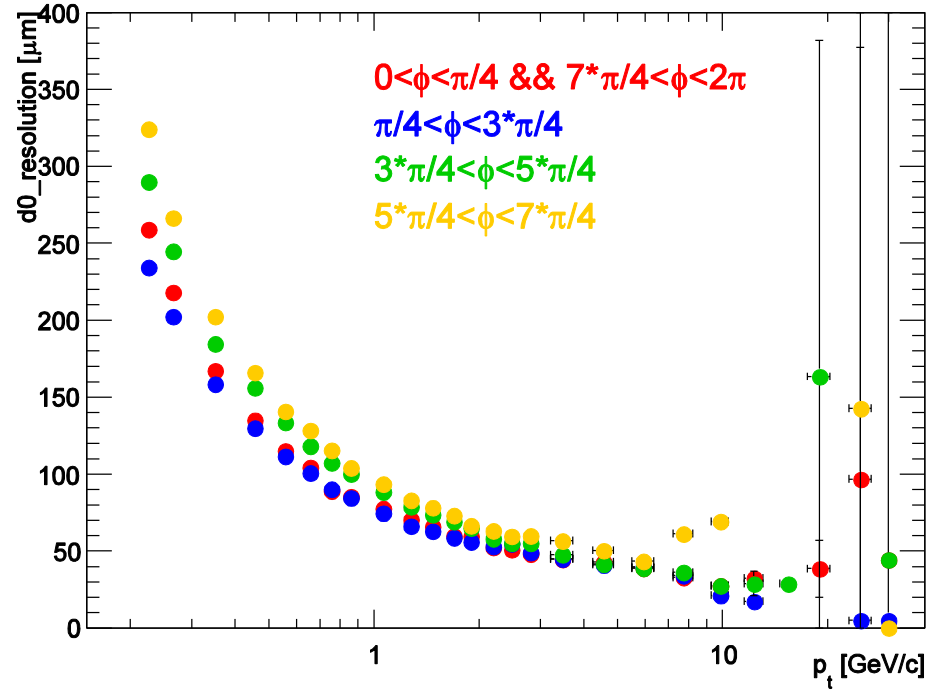
AD

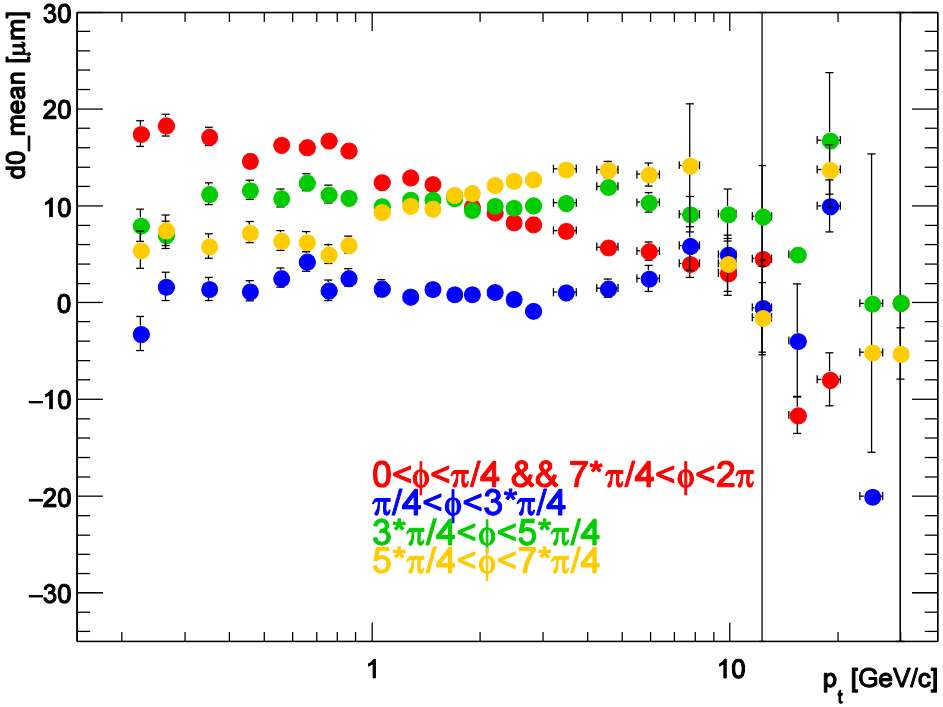
- All runs can be considered good for analysis, but:
- Bug in DA produced wrong splines for slewing correction (already masked in OCDB)
- ESD time information is wrong, need to take raw time from ESDfriends and correct manually, https://twiki.cern.ch/twiki/bin/viewauth/ALICE/AD_Offlline

T0

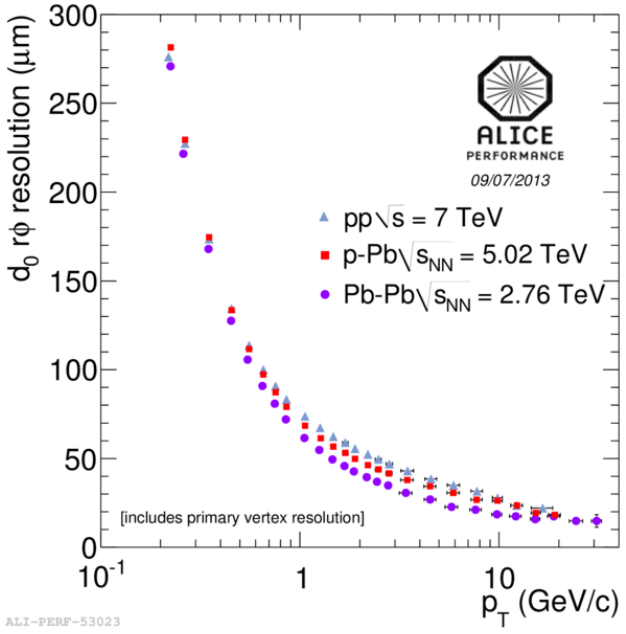
- Was removed from CPass1 due to the bug (fixed)
- Slewing correction produced manually, uploaded at TS1
- In most of runs T0 aligned to 20ps with resolution of <42ps
- 50 ps shift is observed in few runs under presumably stable conditions, under investigation

Check of the effect of IP shift on DCA resolution (A.Festanti)





- IP in LHC15f was at X~+0.08, Y~+0.52 cm
- As expected, largest difference between 1/4π: 3/4π (best) and 5/4π:7/4 π (worst)
- DCA bias similar to Run1 (residual misalignment)
- After TS1 Y_{IP} was re-steered to ~0.35cm

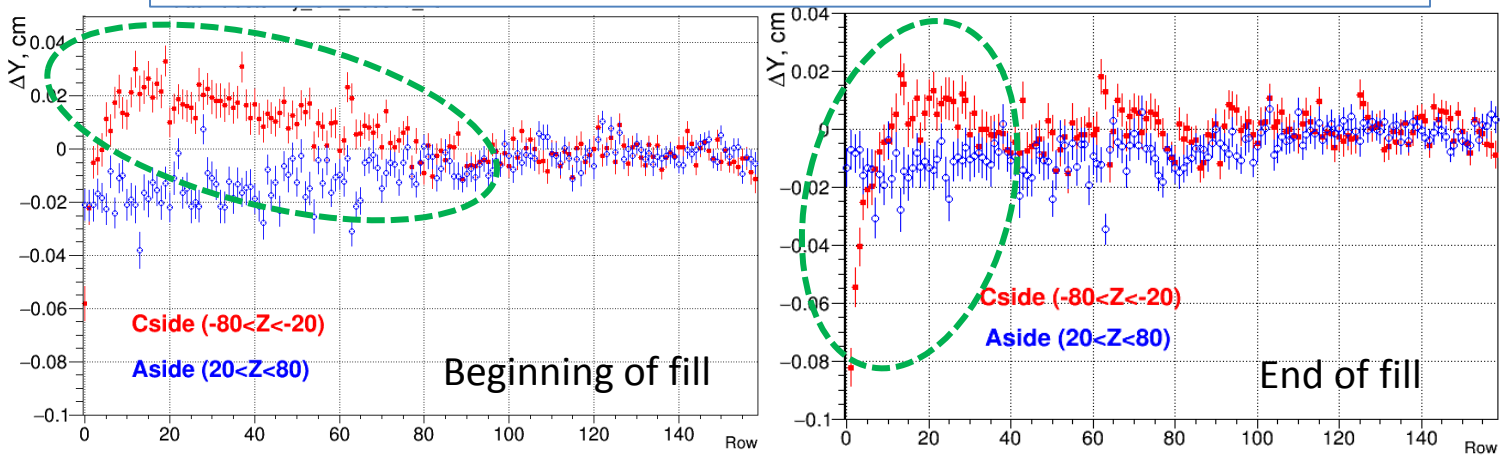


Plans for near future

TPC Tracking

- Strong, intensity dependent distortions were observed in high intensity data of Run1
  - Large amplitude, but concentrated at small R – increase with accumulated charge, strongest in the end of HI fill. Can be masked by rescaling errors of affected clusters
  - Small amplitude but reaching OROC – increase with inst. occupancy: strongest in the beginning of HI fill. Cannot be masked since affect large fraction of volume

LHC12d/Fill 2875 TPC track-cluster rφ residuals (partially unbiased)



- New TPC space-point distortions calibration procedure to be used for Run2 data (See talk this afternoon by Marian)
  - Similar to schema for Run3: use track interpolation between ITS and TRD/TOF as an unbiased reference for TPC calibration
  - Requires very good alignment between ITS and TRD/TOF (done? see R.S. talk this afternoon)

TRD in tracking

- With improved alignment in completed TRD (and TOF) and better TPC space-points distortions calibrations we should renew efforts to bring TRD into tracking
  - Requires minor changes in tracklet position assignment
  - May require improving ion-tail correction procedure
  - Must be tested on filtered high-pt raw data of LHC15f

TOF matching

- Work on alignment revealed incorrect application of alignment to TOF clusters (r, φ was properly aligned, Z taken with ideal geometry assumption)
  - Trivial fix (need to flag the change in the produced TrackPoints in the ESDfriends)
  - Should not affect noticeably matching rate, since cluster are used only in preliminary matching candidate selection, but need verification

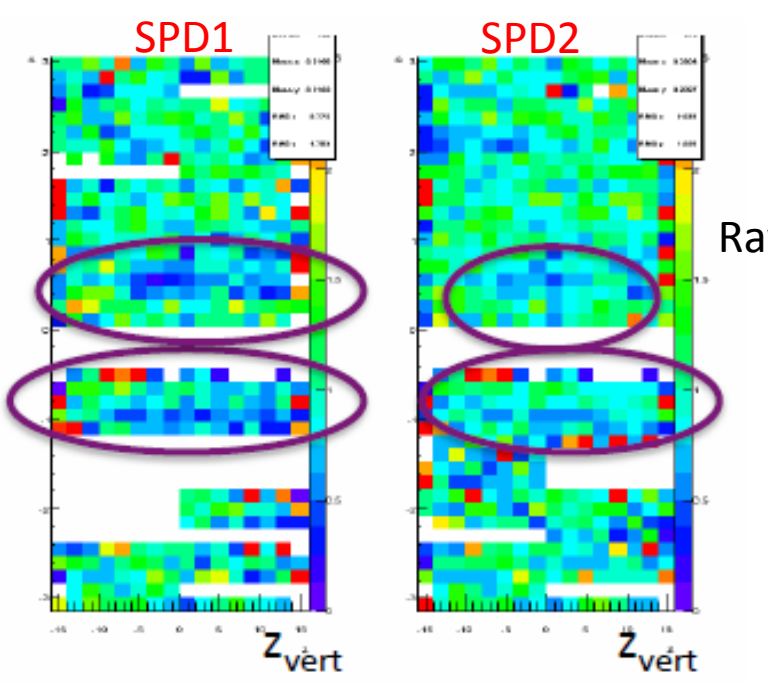
Track selection cuts for AOD filtering

- LHC15 was filtered using 2011 selection cuts.
  - New ticket PWGPP-145 for definition of new AddTrackCutsLHC15 (placeholder added) selection in AddTaskESDFilter.C (M.Floris)
  - Request (H.Beck) to retune the V0 and cascade selection cuts, but given expected improvement due to the new alignment/calibration, it is worth doing this once new reconstruction is available
  - From TPC side the standard ESDTrackCuts for 2015 need to be refined
  - For custom, analysis-dependent selections need input from PWGs

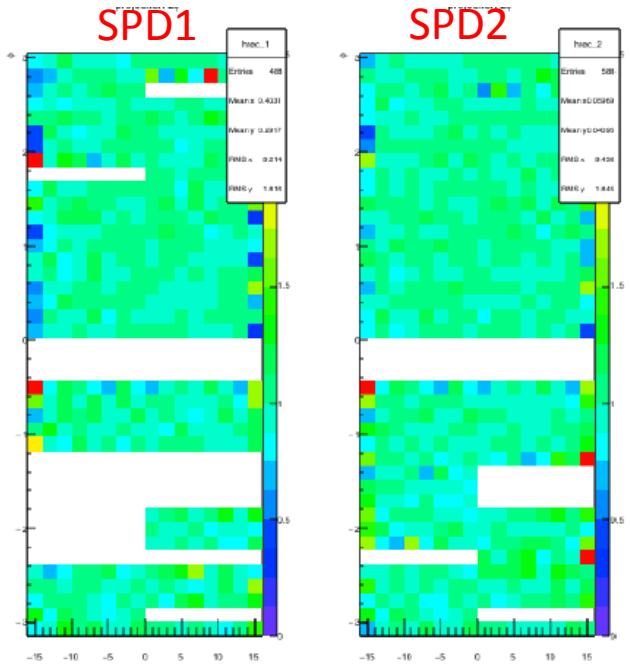
Other developments

Geometry overlaps issue in MC simulation/reconstruction

- SPD overlaps in geometry with realistic alignment damage simulation (hit loss)
  → we are forced to use completely different ITS geometries in data and MC
- Recently A.Gheata modified TGeometry package to allow “legitimization” of selected overlapping volumes (“parallel world” option, root-5-34-30 ☺).
- Tests with new option show no observable effects of overlaps
- Next step is to produce realistic misalignment (residual wrt to the real alignment rather than to ideal one, as now) and perform full scale test



Raw / Ideal

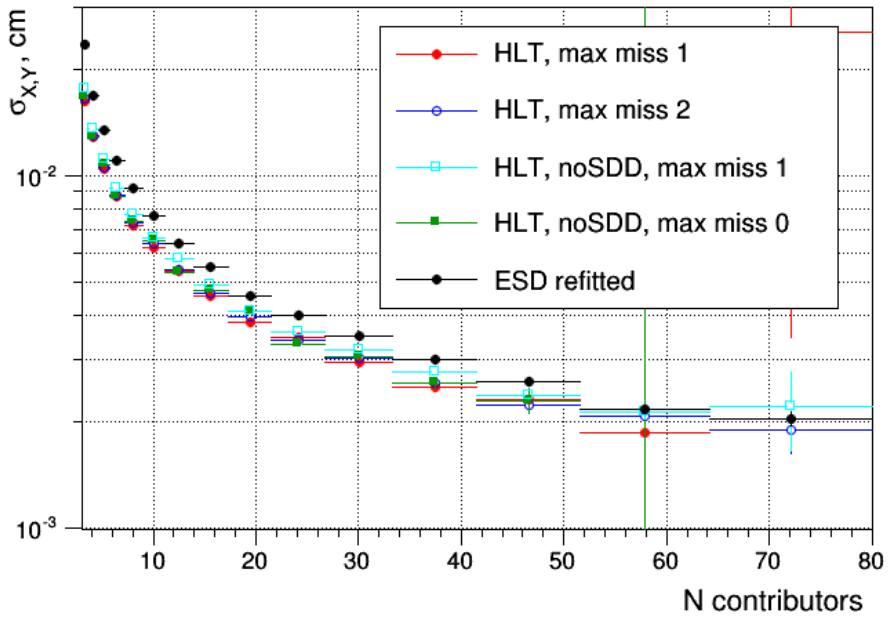


Old geometry

New geometry

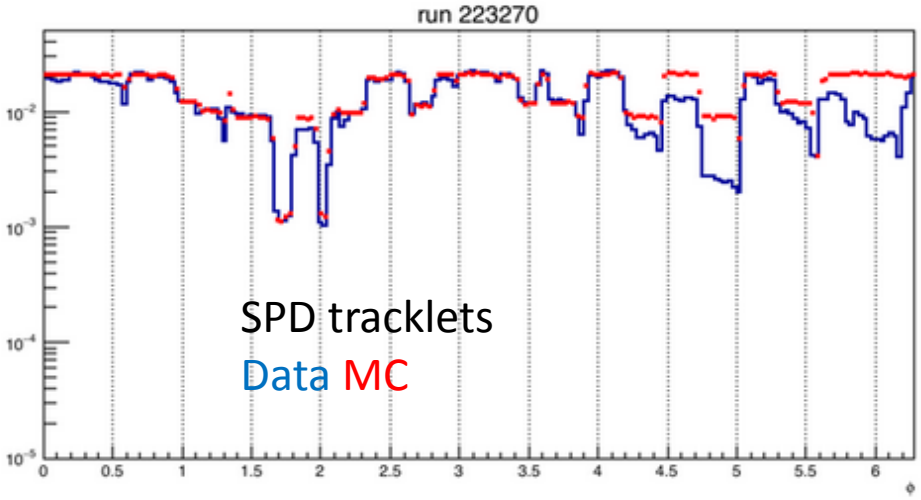
Upgrade of MultiVertexer

- Both resolution and pile-up tagging capabilities of Multi-Vertexer can be improved by relatively simple upgrade (we still use old fitter in Mvertexer)
- Better resolution was already demonstrated for Vertexer (not “Multi” but using the same outlier rejection mechanism) written for HLT ITS-standalone vertexing

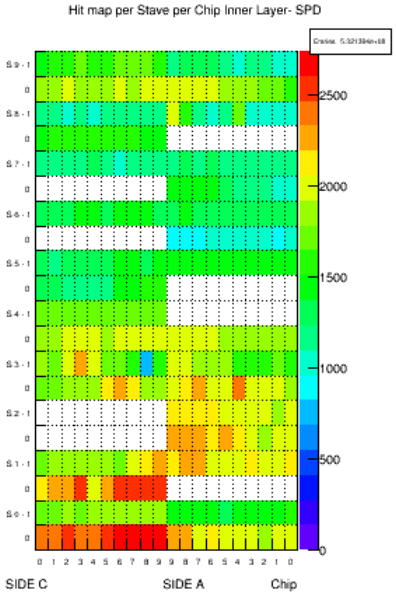


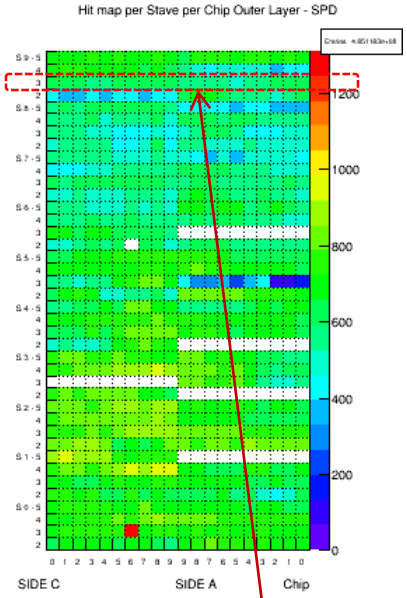
- Will require 2-3 weeks of dedicated work

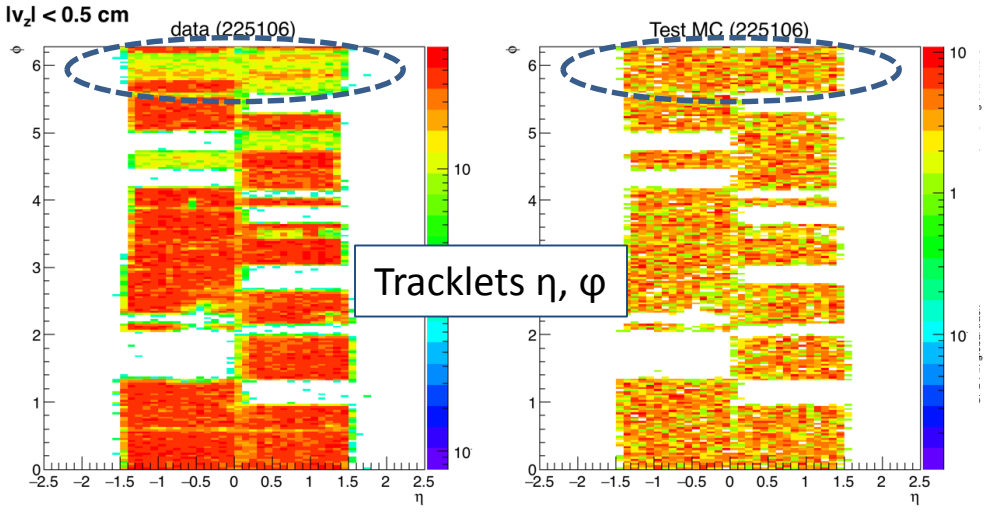
SPD MEB Problems?



private tests by Roberto,
https://alice.its.cern.ch/jira/browse/PWGLF-300)







SPD staves contributing to tracklets