



CWG6/7 report

TDR: Calibration and Reconstruction

- Split in 2 parts
 - Chapter 5:

Some information still missing from detectors (e.g. calibration table)

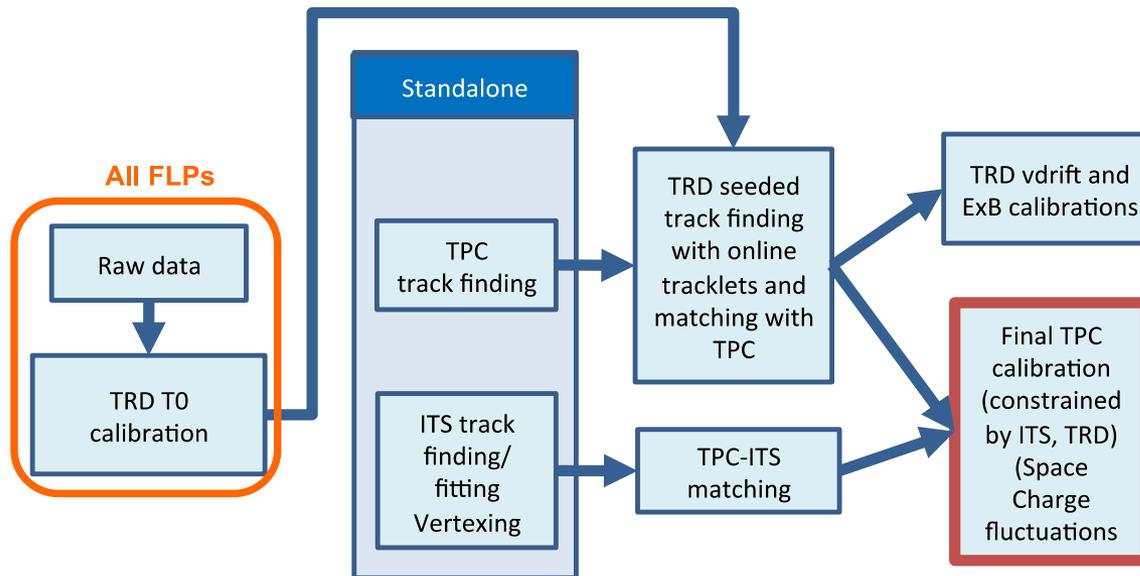
5.3	Calibration, reconstruction and data reduction	34
5.3.1	Calibration and Reconstruction flow	34
5.3.2	Processing partitioning: synchronous, quasi-synchronous, asynchronous	35
5.3.3	CPU requirements - This paragraph will be filled only in case ^{once} enough input is available in the next months	36

- Chapter 7:

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7.5.2	Reconstruction procedures	79
7.5.3	Event building	81
7.5.4	Data reduction	82

Prototype for calibration + reconstruction

- ❑ Needed to proof feasibility of the processing schema
- ❑ Necessary ingredients: TPC, TRD, ITS

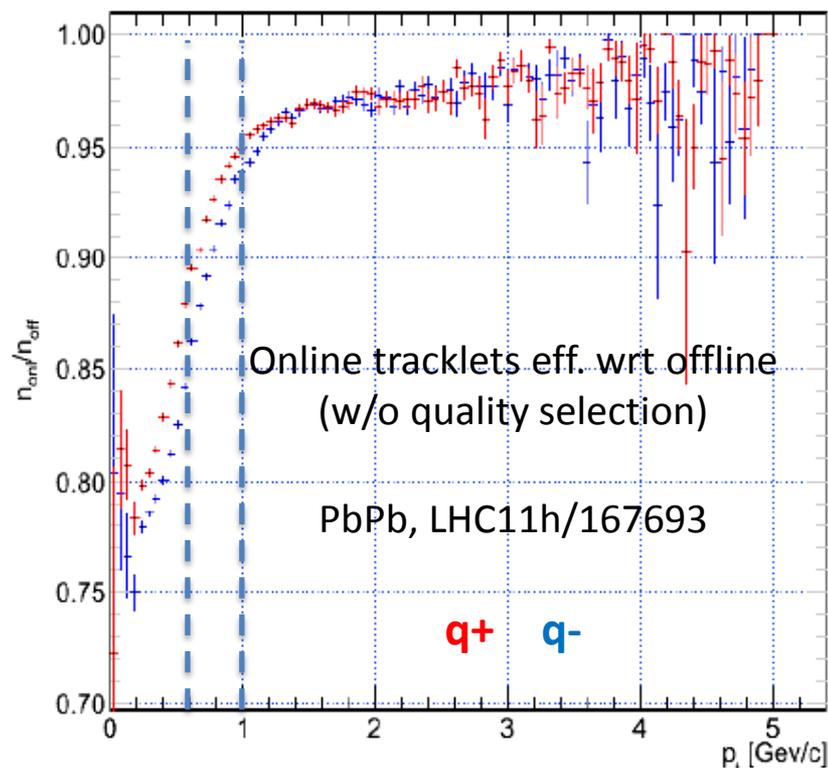


- ❑ ITS, TRD input for TPC SCD calibration:
→ need fast reconstruction (standalone for ITS) for at least $p_T > 0.6$ GeV/c

Prototype for calibration + reconstruction

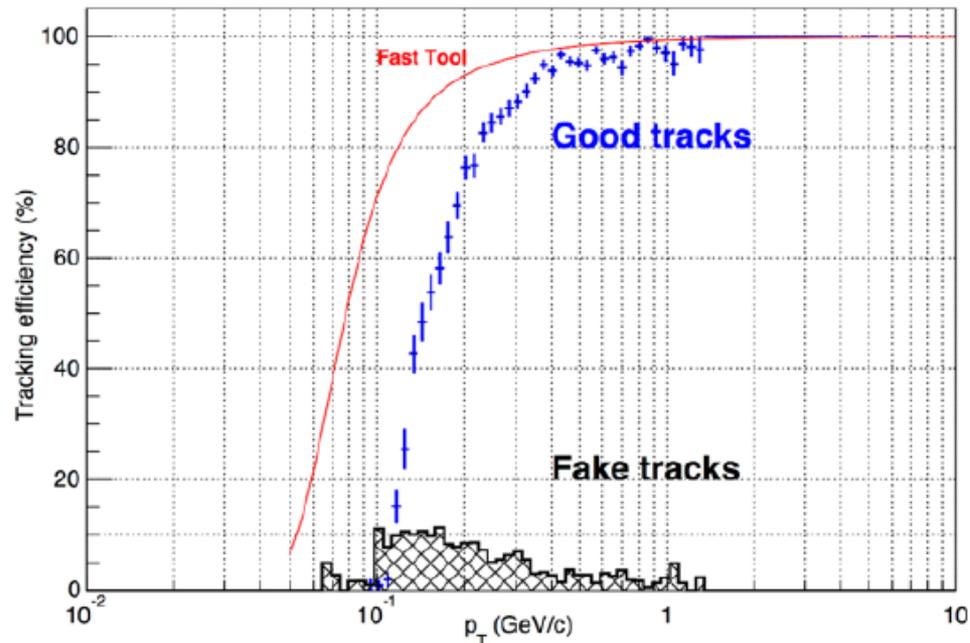
- **TRD:** plans to use online tracklets in run3 tracking:
 - Need to implement TPC-seeded TRD tracking with online tracklets
→ work can start in mid-October by A.Bercuci (~2 months)
 - Evaluation of performance of TRD online tracklet finding
 - Efficiency, position resolution, p_T resolution (preliminary study by A.Bercuci)
 - Effect of p_T cutoff (currently at ~ 1 GeV/c, too high also for physics program)
 - Difference between negative and positive tracks
 - Evaluation of TRD t0 calibration
 - Input needed (mixed readout mode or dedicated calibration runs with raw data readout)
 - Investigation of its time dependence
 - TRD reconstruction needs performance speed-up (at least in long-term, but estimates should be produced soon)

- Discussion within TRD group on needed manpower



Prototype for calibration + reconstruction

- ❑ **ITS:** standalone reconstruction by CA algorithm:
 - Significant progress during last months (M.Puccio)
 - CPU budget: 0.6-0.8 s/central PbPb, Intel Core i7-2720QM @ 2.2GHz
 - Still need to improve efficiency at low- p_T (discrepancy wrt analytical “fast-tool” estimates)
 - Already good enough to provide online data for TPC calibration (low p_T tracks are irrelevant, for high p_T the reconstruction is very fast)



Prototype for calibration + reconstruction

TPC: implementation of SC calibration based on standalone reconstruction
(preliminary planning from, mostly by Jens)

- ❑ Microscopic simulation of SCD
→ Implemented
- ❑ Reconstruction code modification to deal with large distortions (seed evaluation at estimated cluster r-position rather than pad-row center) (Jens, Marian)
→ 4-6 weeks?
- ❑ Implementation of the ITS - TRD interpolation method (Ernst, Marian, Ruben)
→ 3-4 weeks? (prototype exists)
- ❑ Extraction of residual distortion maps (Jens)
→ 1 week
- ❑ SCD maps with fluctuations + average required
 - Can be re-used from TDR studies → available
 - ITS-TRD interpolation could be used to extract the average map
(not necessarily needed to verify the feasibility)
- ❑ CPU and memory requirements for SCD calibration map parameterization
(currently 50-100MB @ 200-400Hz): critical, will drive decision on having it persistent, or done on the fly (Jens, Chiara, Ruben)
→ ???

Prototype for calibration + reconstruction

TPC: implementation of SC calibration based on standalone reconstruction
(preliminary planning from, mostly by Jens)

- ❑ Simulations with pseudo-continuous readout (pileup)
 - Implemented (one central event + min. bias pileup as for the TPC TDR)
→ available
 - Validation of TPC standalone t0 adjustment procedure
→ ???
- ❑ Validation of x20 data compression
 - Junk tagging (detection of loopers, delta electrons, noise) (HLT TPC?)
→ ???
 - Data format optimisation (Norway?)
→ ???

Total → 2-3 months? (End of the year)

Possible milestones: summary

- ❑ Validation and CPU estimates of:
 - Procedure for going from “MC map” to “averaged map” usable for initial TPC reconstruction
 - Standalone ITS reconstruction
 - TPC seeded TRD reconstruction with TRD online tracklets
 - Fine SCD map extraction from ITS/TRD constraints
 - Data compression factor 20 for TPC

- ❑ Dates to be defined

- ❑ Could be that not the full chain is possible: will need to bricolage different inputs

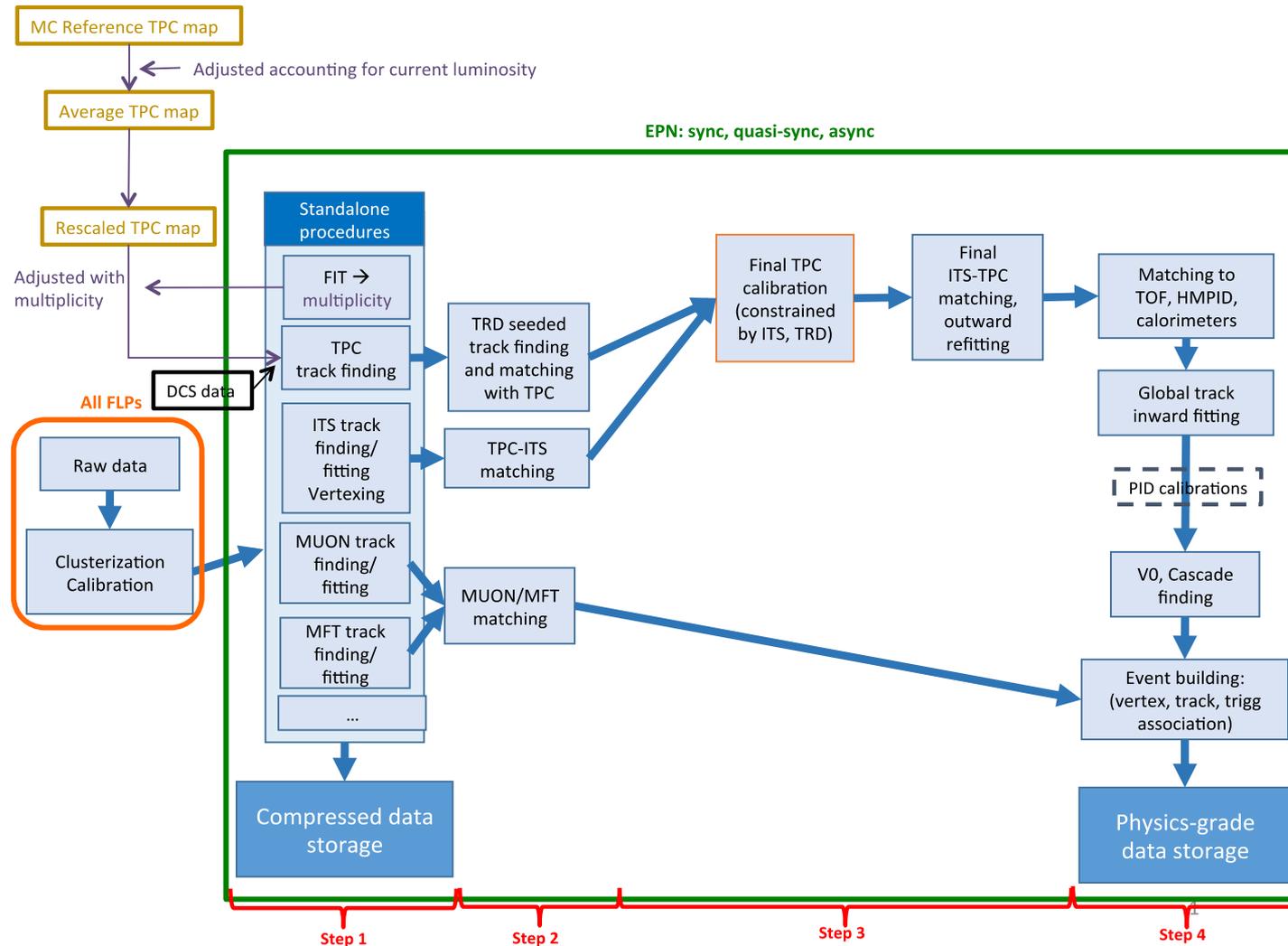
- ❑ Manpower needs are being evaluated, but we certainly miss people
 - There are volunteers (LIPI) but training will be required

More details will be clarified at TPC upgrade software mini-workshop next week (CERN)

BACKUP

Prototype for calibration + reconstruction

- Needed to proof feasibility of the processing schema



Longer term planning

TPC offline milestones

Jens



- Physics simulation
 - Basic simulation (space point, clusters, time frame, ...) [end 2015]
 - Time variation of calibration constants [mid 2016]
 - Realistic space charge distortions [end 2016-mid 2017]
- Reconstruction
 - Basic reconstruction scheme (TPCsa, combined) [end 2015]
 - Full compression scheme [mid-end 2017]
 - Tuning of reconstruction scheme [till end 2018]
- Calibration
 - Implementation of feedback loop [end 2015]
 - Basic calibration components [mid-end 2016]
 - High performance methods for SCD calibration [end 2016]
 - Extended schemes for SCD calibration [end 2017]



Manpower requirements

A Large Ion Collider Experiment



ALICE

Resources: Tasks III

Run3 R&D: online reconstruction, continuous readout, space-charge distortions

Tasks	Manpower required	Manpower existing
Coordination - Coordination of TPC Run3 plans - Represent TPC in various PWGs/CWGs	1.0 FTE Expert 4.5 FTE PostDoc/ Senior 4 PhD Student (50%)	0.25 FTE Expert 0.8 FTE PostDoc/Senior 2 PhD Student (33%)
Simulations - Development of continuous readout simulation - Development of microscopic treatment of space-charge distortions - Implementation/testing of future reco. strategy - Studying of calibration flow		
Online reconstruction - Development of reconstruction algorithms for O ² - Development of calibration data flow - Development of compression strategy		
Online calibration: - Porting/developing calibration code to O ² farm - Development of per formant methods for space-charge calibration / analytical solution calculations - Injection of calibration data in the data flow		
QC - Development of QA/QC strategies - Definition of relevant quantities / data flow		

Requirements on Manpower

- Expert/Senior !
- PostDocs / PhD Students
 - Some can be newly coming in
 - C++, ROOT knowledge should be present
 - Initial training period
O(1-1.5 months at GSI)
- PostDocs to steer also sub-projects

