

Positron Analysis Status

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on behalf of the Positron Analysis WG

Many thanks...

- ... to **Miki**, who did a great work in coordinating the Positron Analysis WG in the last year...
- ... and good luck for the upcoming discussion of your PhD thesis!
- I am temporarily taking over for the WG coordination

Positron Analysis Overview

- Activities **on going/foreseen** in many fields:
 - CYLDCH software architecture
 - CYLDCH new waveform simulation
 - CYLDCH “low order” calibrations (time, gain)
 - CYLDCH tracking
 - CYLDCH “high order” corrections & diagnostic (wire sagitta, alignment, DT,...)
 - CYLDCH data reduction
 - SPX hit reconstruction (incl. calibrations)
 - SPX tracking
 - SPX-CYLDCH matching
 - Efficiency Studies

Manpower

- Almost all activities are well covered in terms of manpower, with a few people recently joining the team
 - CYLDCH software architecture → **Francesco**
 - CYLDCH new waveform simulation → **Gianluigi**
 - CYLDCH “low order” calibrations → **Cecilia + undergrad @ Rome**
 - CYLDCH tracking → **Fabrizio, Fedor (next months @ Pisa)**
 - CYLDCH “high order” corrections & diagnostic → **Angela, Patrick**
 - CYLDCH data reduction → **???**
 - SPX hit reconstruction (incl. calibrations) → **see today’s talks by Taka & Miki**
 - SPX tracking → **Taka, Masashi**
 - SPX-CYLDCH matching → **Taka, Masashi**
 - Efficiency Studies → **Taka**

CYLDCH software architecture

- Activity on going to harmonize the DB and geometry handling for the CYLDCH to what is done for the other subdetectors
- Modifications implemented, debugging on going

GEM4

OLD

- DB readout in two different places:
 - GEANT4 detector construction
 - Class for geometry handling (MEGCYLDCHGeometry)
- Geometry information stored in the geometry class

NEW

- DB readout only in the GEANT4 detector construction
- Wire run headers used to store the geometry information
- Geometry class only used to perform calculations (local frames of reference, virtual planes, etc...)

Bartender

OLD

- Hard coded DB configuration
- DRS DB readout in a custom class (DCHDatabaseRead) called from the digitization task and not stored
- Geometry DB readout and stored in the geometry class (MEGCYLDCHGeometry)

NEW

- DB configuration from custom run number
- DRS & Geometry DB readout in the ROME automatically generated MEGDBAccess class and stored in run headers
- Geometry class not needed

Analyzer

OLD

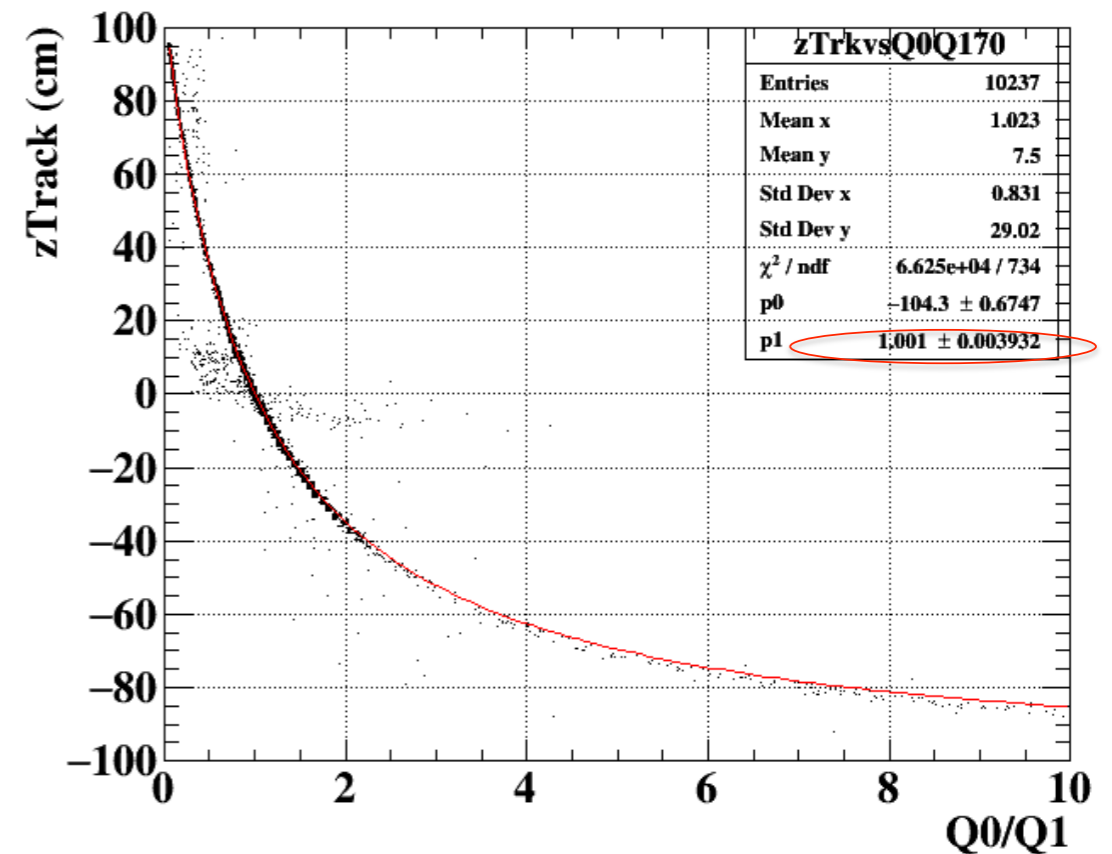
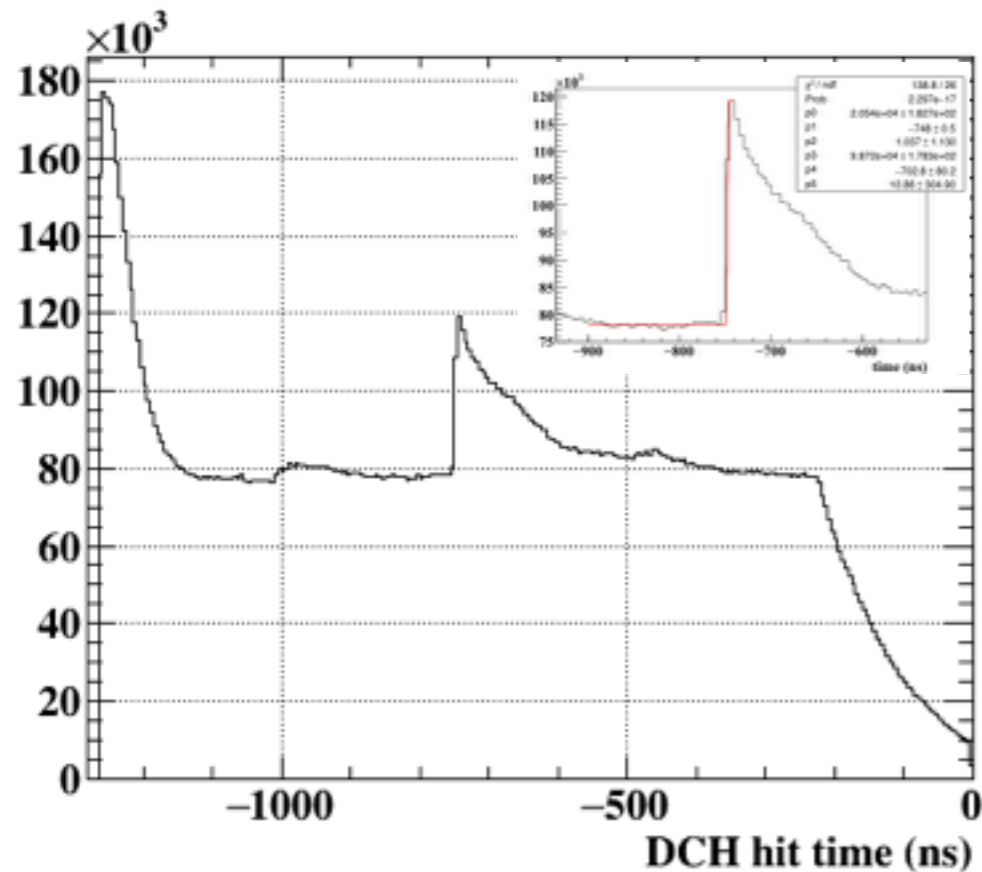
- DRS DB readout in a custom class (DCHDatabaseRead), called from a dedicated Task
- Geometry DB readout in the geometry class (MEGCYLDCHGeometry)
- Geometry information stored in the geometry class

NEW

- DB configuration from the custom run number
- DRS & Geometry DB readout in the ROME automatically generated MEGDBAccess class and stored in the run headers
- Geometry class only used to perform calculations (local frames of reference, virtual planes, etc...)

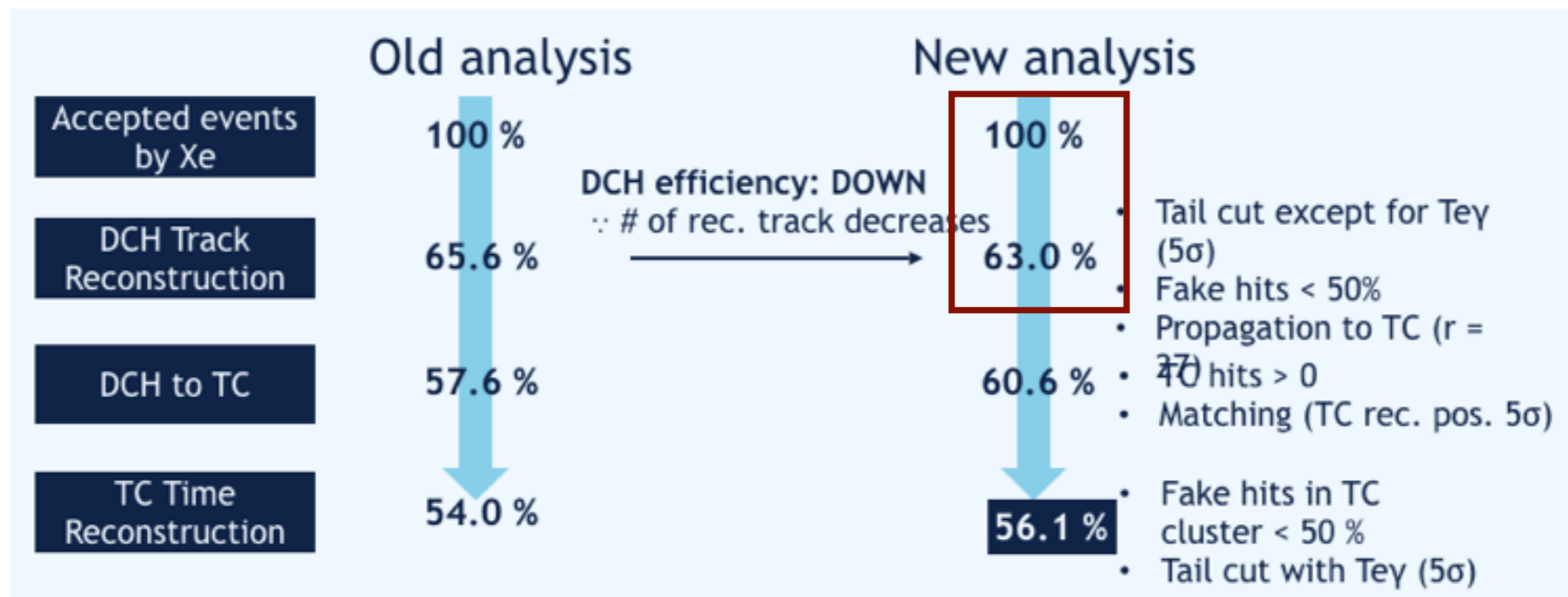
CYLDCH low level calibrations

- Software and DB to determine and apply **time and gain calibrations** is essentially ready
 - it was an occasion to deeply review the CYLDCH bartender configuration and the waveform reconstruction
- Needs refinements and tests



CYLDCH tracking

- Most recent performance estimate including SPX-CYLDCH matching (10 layers)

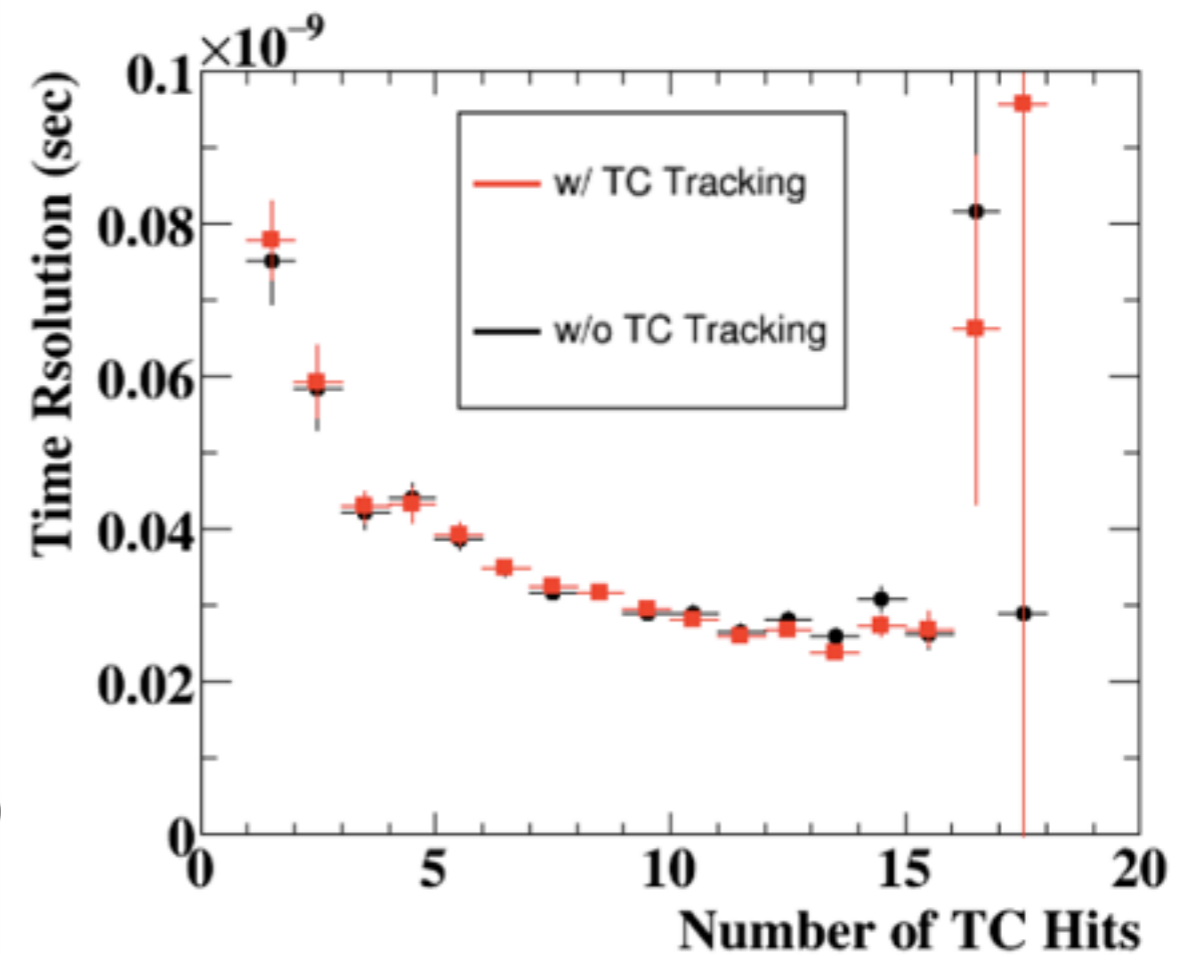
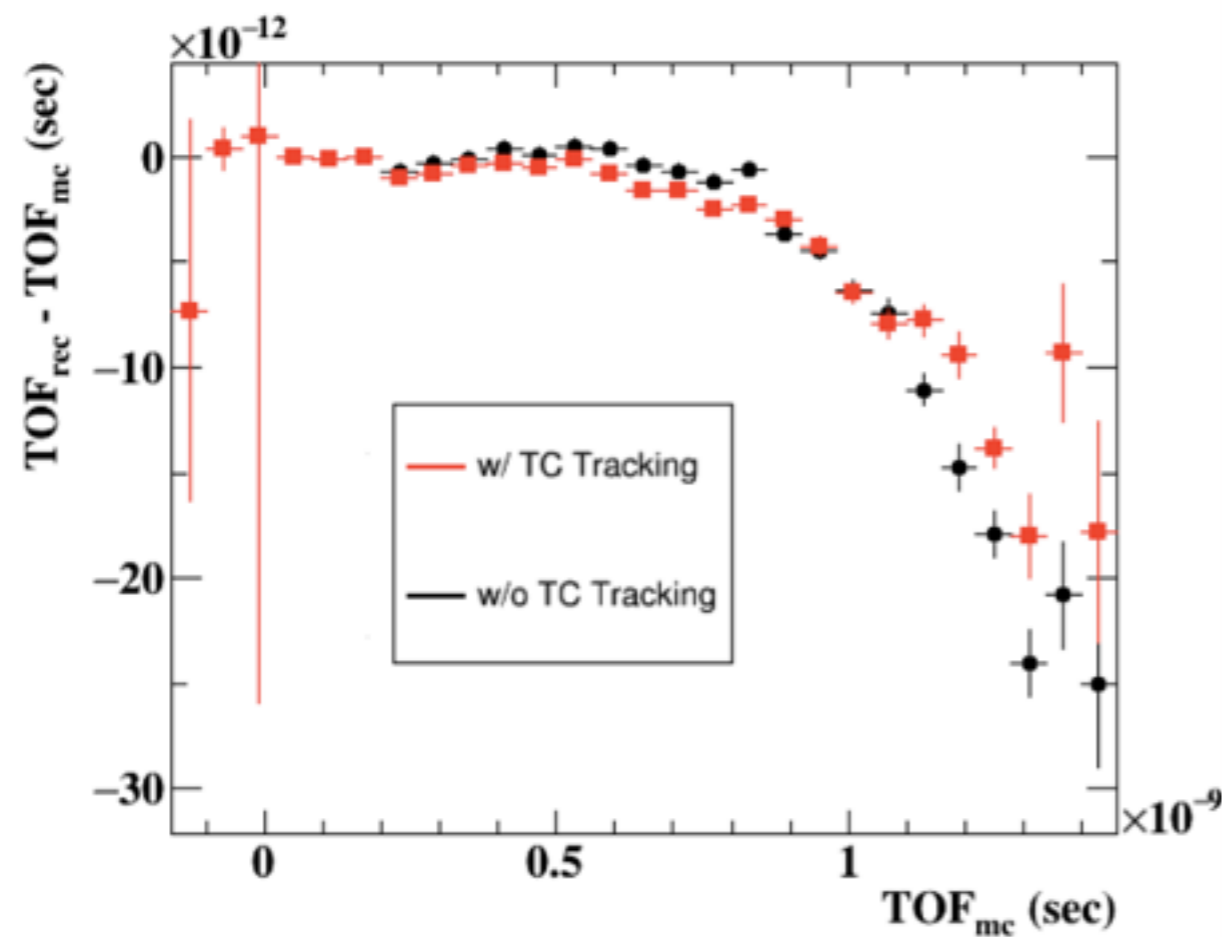


	P [keV]	Theta [mrad]	Phi [mrad]	Y [mm]	Z [mm]
sigma	93	6.1	5.8	0.63	1.14

- CYLDCH efficiency **loss by ~10% with 9 layers** and the present code (resolutions unaffected):
 - pattern recognition tuned for 10 layers —> **much room for improvements**

SPX tracking

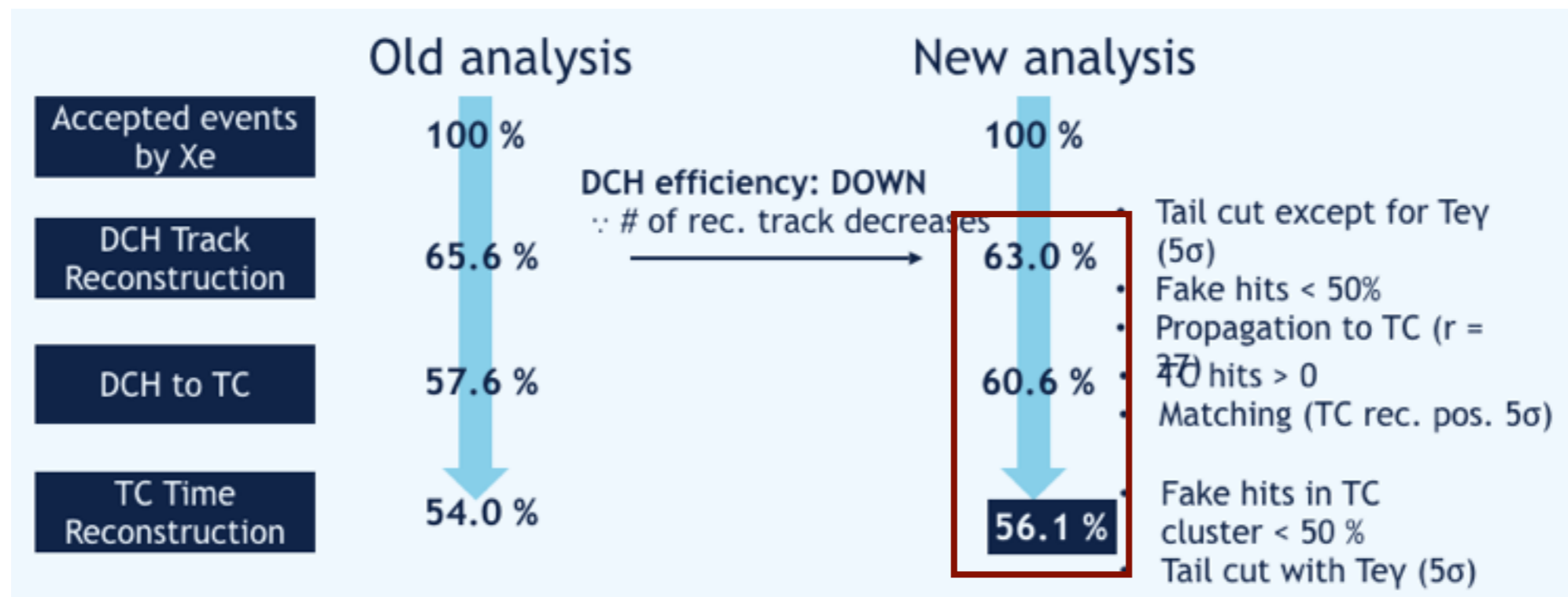
- First attempts:



- Algorithms need to be finalized

SPX-CYLDCH Matching

- Most recent performance estimate including SPX-CYLDCH matching (10 layers)



	P [keV]	Theta [mrad]	Phi [mrad]	Y [mm]	Z [mm]
sigma	93	6.1	5.8	0.63	1.14

- SPX reco + SPX-CYLDCH matching algorithm seems to work already well (~88% eff.), but there is probably some room for improvements

Conclusions

- Several activities are on going for the positron analysis, both on the CYLDCH and SPX side
- Work is well organized for optimizing the use of the available manpower
- We are confident that the software will be ready and in a good shape for the first physics data