TRD alignment with (German) cosmics

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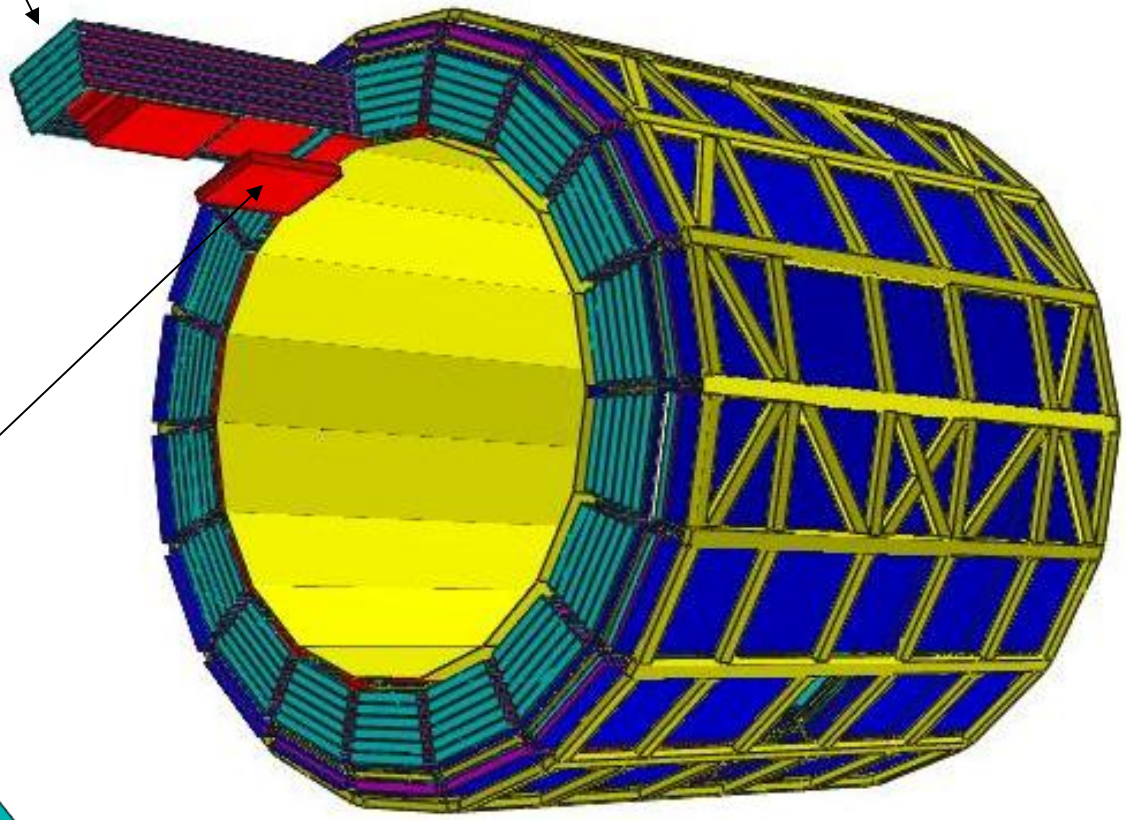
ALICE offline week, 8-Jul-2008

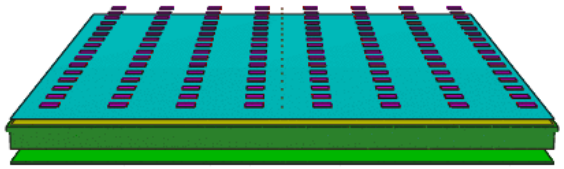
- *intro*
- *alignment with Münster cosmics*

alignable objects in TRD

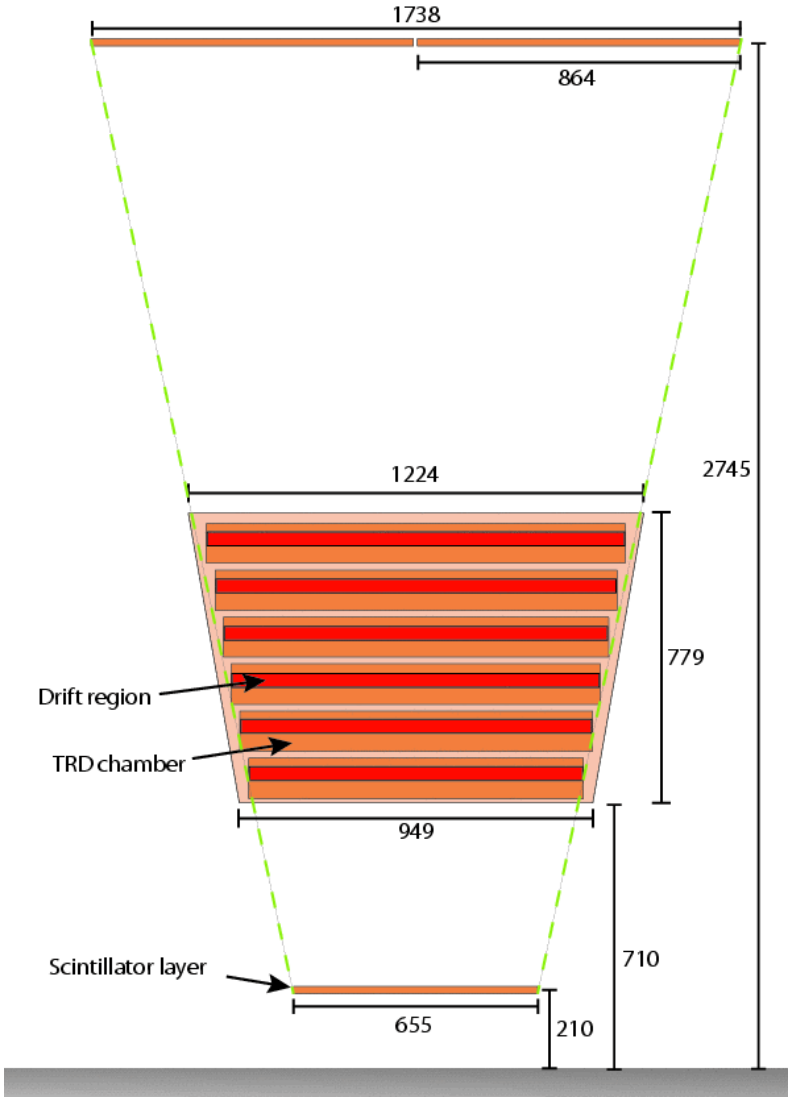
18 TRD supermodules
like /TRD/sm03
aligned by survey



540 TRD chambers
like /TRD/sm03/st3/pl0
aligned with tracks

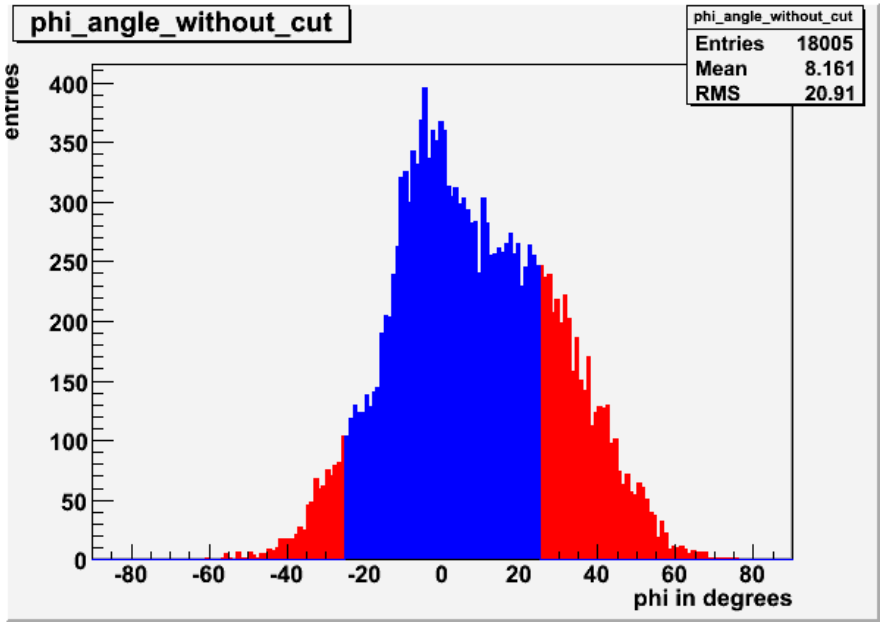


Münster cosmics



Bastian Bathen

cosmic trigger rate 100 Hz
1 M – 10 M events per SM
100 k – 1 M tracks per SM



phi

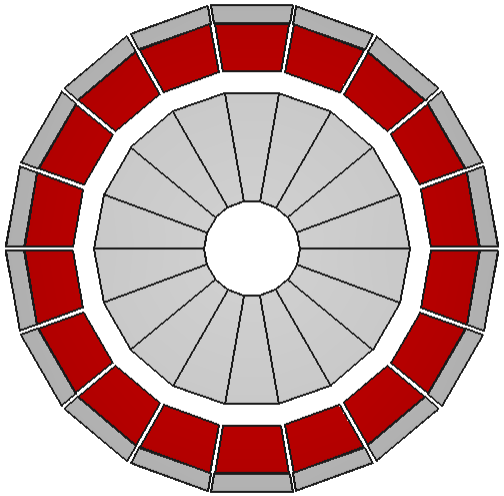
scintillator paddles for cosmic trigger

TRD supermodule

Münster cosmics

supermodule	assembled	reassembled	inserted	
SM1	Heidelberg	---	Nov(?) 2006	Sector 8
SM2	Münster	---	Jan 2008 (?)	Sector 0
SM3	Münster	Münster		
SM4	Münster	CERN	May 2008	Sector 9
SM5	Münster	Münster	May 2008	Sector 17

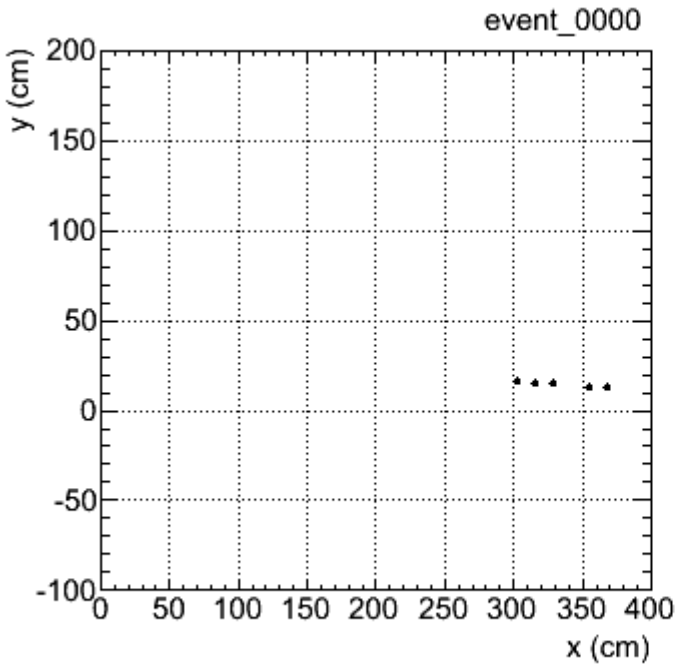
in this talk: 5370 tracks in SM4 (now in sectior 9)



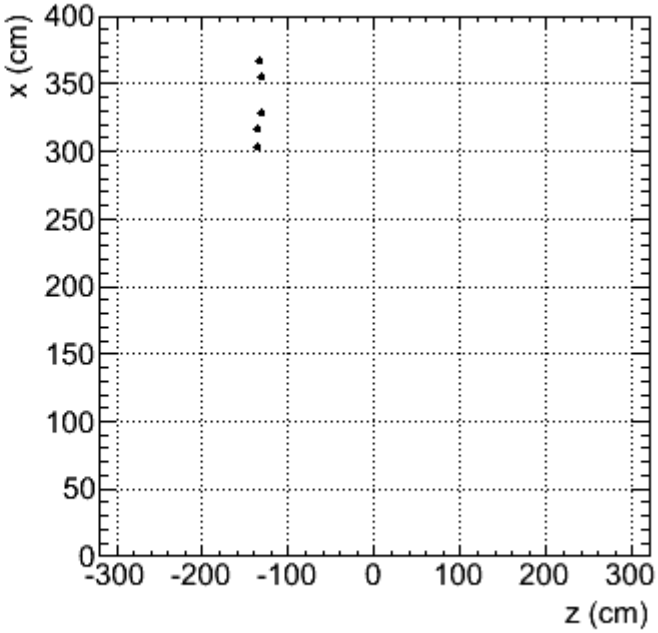
btw. data looks like coming from sector 0

Münster cosmics, SM4

ALICE pit view from A-side

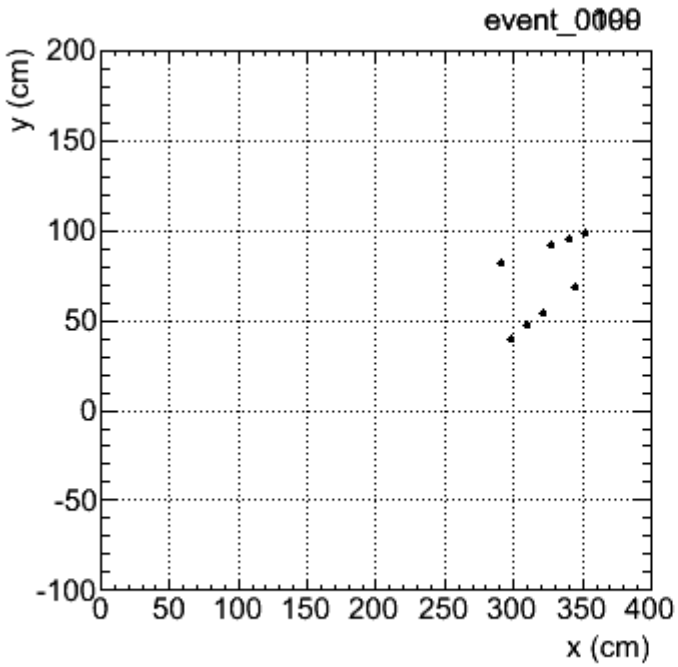


ALICE pit top view

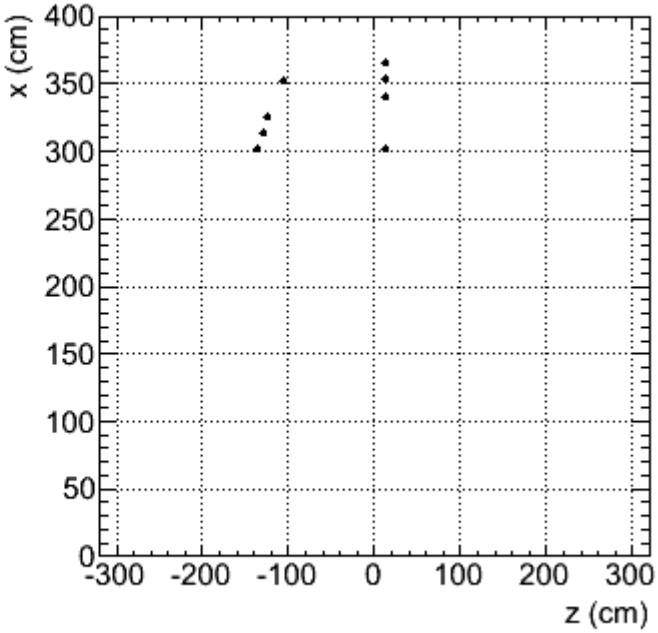


Münster cosmics, SM4

ALICE pit view from A-side

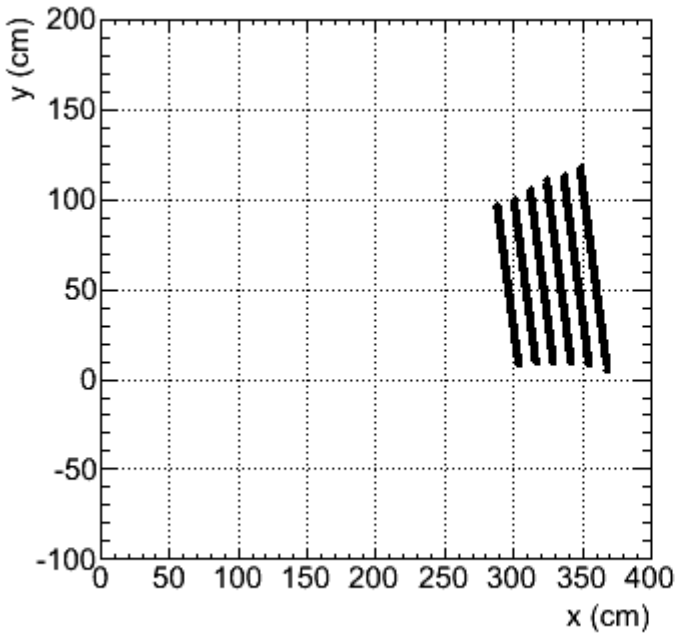


ALICE pit top view

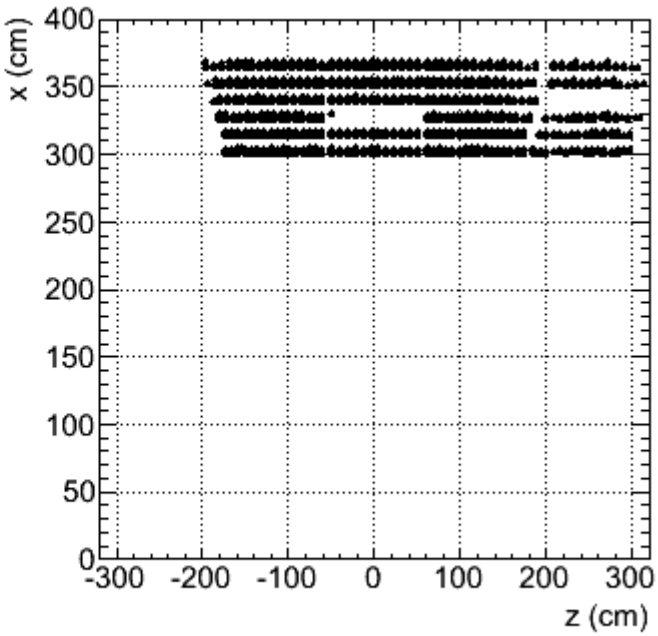


Münster cosmics, SM4

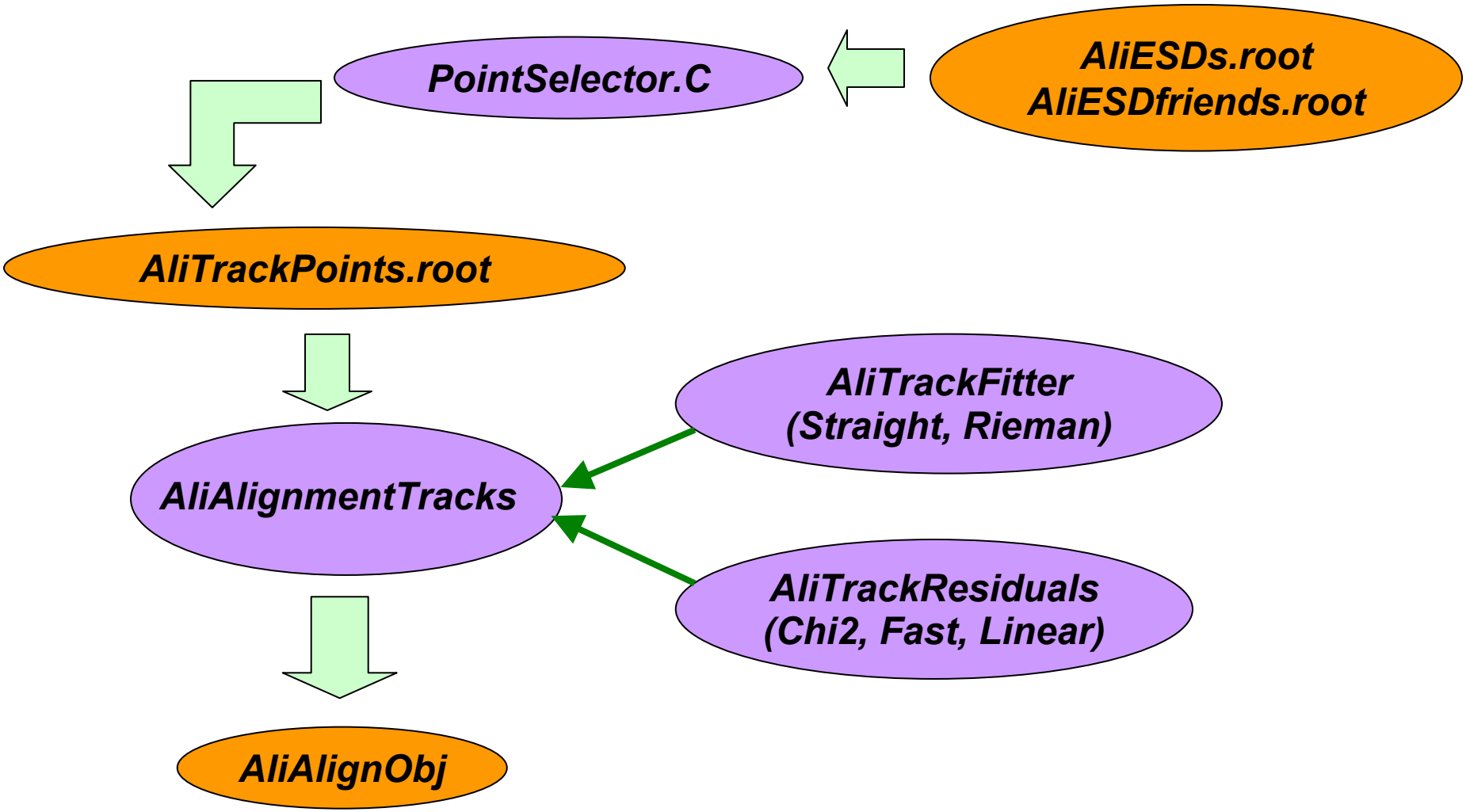
ALICE pit view from A-side



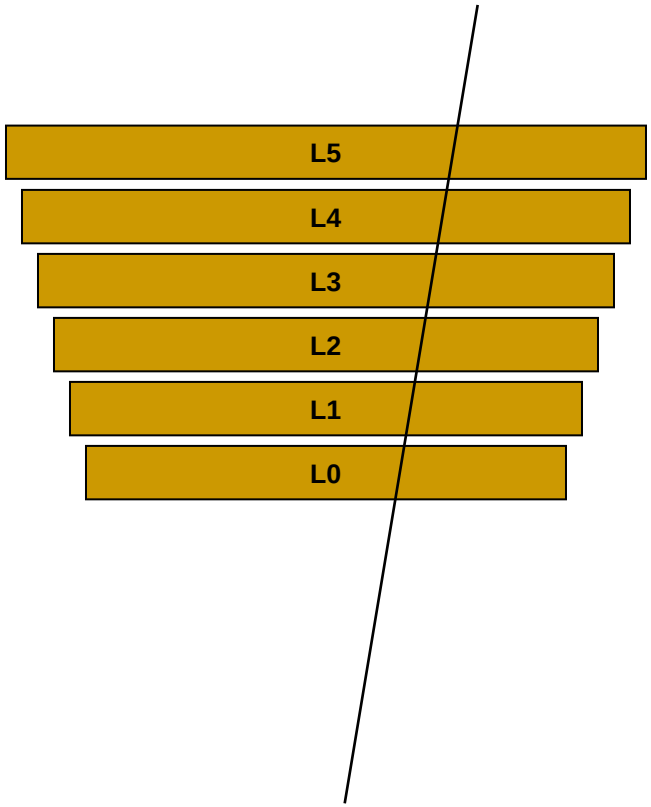
ALICE pit top view



alignment procedure with AliAlignmentTracks

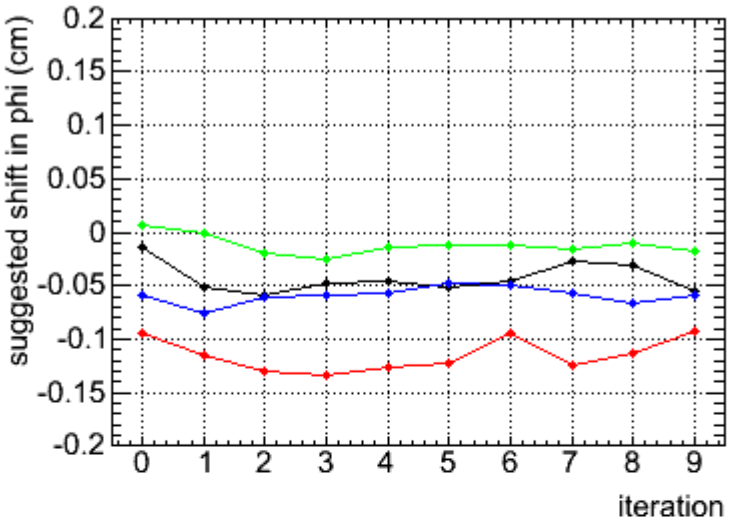


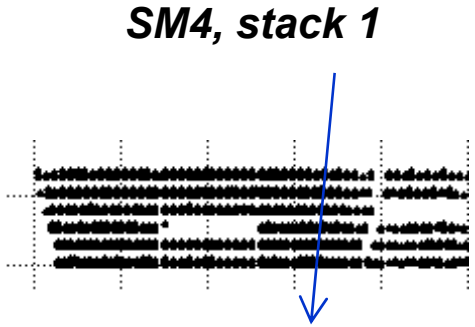
alignment procedure

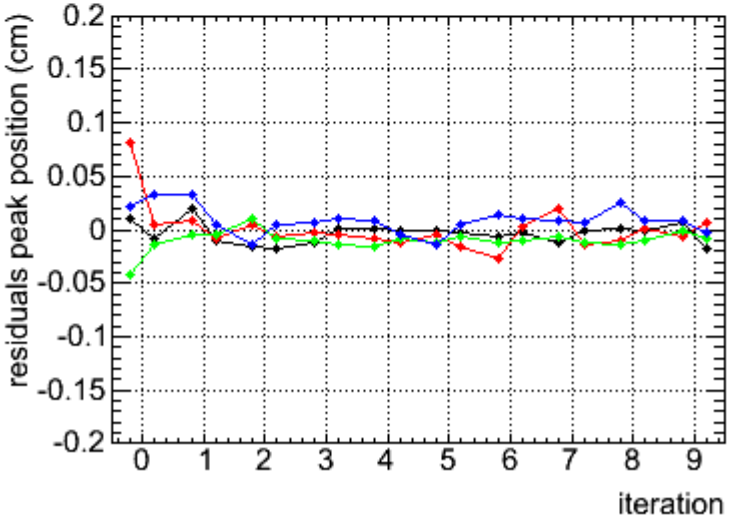


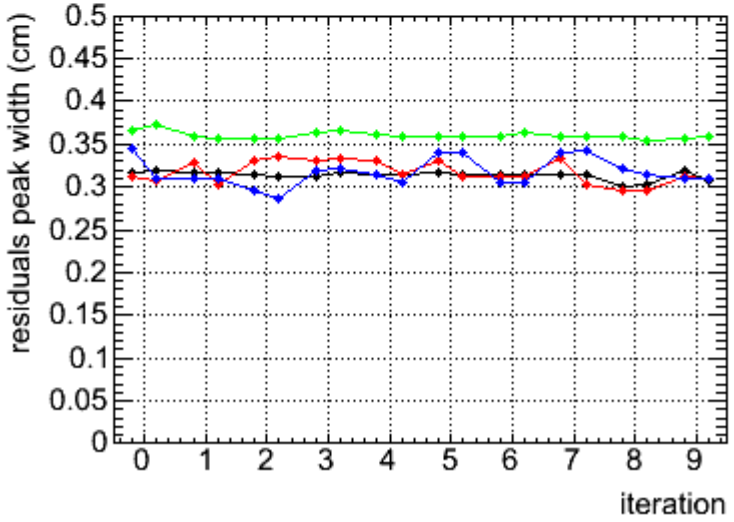
- *keep L0 and L5 fixed*
- *adjust inner ones to all (at least 4) others*
- *(iteratively)*
- *fit straight tracks*
- *use "fast" minimizer*
  (all 6 shifts and tilts allowed)

Münster cosmics, SM4

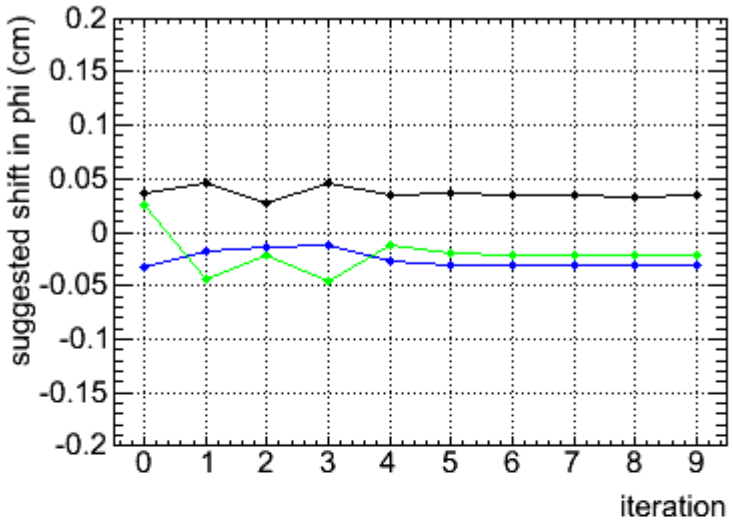




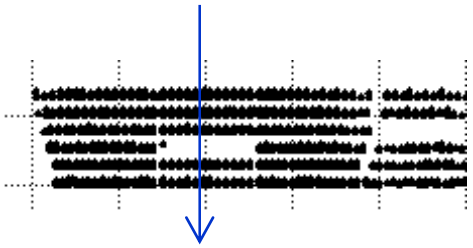


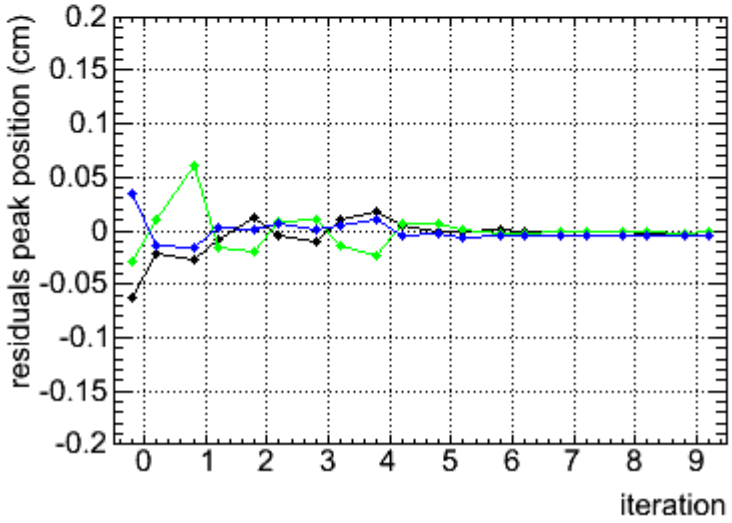


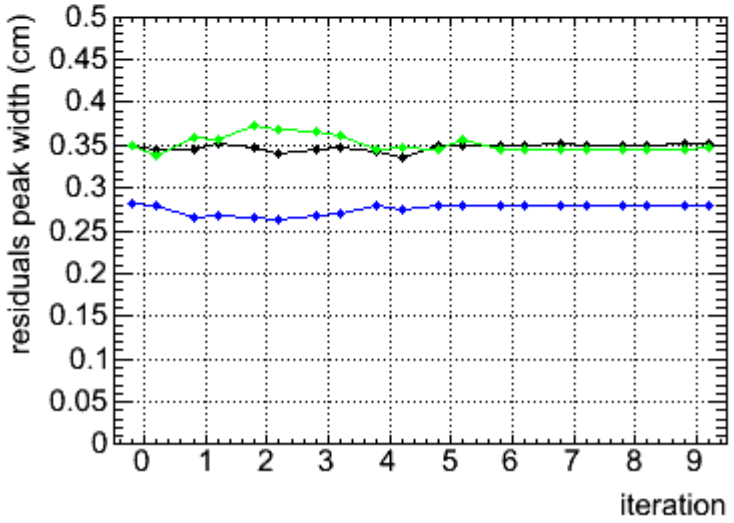
Münster cosmics, SM4



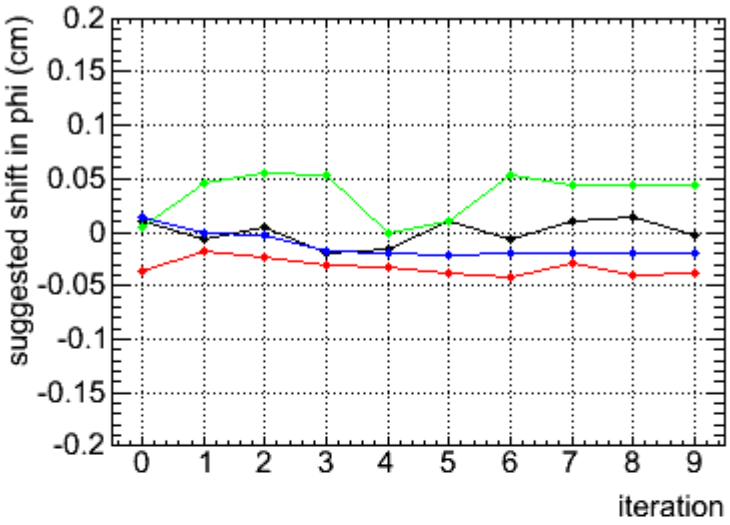
SM4, stack 2



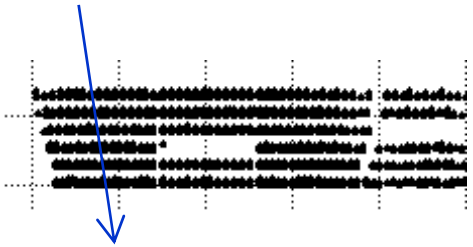


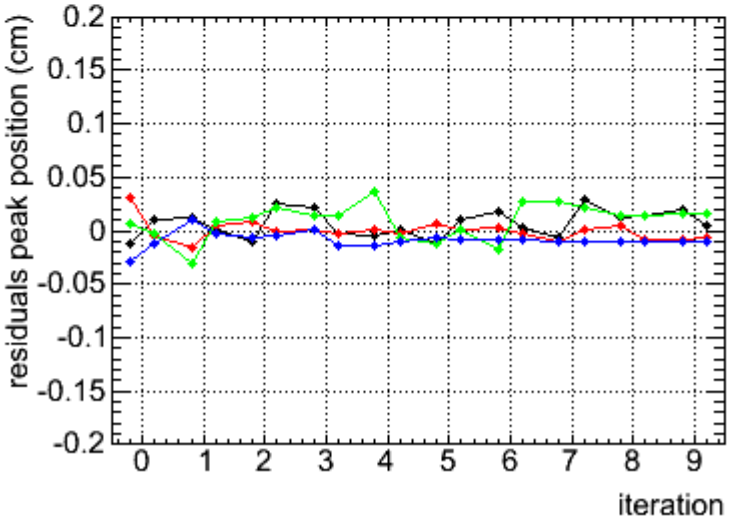


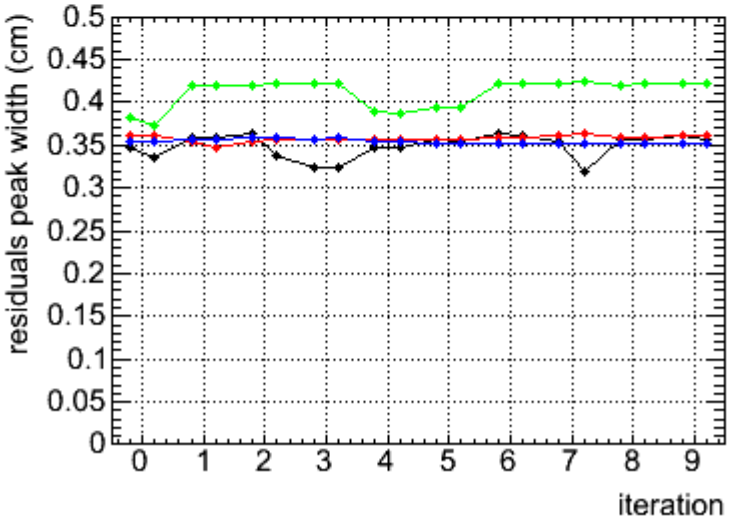
Münster cosmics, SM4



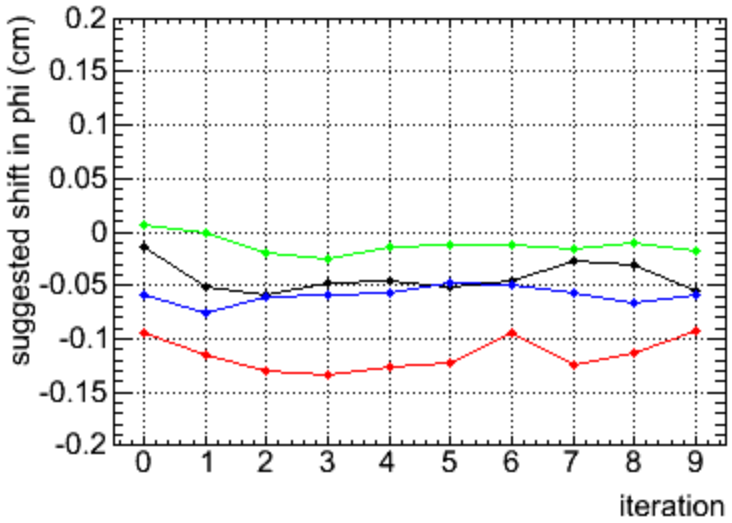
SM4, stack 3





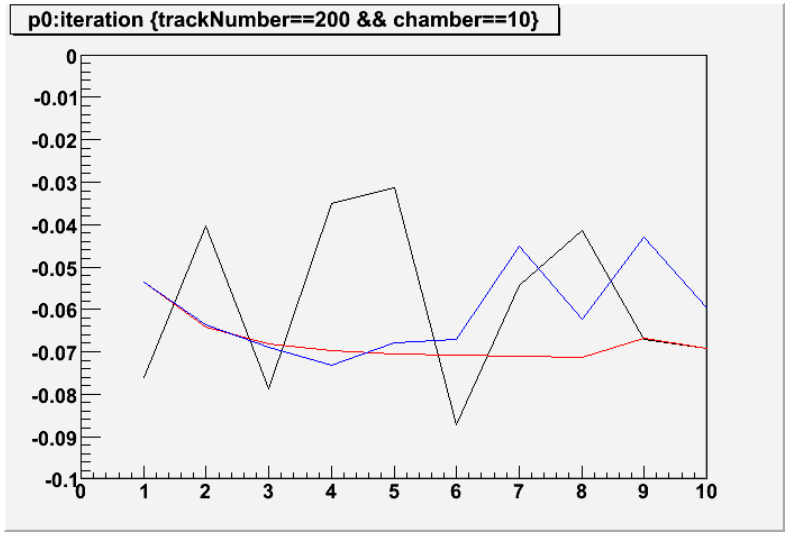


How many tracks per stack are needed?



this was with 1000 tracks

tested 200,1000, 2000
2000 much better (flatter) than 1000



Münster cosmics, resolution

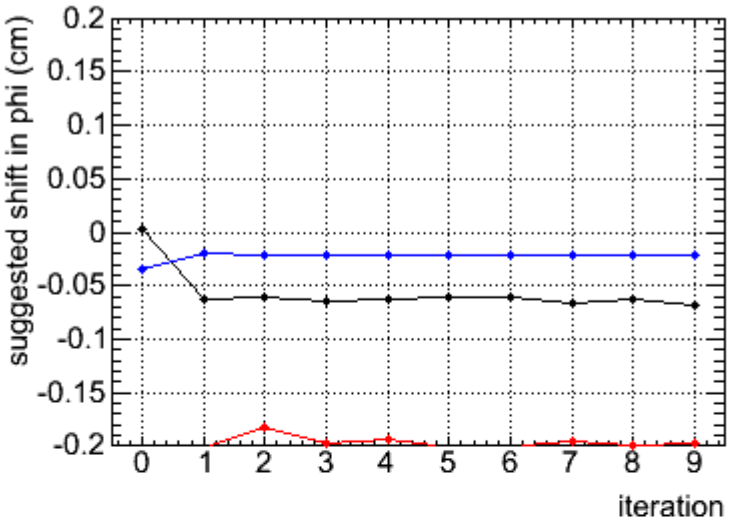
dataset	what	aligned to what	residuals peak width
Münster cosmics	L3	L0,L1,L2,L4,L5	0.30 cm
sim v4-11-Release	L3	L0,L1,L2,L4,L5	0.18 cm
sim v4-11-Release	L0	TPC	0.22 cm
sim v4-11-Release	L5	TPC	0.80 cm
sim v4-06-Release	L3	L0,L1,L2,L4,L5	0.07 cm
sim v4-06-Release	L9	TPC	0.11 cm

Münster cosmics, summary

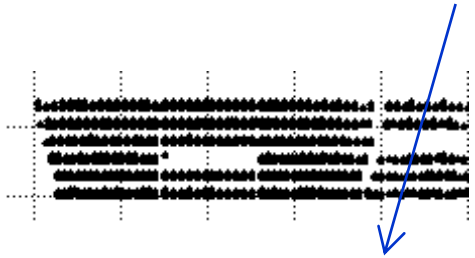
- *chamber alignment very good (typically within 0.5 mm)*
- *1000-2000 tracks per stack reasonable for alignment*
- *residuals 1.7 times wider than in simulation*
- *residuals with tracklets 2.2 times wider than with cluster*

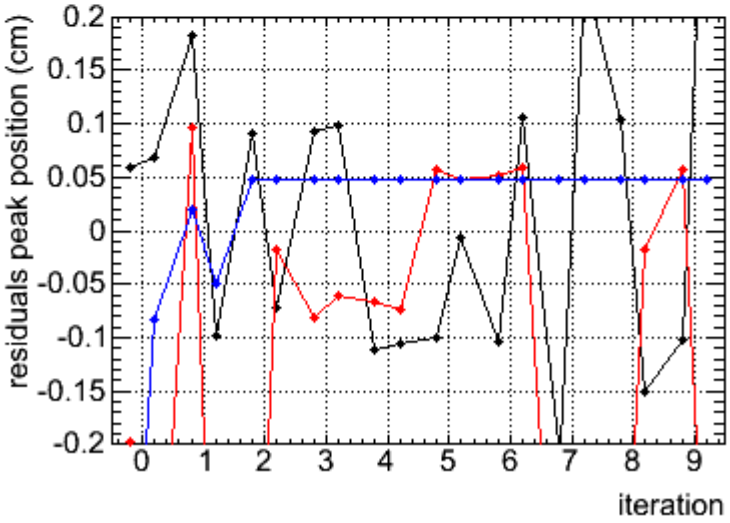
backup

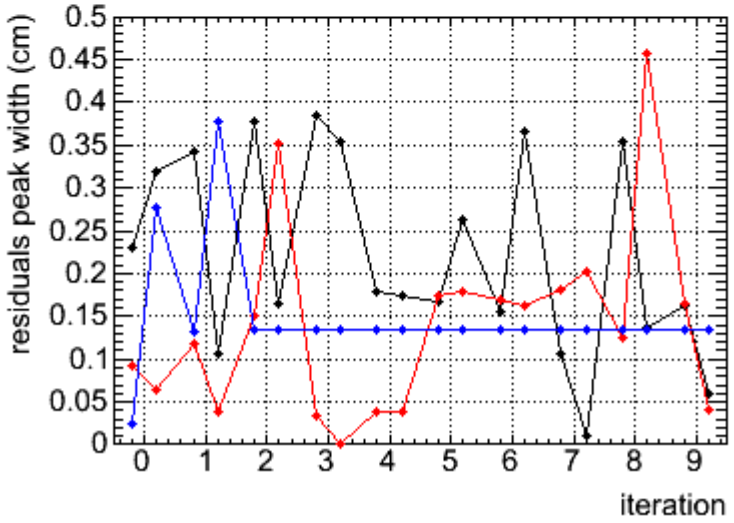
Münster cosmics, SM4



SM4, stack 0

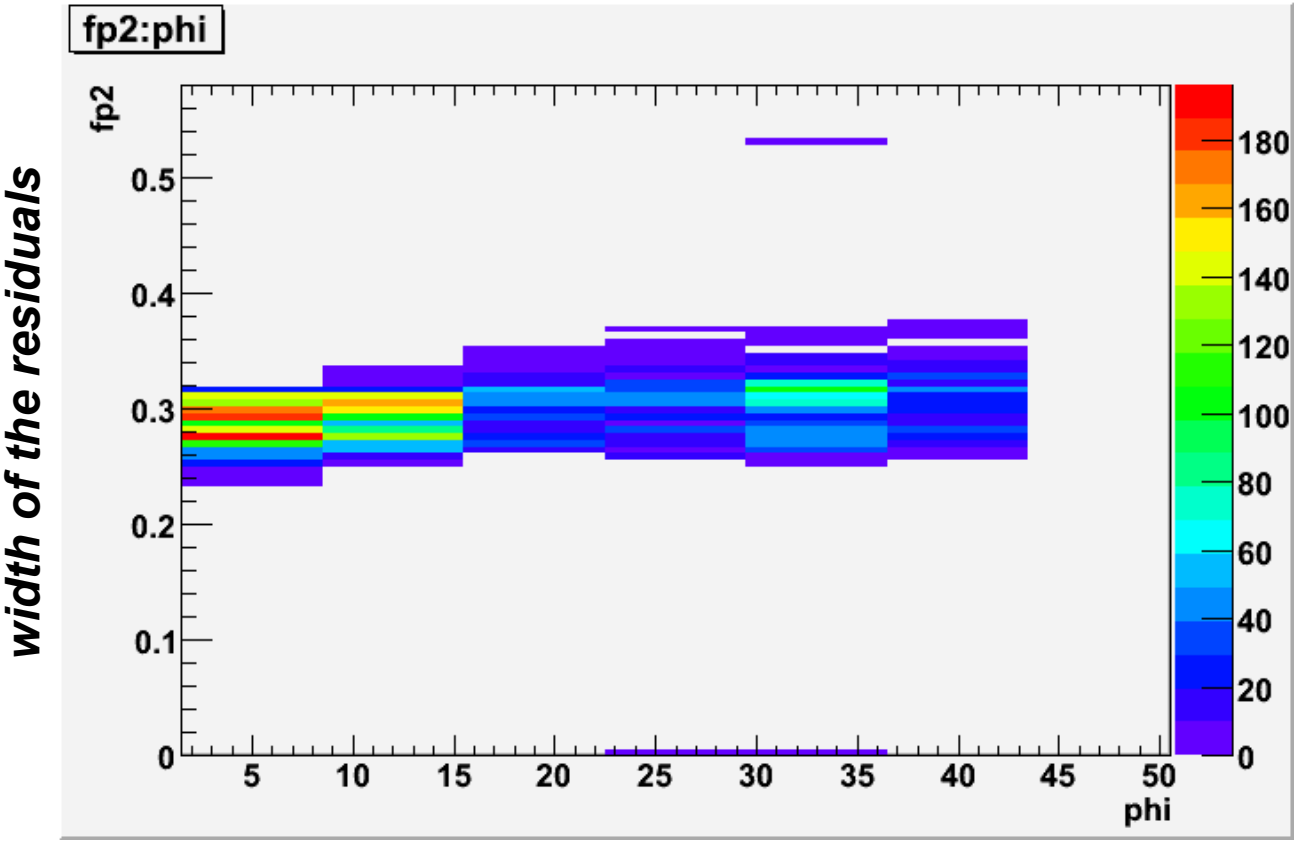






Why resolution worse than in sim?

Might be because of the tail Xe tail cancellation applied to Ar.
In this case, however, phi-dependence expected. Not seen (Eva):



btw., different groups of tracks give within 0.1 mm the same alignment

Münster cosmics, why poor resolution?

Might be because of the track cuts, wide open for cosmics and B=0

Under investigation by Eva.

Münster cosmics, SM4