

**first alignment set
with cosmics 2009**

runs used (local reco at GSI)

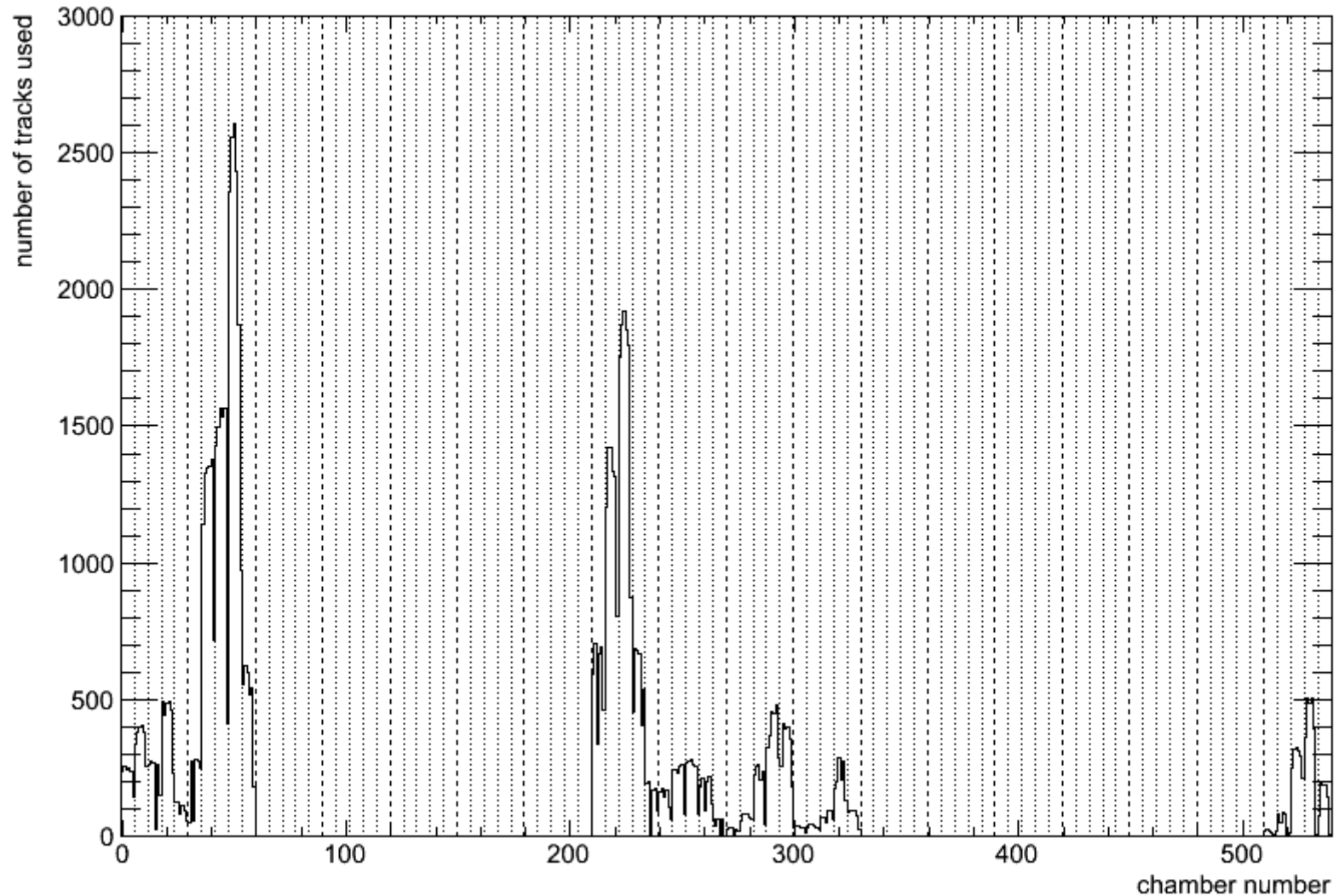
run	hours	tracks
81043	8	1220
81116	1	628
85618	6	5489
85660	2	952
85698	8	2747
91529	3	3063
91822	4	2713
91960	5	4370
92582	9	7938

30 k with B=0

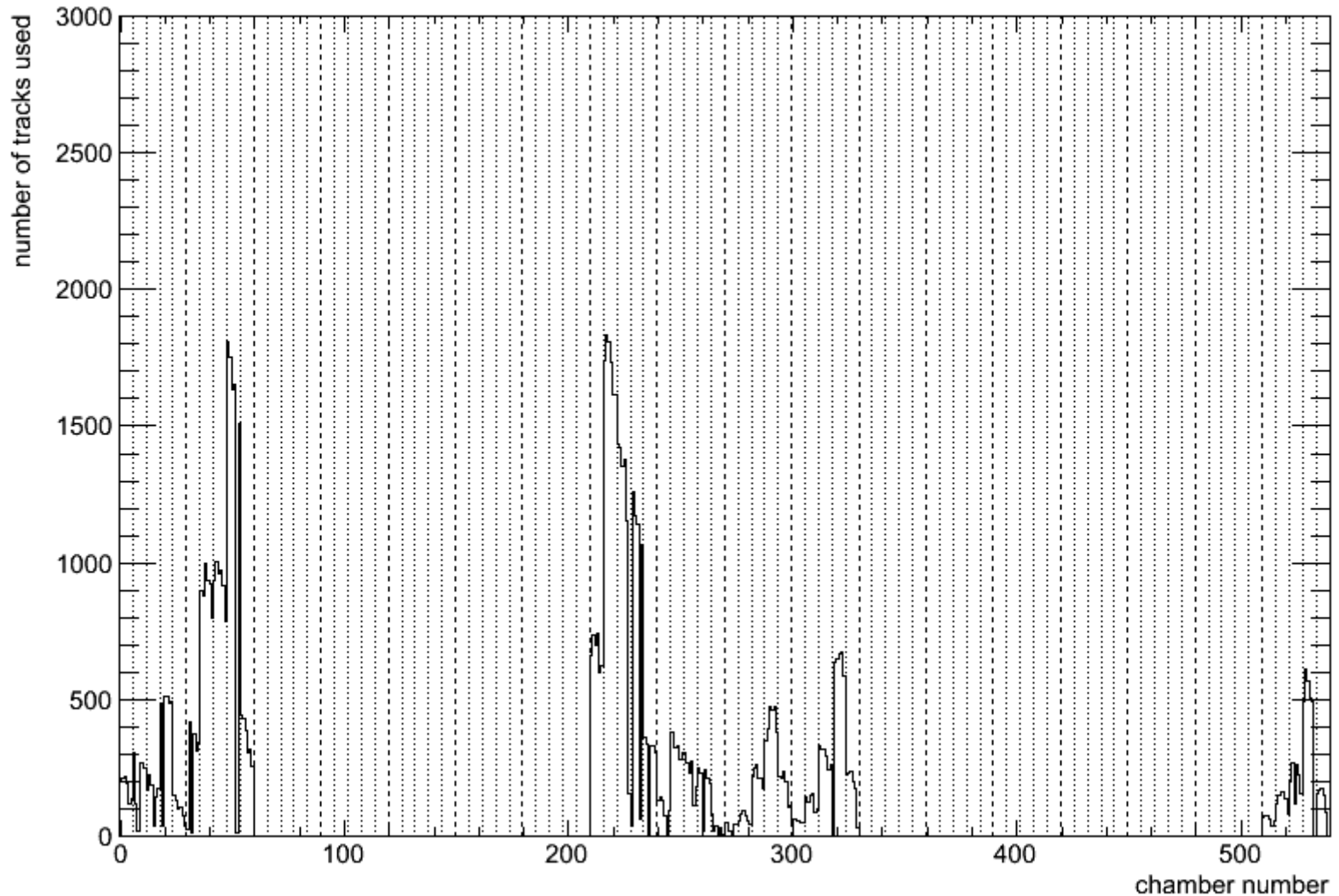
run	hours	tracks
95352	0.3	584
95354	0.1	262
95741	1.3	351
95741	1.3	535
96287	7.3	15058
97873	3.5	8208
98371	0.5	850
99031	2.6	10747

36 k with B=0.2 T

number of tracks used, $B = 0$

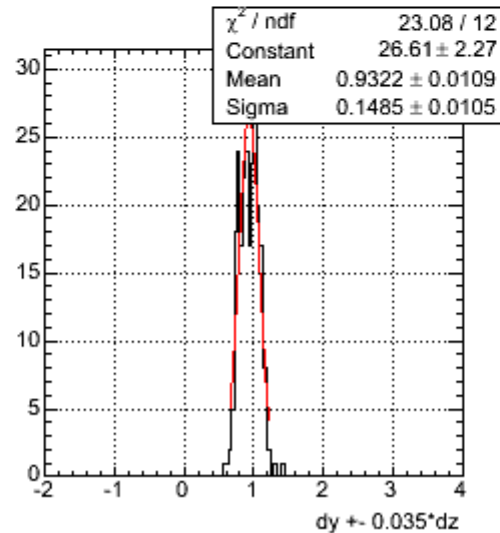
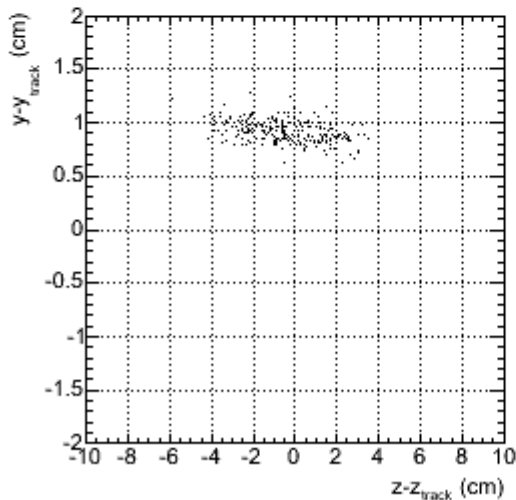
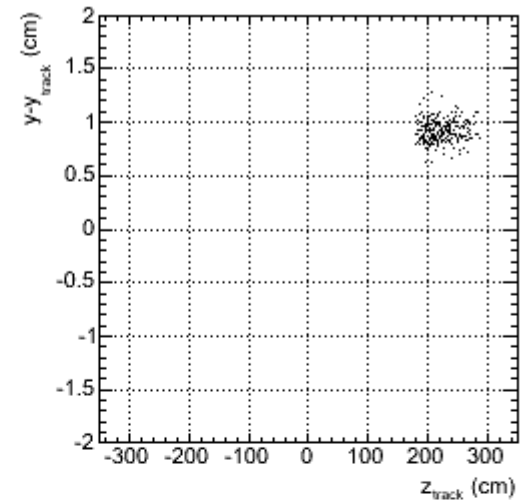
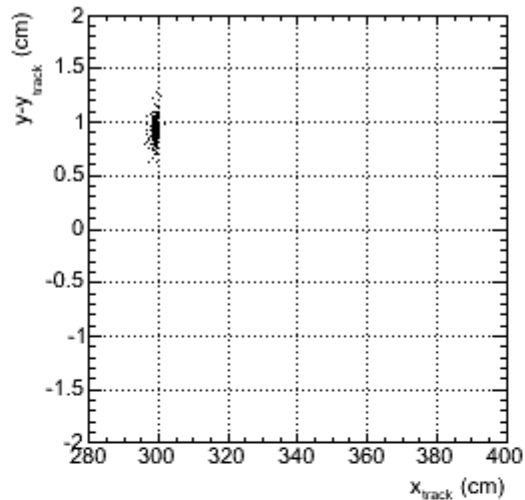
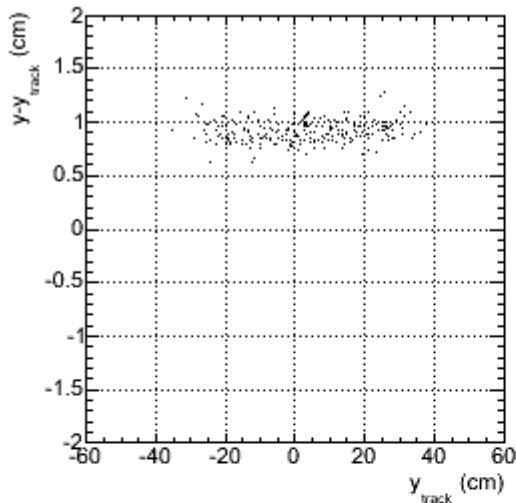


number of tracks used, $B = 0.2 T$



alignment examples
Kalman fit, $B = 0$
with respect to TPC

Chamber-by-chamber alignment example: sm0, stack0, layer0 before alignment



AliTrackResidualsFast

Aligning volumes

18432 (TRD/sm00/st0/pl0)

to reference volumes

14336 (TPC/EndcapA/Sector1/InnerChamber)

14354 (TPC/EndcapC/Sector1/InnerChamber)

16384 (TPC/EndcapA/Sector1/OuterChamber)

16402 (TPC/EndcapC/Sector1/OuterChamber)

Result

shift in phi -0.895

shift in z 0.595

shift in r 0.100

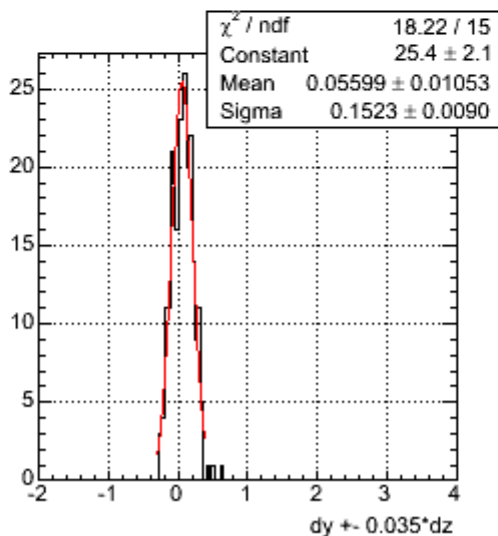
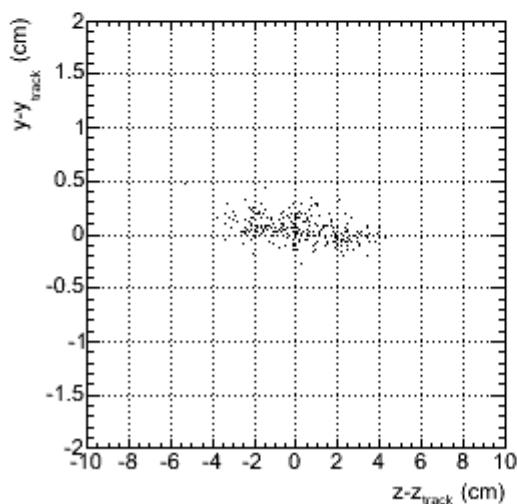
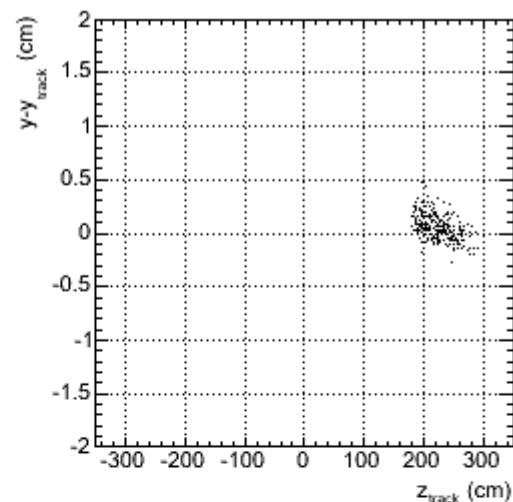
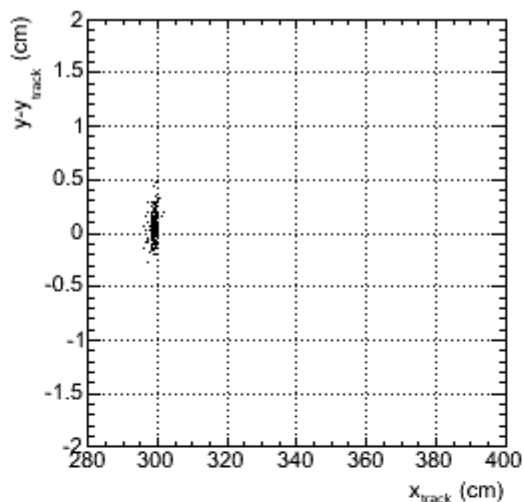
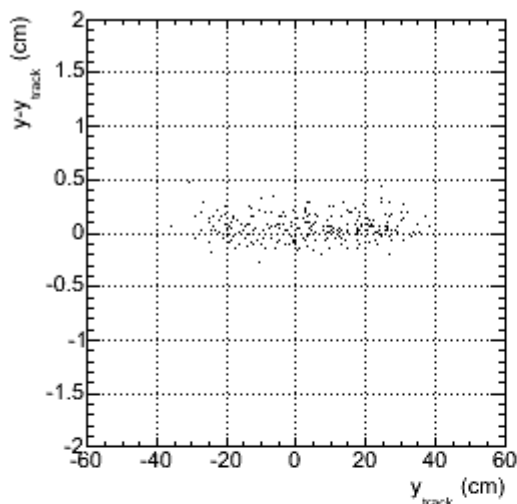
tilt in phi -0.6382

tilt in z 0.2760

tilt in r 0.1245

Residuals shown before alignment

Chamber-by-chamber alignment example: sm0, stack0, layer0 after alignment



AliTrackResidualsFast

Aligning volumes

18432 (TRD/sm00/st0/pl0)

to reference volumes

14336 (TPC/EndcapA/Sector1/InnerChamber)

14354 (TPC/EndcapC/Sector1/InnerChamber)

16384 (TPC/EndcapA/Sector1/OuterChamber)

16402 (TPC/EndcapC/Sector1/OuterChamber)

Result

shift in phi -0.895

shift in z 0.595

shift in r 0.100

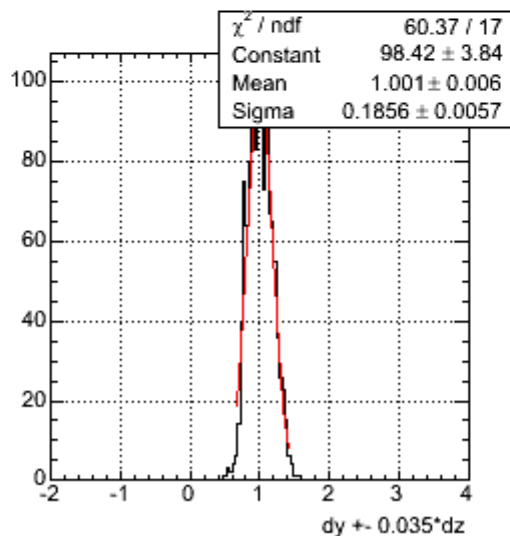
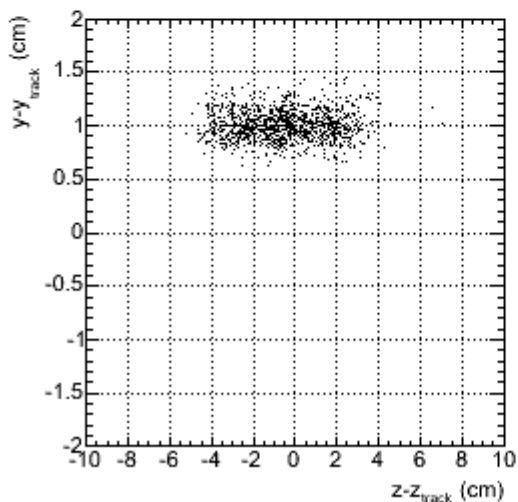
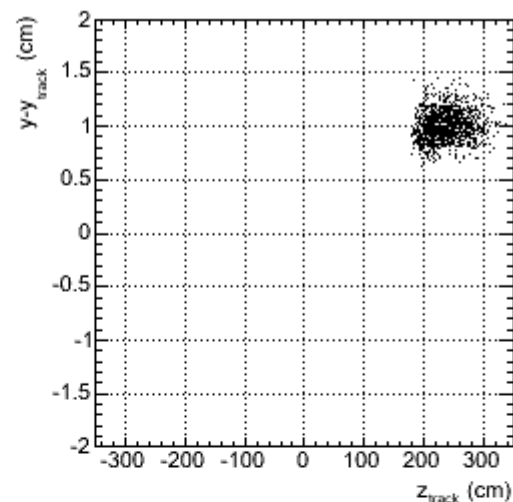
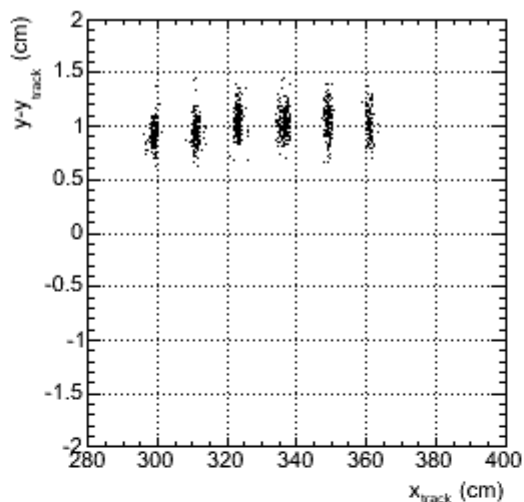
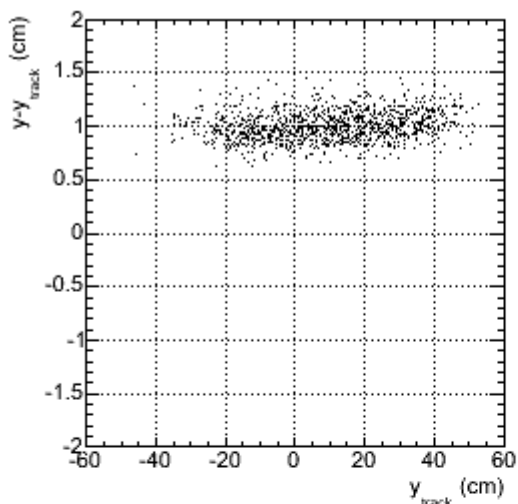
tilt in phi -0.6382

tilt in z 0.2760

tilt in r 0.1245

Residuals shown after alignment

Stack-by-stack alignment example: sm0, stack0 before alignment



AliTrackResidualsFast

Aligning volumes

18432 (TRD/sm00/st0/pl0)
20480 (TRD/sm00/st0/pl1)
...etc...
28672 (TRD/sm00/st0/pl5)

to reference volumes

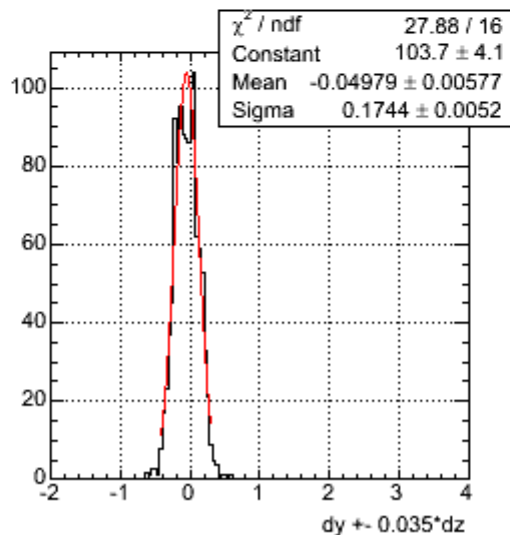
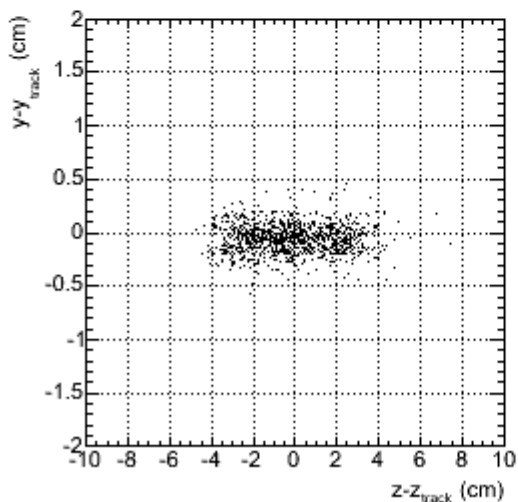
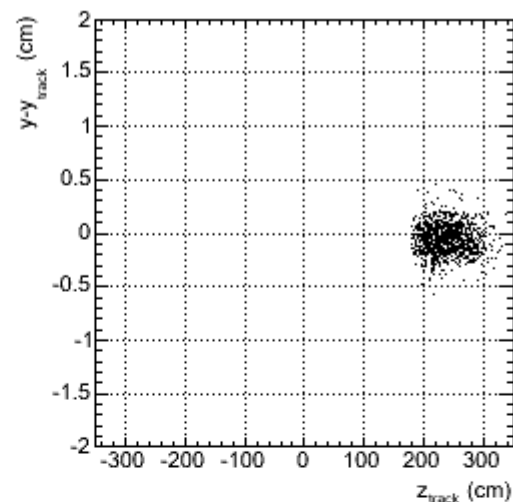
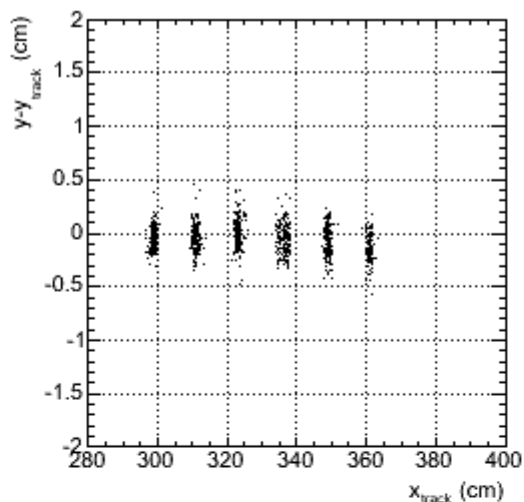
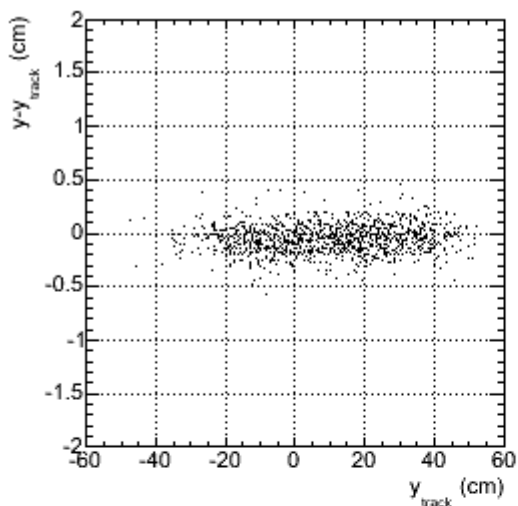
14336 (TPC/EndcapA/Sector1/InnerChamber)
14354 (TPC/EndcapC/Sector1/InnerChamber)
16384 (TPC/EndcapA/Sector1/OuterChamber)
16402 (TPC/EndcapC/Sector1/OuterChamber)

Result

shift in phi -1.164
shift in z 0.549
shift in r -0.425
tilt in phi -0.3038
tilt in z -0.1895
tilt in r -0.0065

Residuals shown before alignment

Stack-by-stack alignment example: sm0, stack0 after alignment



AliTrackResidualsFast

Aligning volumes

18432 (TRD/sm00/st0/pl0)

20480 (TRD/sm00/st0/pl1)

...etc...

28672 (TRD/sm00/st0/pl5)

to reference volumes

14336 (TPC/EndcapA/Sector1/InnerChamber)

14354 (TPC/EndcapC/Sector1/InnerChamber)

16384 (TPC/EndcapA/Sector1/OuterChamber)

16402 (TPC/EndcapC/Sector1/OuterChamber)

Result

shift in phi -1.164

shift in z 0.549

shift in r -0.425

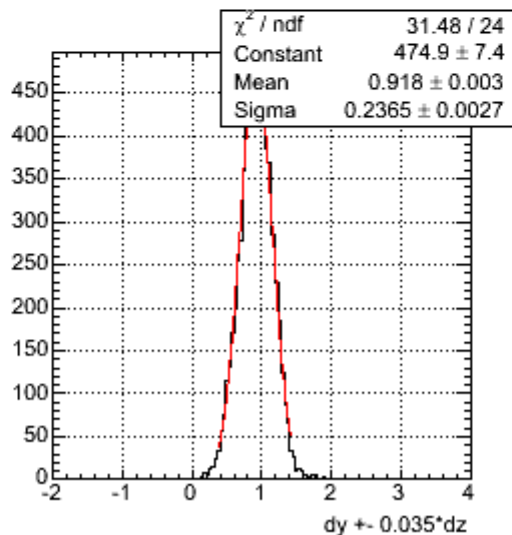
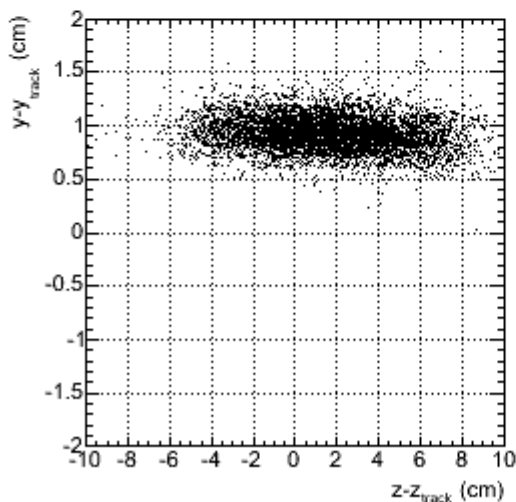
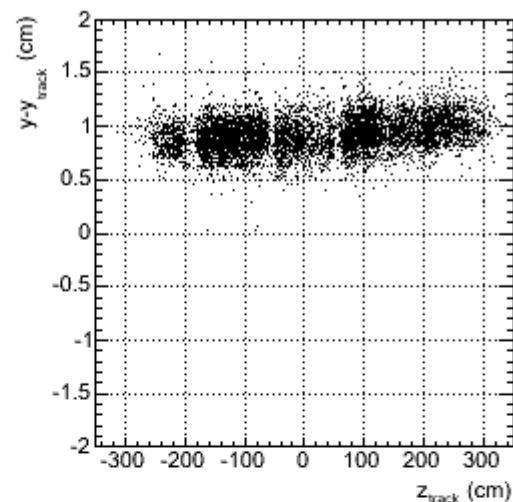
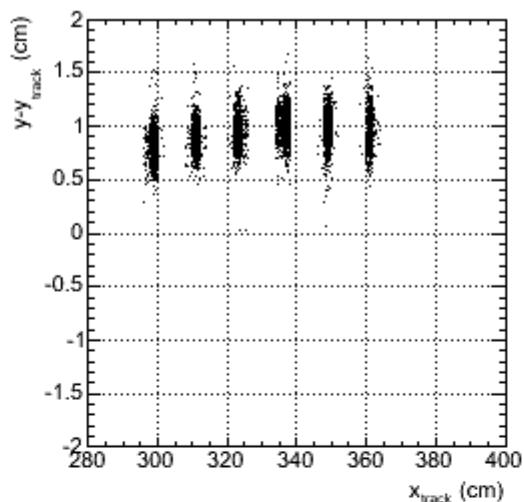
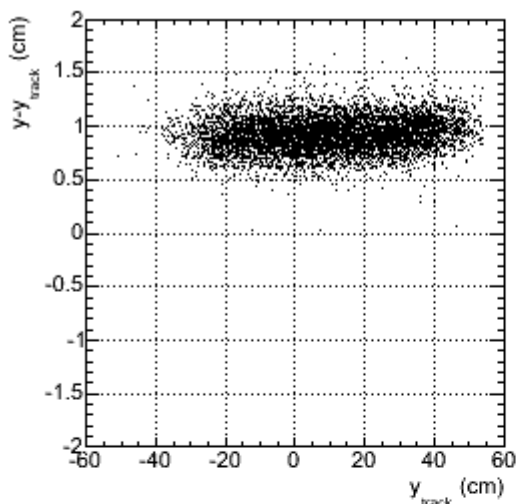
tilt in phi -0.3038

tilt in z -0.1895

tilt in r -0.0065

Residuals shown after alignment

Supermodule-by-supermodule alignment example: sm0 before alignment



AliTrackResidualsFast

Aligning volumes

18432 (TRD/sm00/st0/pl0)

18433 (TRD/sm00/st1/pl0)

...etc...

28676 (TRD/sm00/st4/pl5)

to reference volumes

14336 (TPC/EndcapA/Sector1/InnerChamber)

16384 (TPC/EndcapA/Sector1/OuterChamber)

14354 (TPC/EndcapC/Sector1/InnerChamber)

16402 (TPC/EndcapC/Sector1/OuterChamber)

Result

shift in phi -0.893

shift in z -1.511

shift in r 0.334

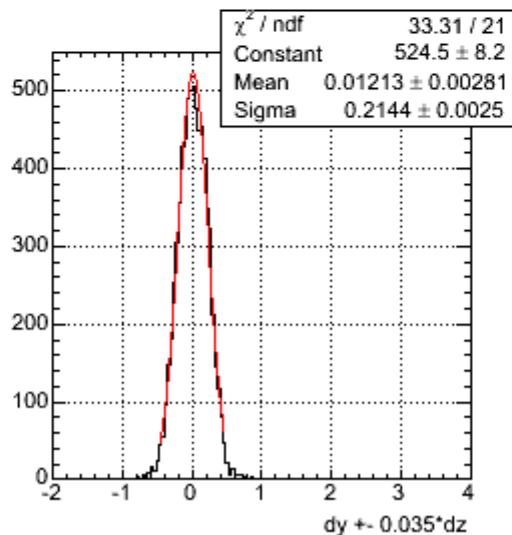
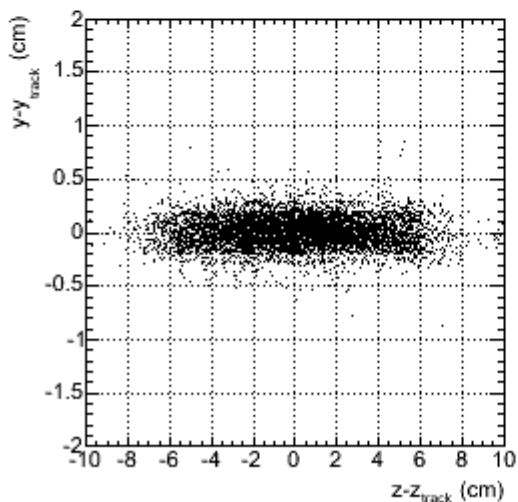
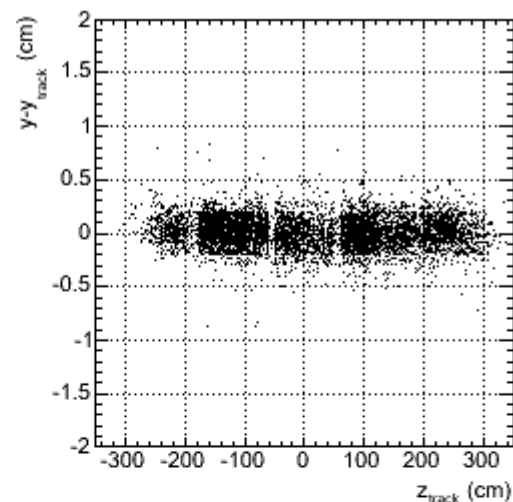
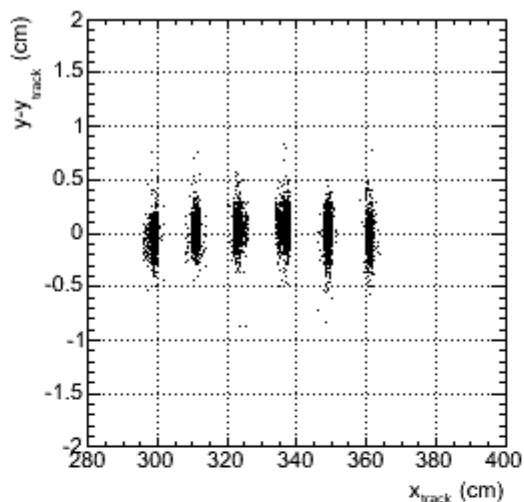
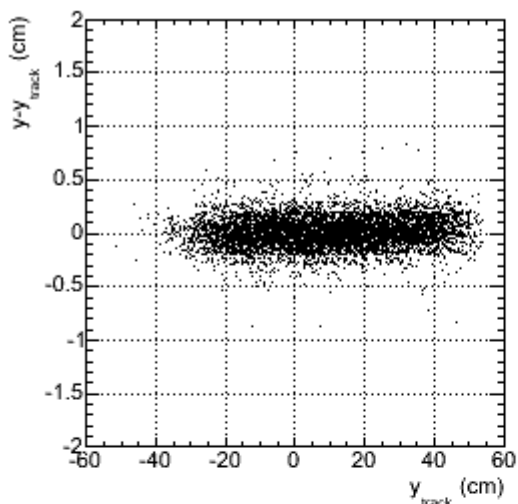
tilt in phi -0.0568

tilt in z -0.1433

tilt in r 0.0201

Residuals shown before alignment

Supermodule-by-supermodule alignment example: sm0 after alignment



AliTrackResidualsFast

Aligning volumes

18432 (TRD/sm00/st0/pl0)
18433 (TRD/sm00/st1/pl0)
...etc...
28676 (TRD/sm00/st4/pl5)

to reference volumes

14336 (TPC/EndcapA/Sector1/InnerChamber)
16384 (TPC/EndcapA/Sector1/OuterChamber)
14354 (TPC/EndcapC/Sector1/InnerChamber)
16402 (TPC/EndcapC/Sector1/OuterChamber)

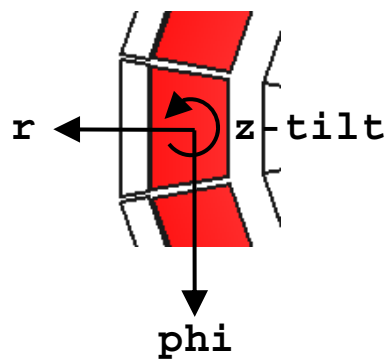
Result

shift in phi -0.893
shift in z -1.511
shift in r 0.334
tilt in phi -0.0568
tilt in z -0.1433
tilt in r 0.0201

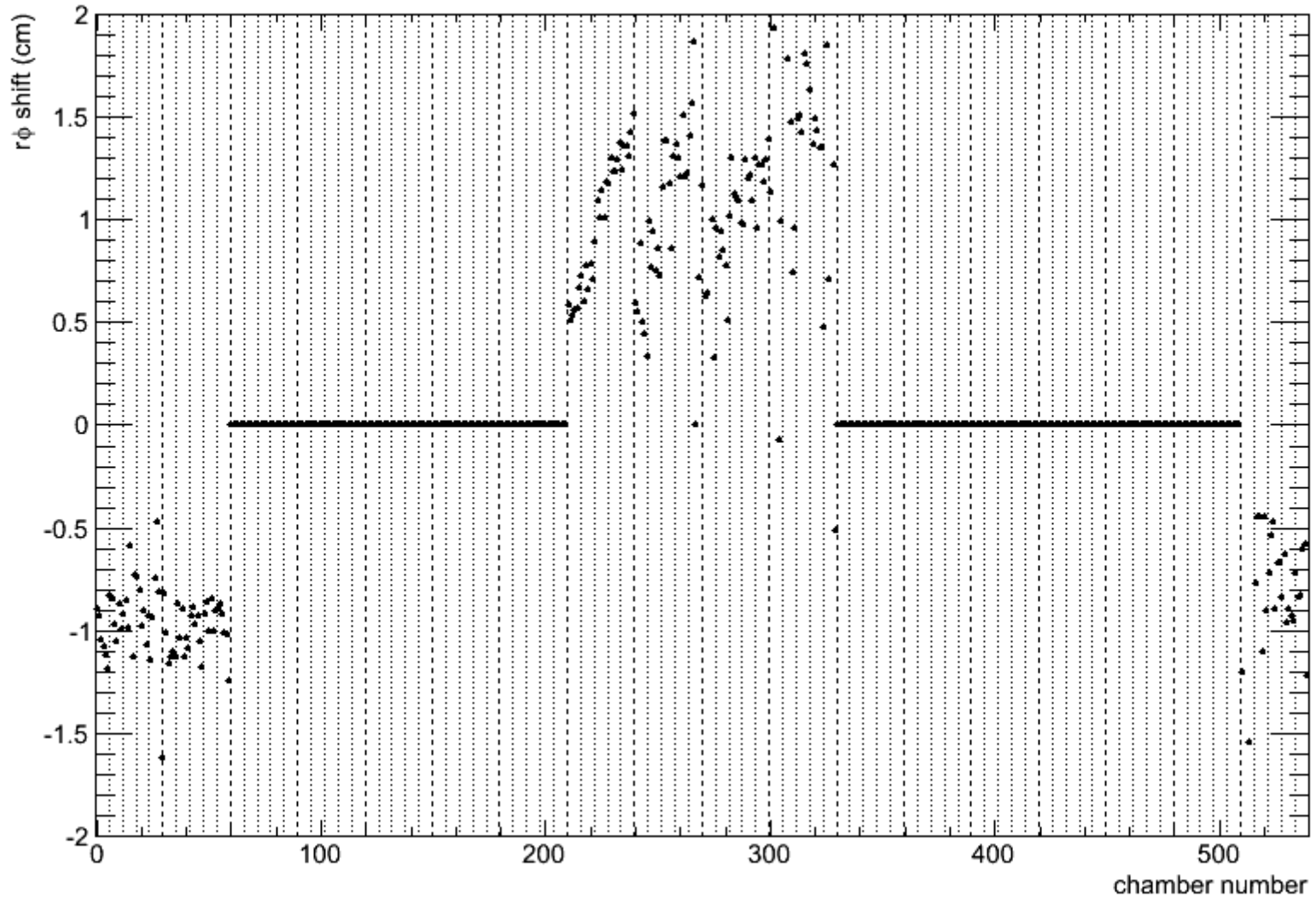
Residuals shown after alignment

alignment results
Kalman fit, $B = 0$
with respect to TPC

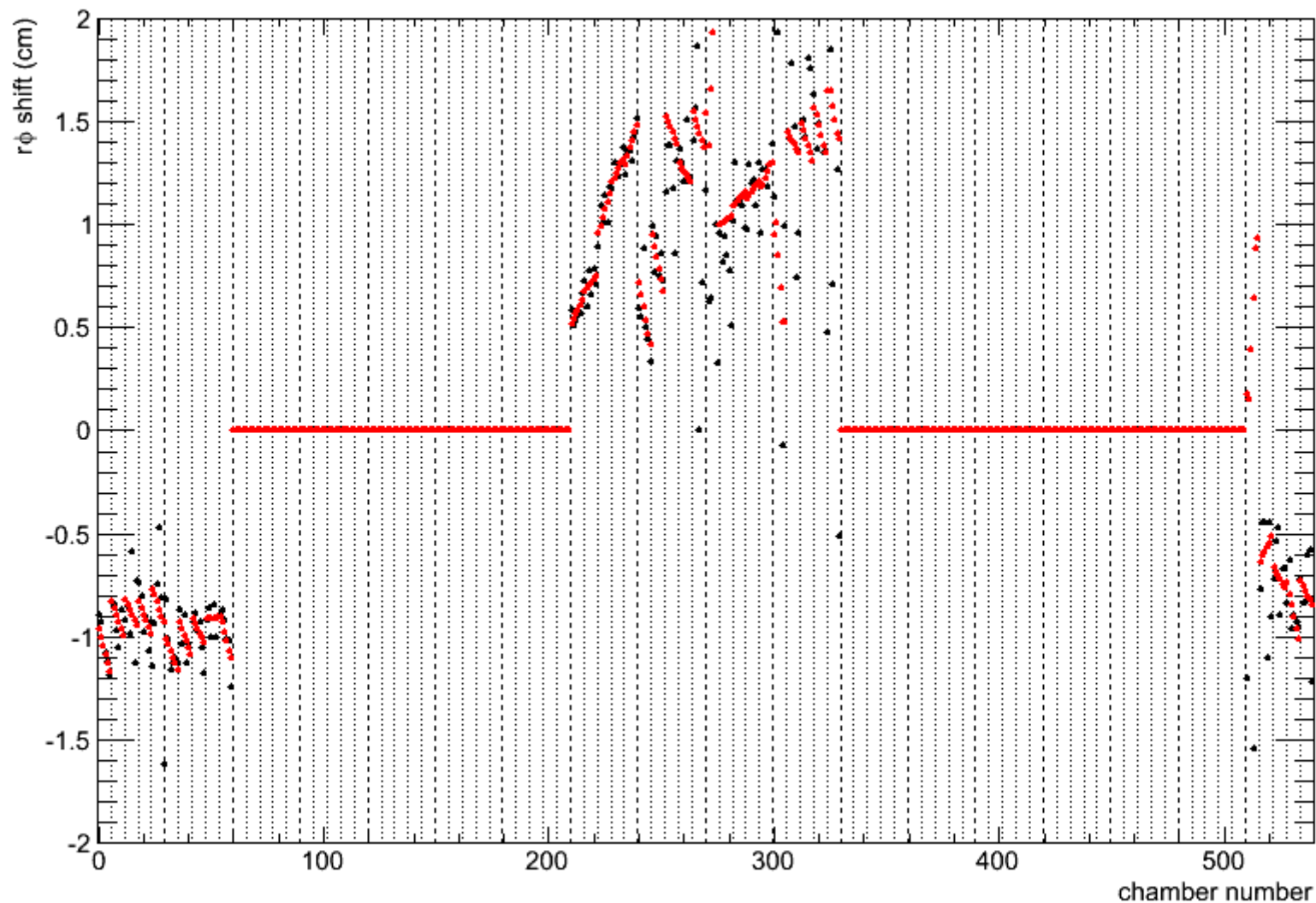
3 of the 6 alignment parameters explained



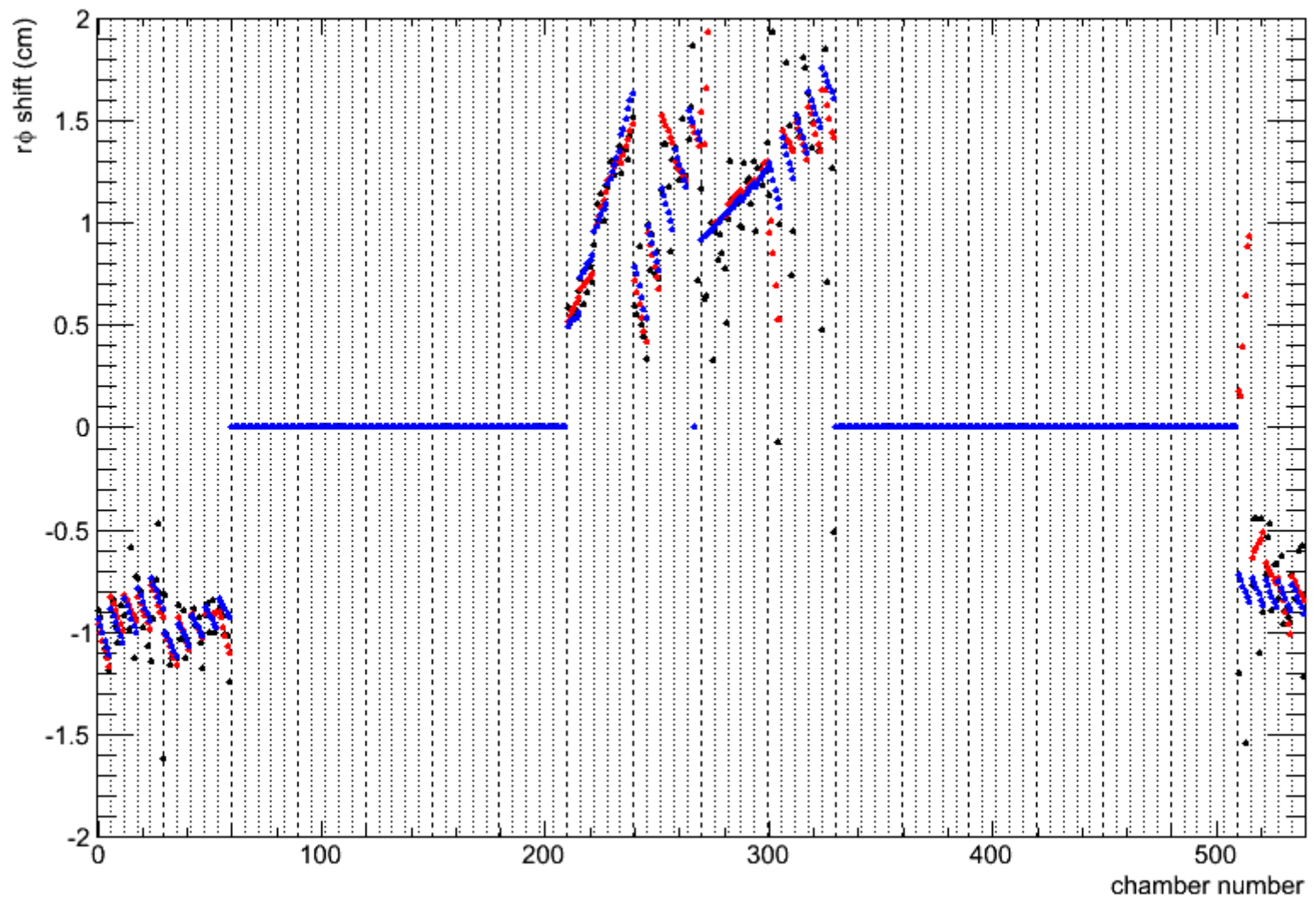
Chamber-by-chamber (black)



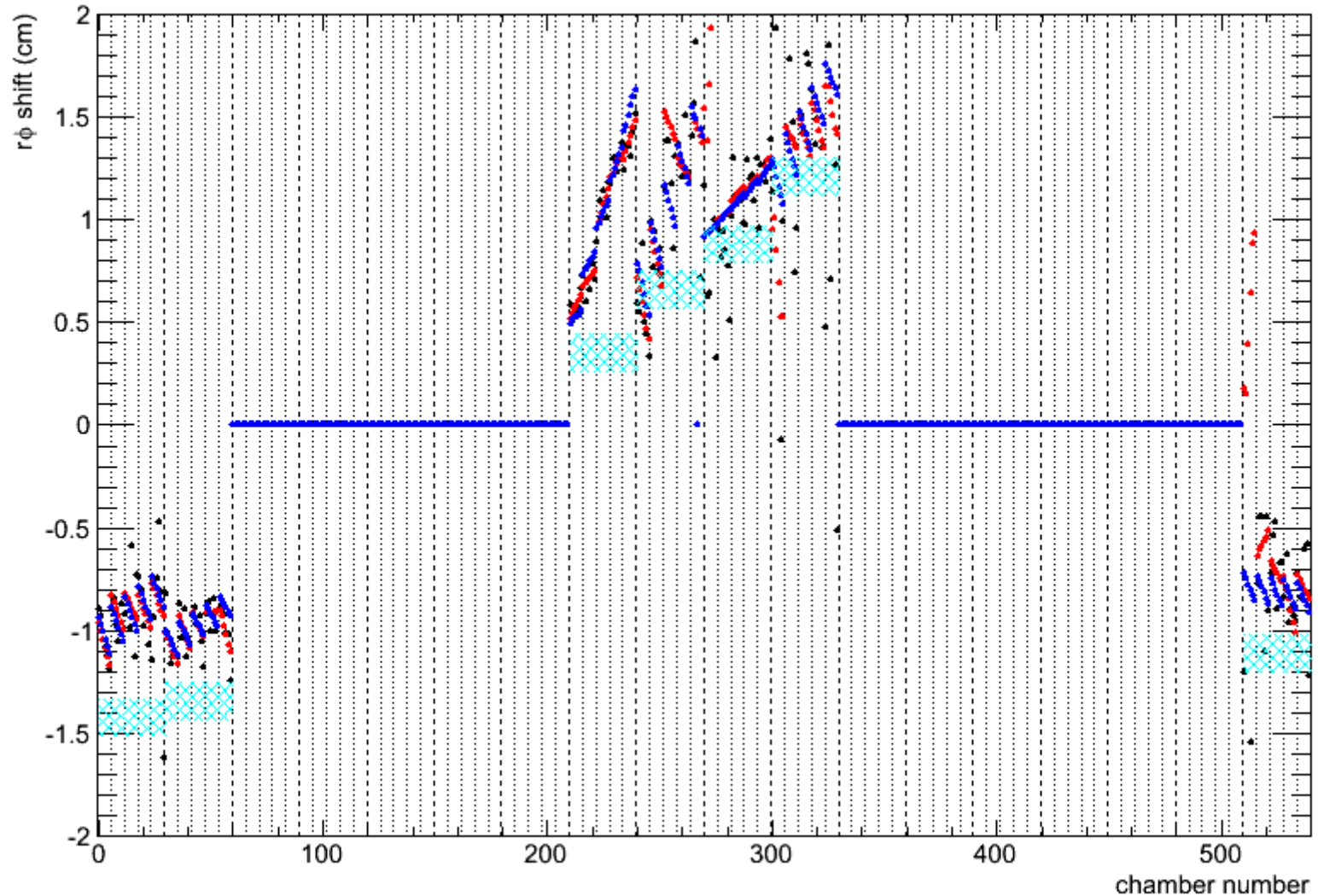
Chamber-by-chamber (black), stack-by-stack (red)



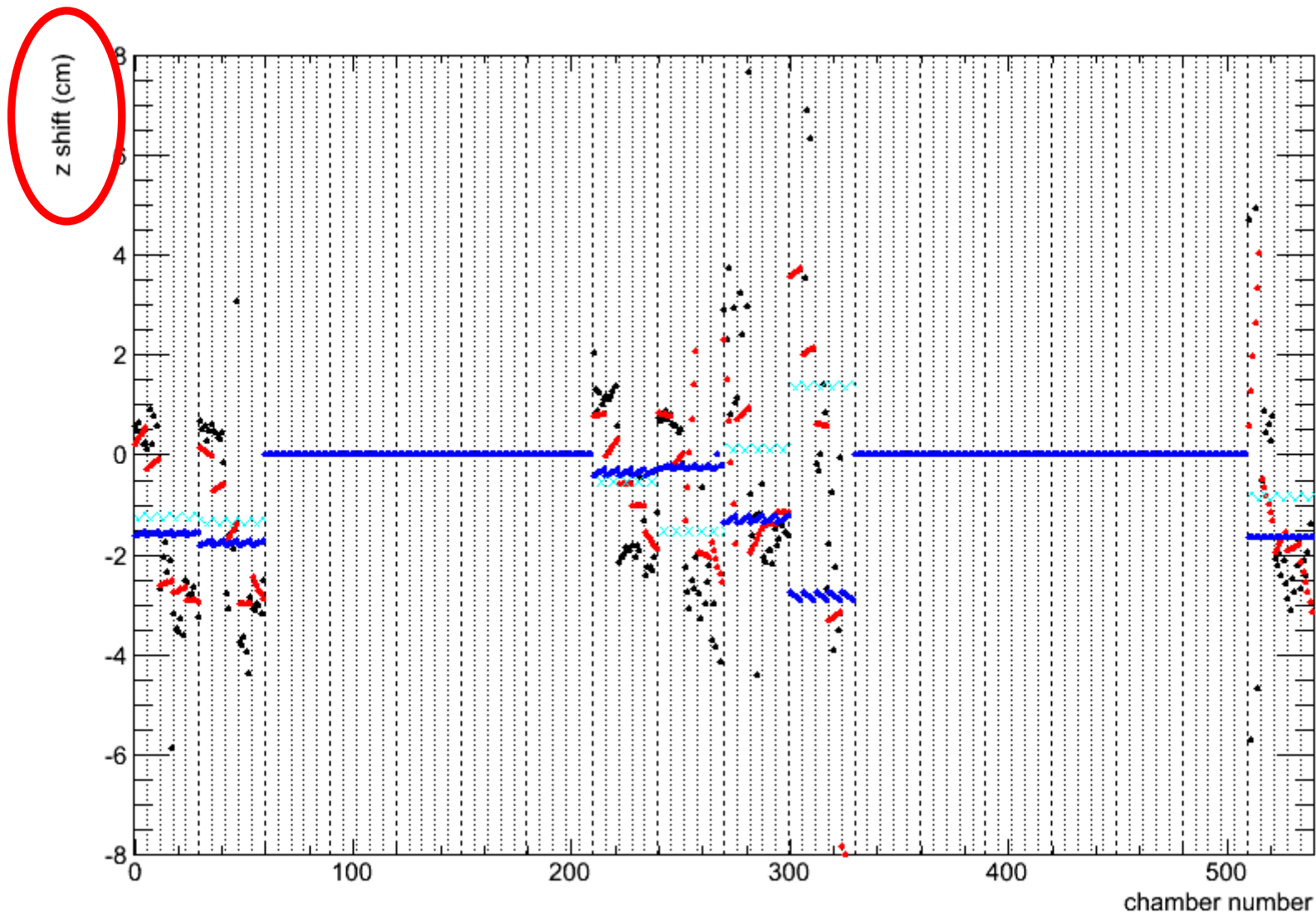
Chamber-by-chamber (black), stack-by-stack (red), supermodule-by-supermodule (blue)



Chamber-by-chamber (black), stack-by-stack (red), supermodule-by-supermodule (blue), survey (cyan)



Chamber-by-chamber (black), stack-by-stack (red), supermodule-by-supermodule (blue), survey (cyan)

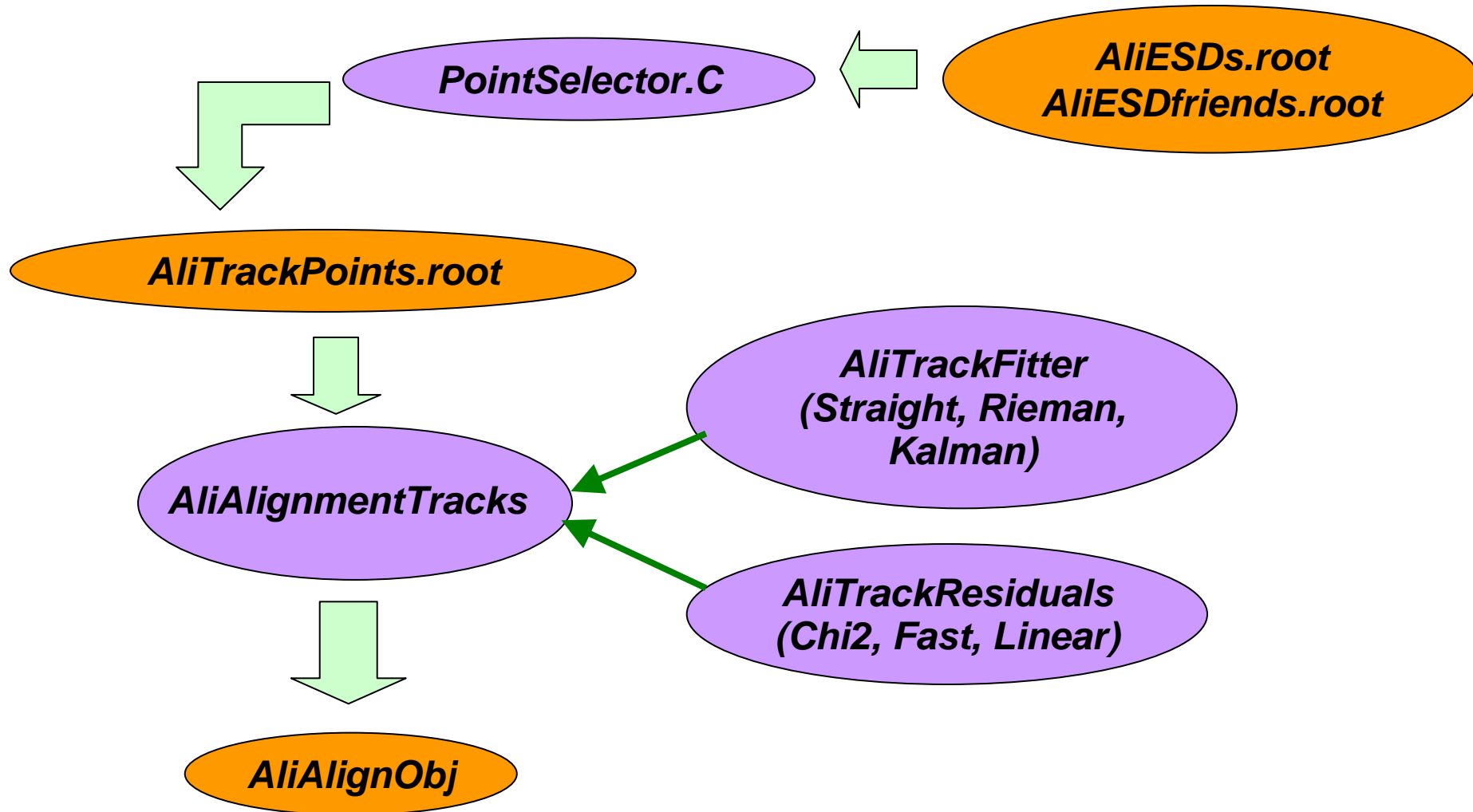


how to proceed

- 🔍 **take the results of supermodule-by-supermodule alignment obtained with $B=0$ and with Kalman fitter**
- 🔍 **replace the z-shift by the survey value, keep the other five parameters as they are**
- 🔍 **put into the OCDB as supermodule alignment objects (not as chamber**

backup

alignment procedure with *AliAlignmentTracks*



Alignable volumes in TRD

18 TRD supermodules
like **/TRD/sm03**
aligned by survey

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

