Weekly Progress Report

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15.08.2023

Global Alignment

2-step alignment with initial parameter

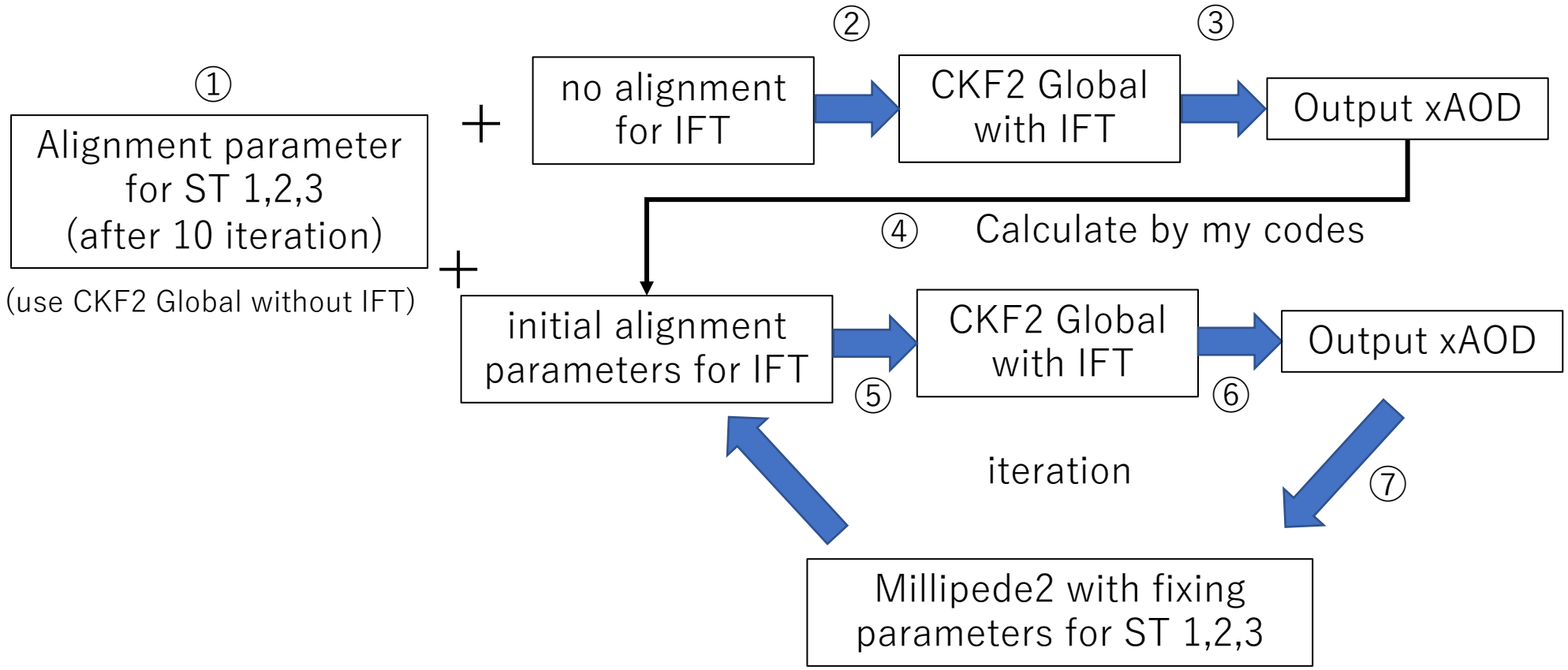
1. Align without IFT (with 2 or 3 iteration)
2. Fix parameters of 3 layers completely
   + set specific value as initial alignment parameters of IFT and align IFT

Now the fitted track by CKF2 cannot trust in IFT,
So, I fitted on my way and tried to get initial parameter

The method is described in previous week's report.
As a simply put, It is a fitting by circle

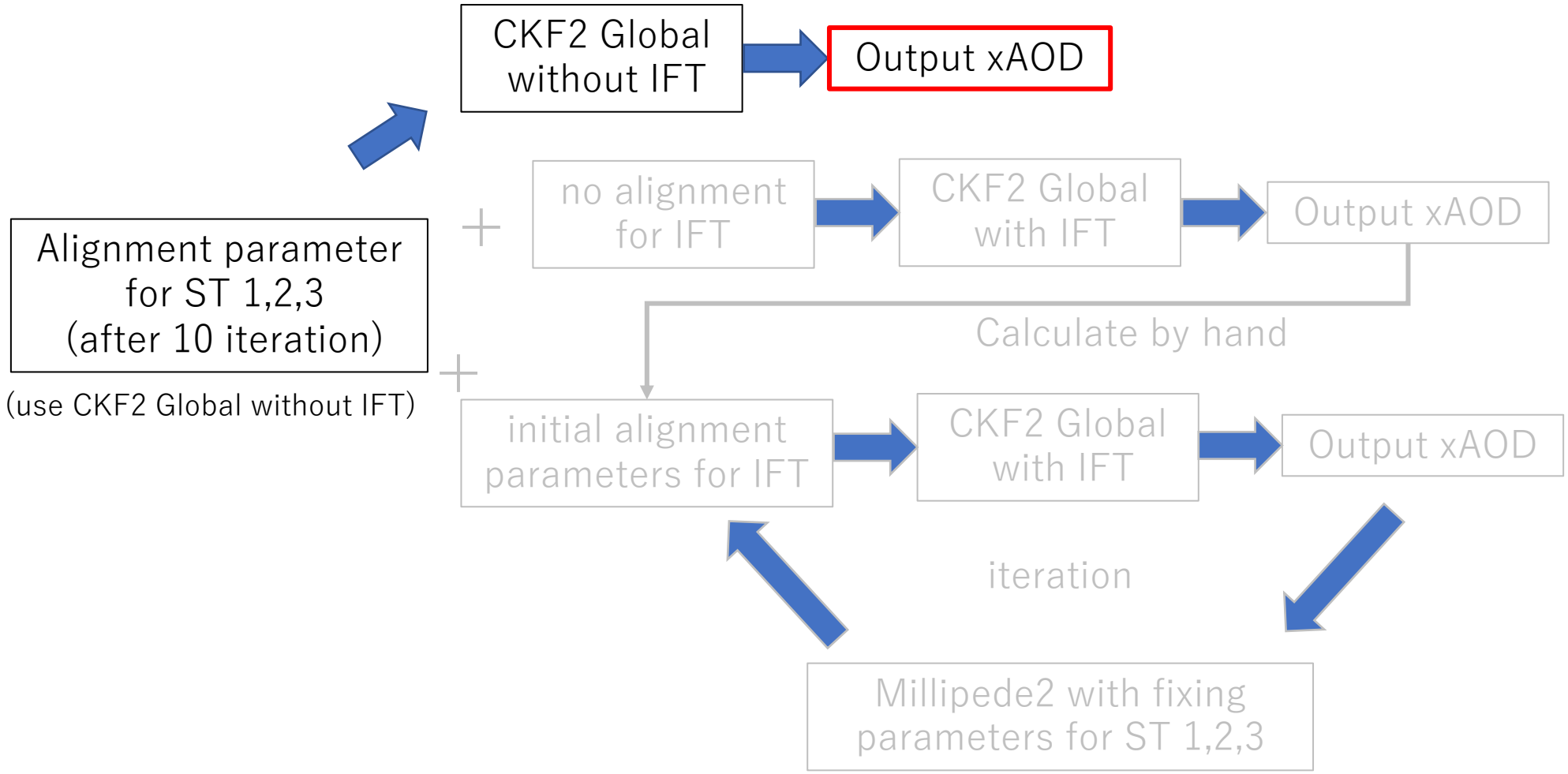
Global Alignment

The figure of process



Global Alignment

First, I checked about alignment parameter for ST 1,2,3



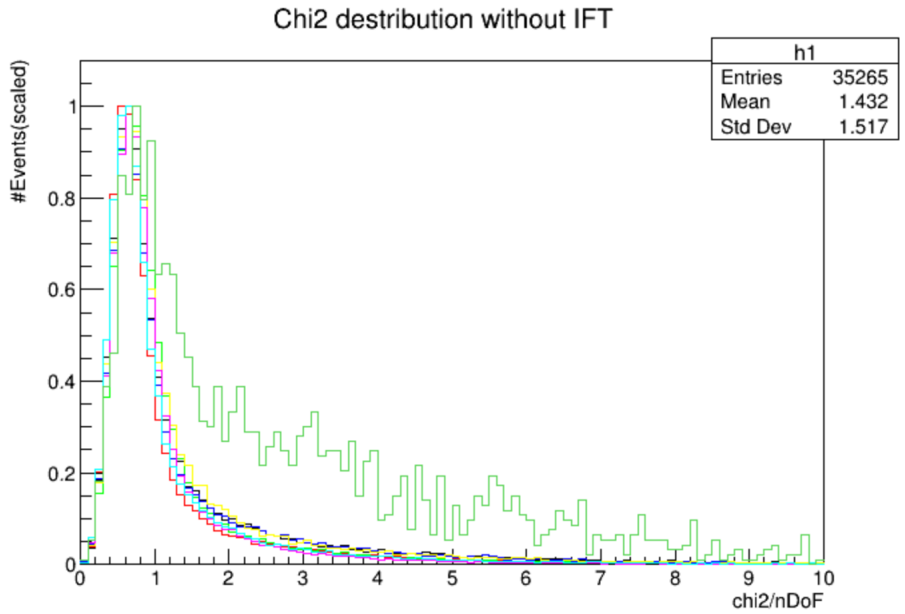
Global Alignment

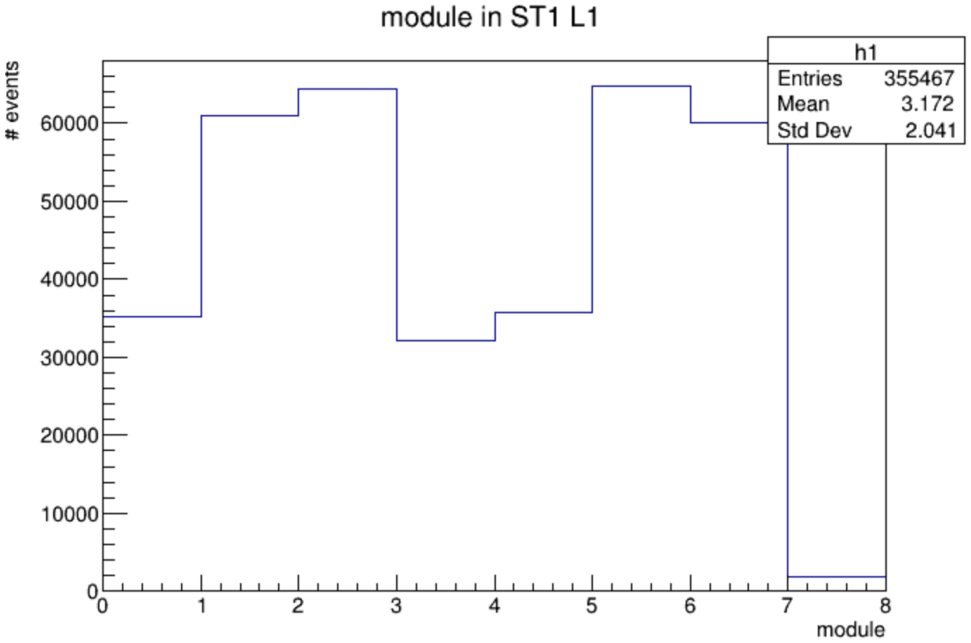
After 10 iteration of CKF2 Global without, IFT,

The mean value of chi2 is
- 1.10-1.25 for inner modules (module 1,2,5,6)
- 1.39-1.44 for outer modules except module 7
- 2.68 for module 7

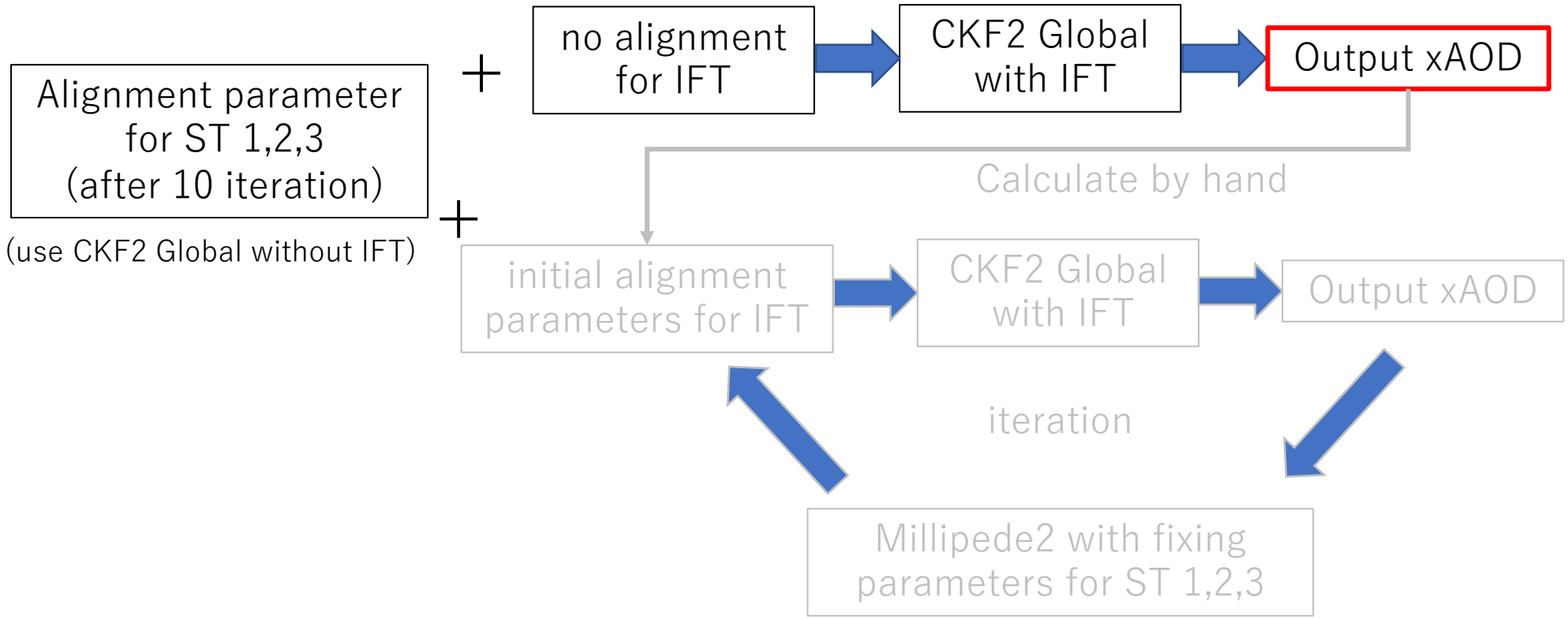
I checked the iteration for module 7,
then between iteration 2 and 4,
the alignment parameter looked like
be moved to wrong direction

The result for the tracks which pass module 7
cannot trust also in the following process





Global Alignment

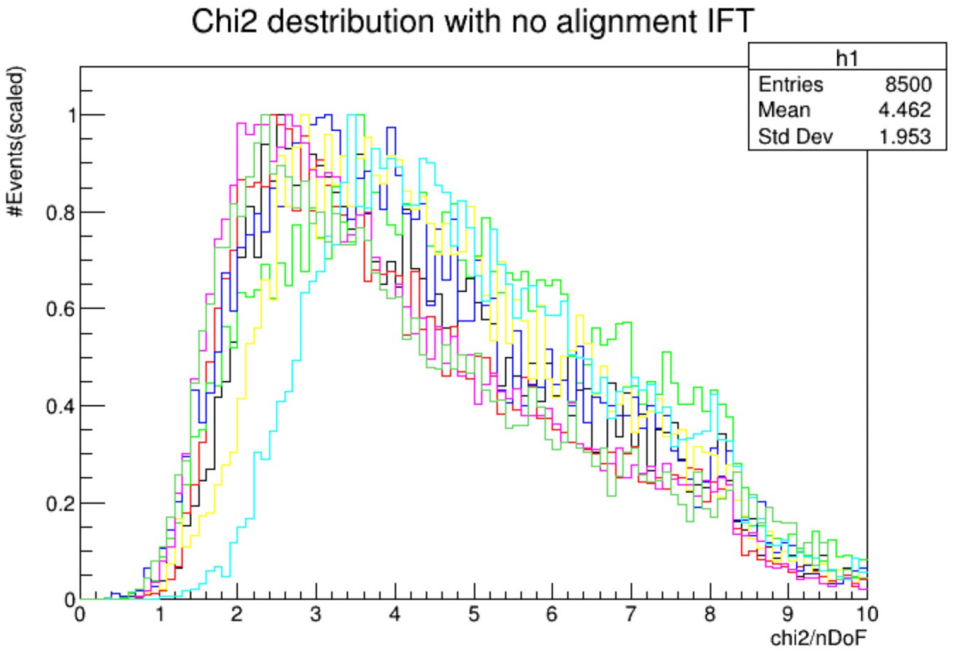


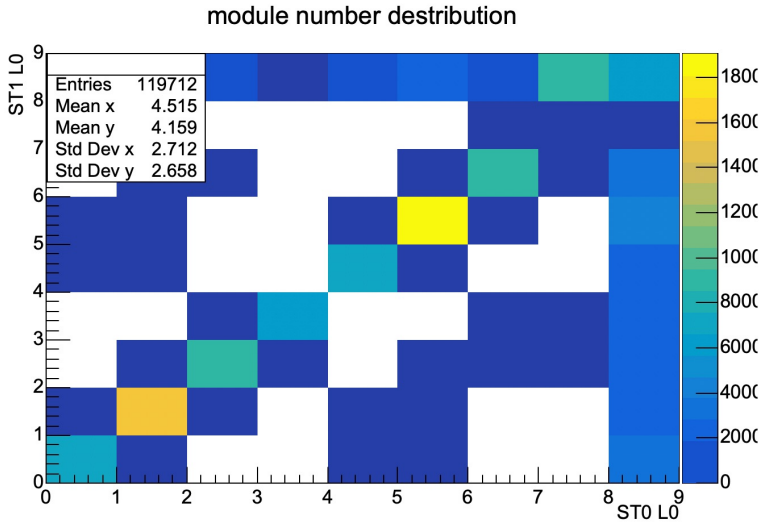
Global Alignment

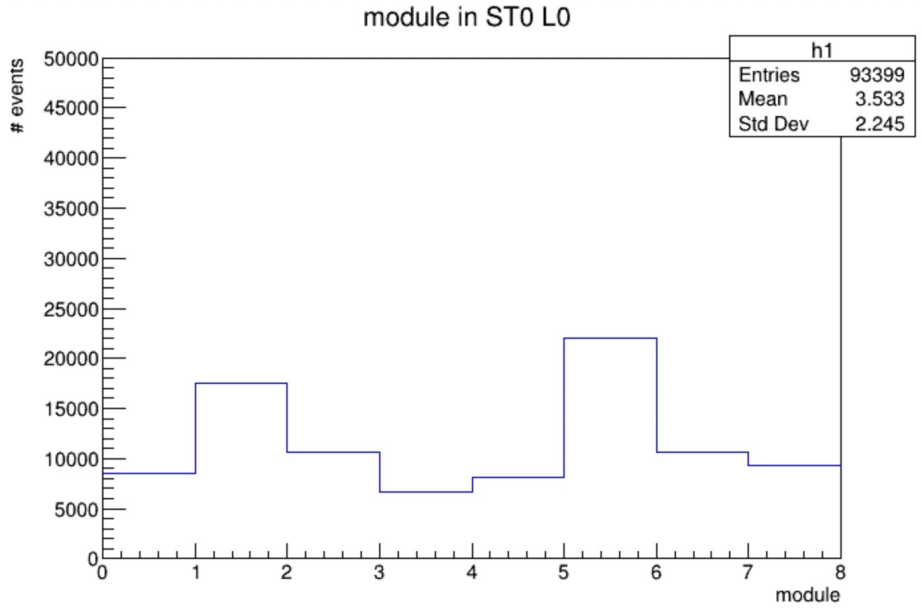
The distribution got worse as expected (chi2=4.1-5.1)

The effect of misalignment in ST1 L0-2 M7 is covered by misalignments in IFT temporary

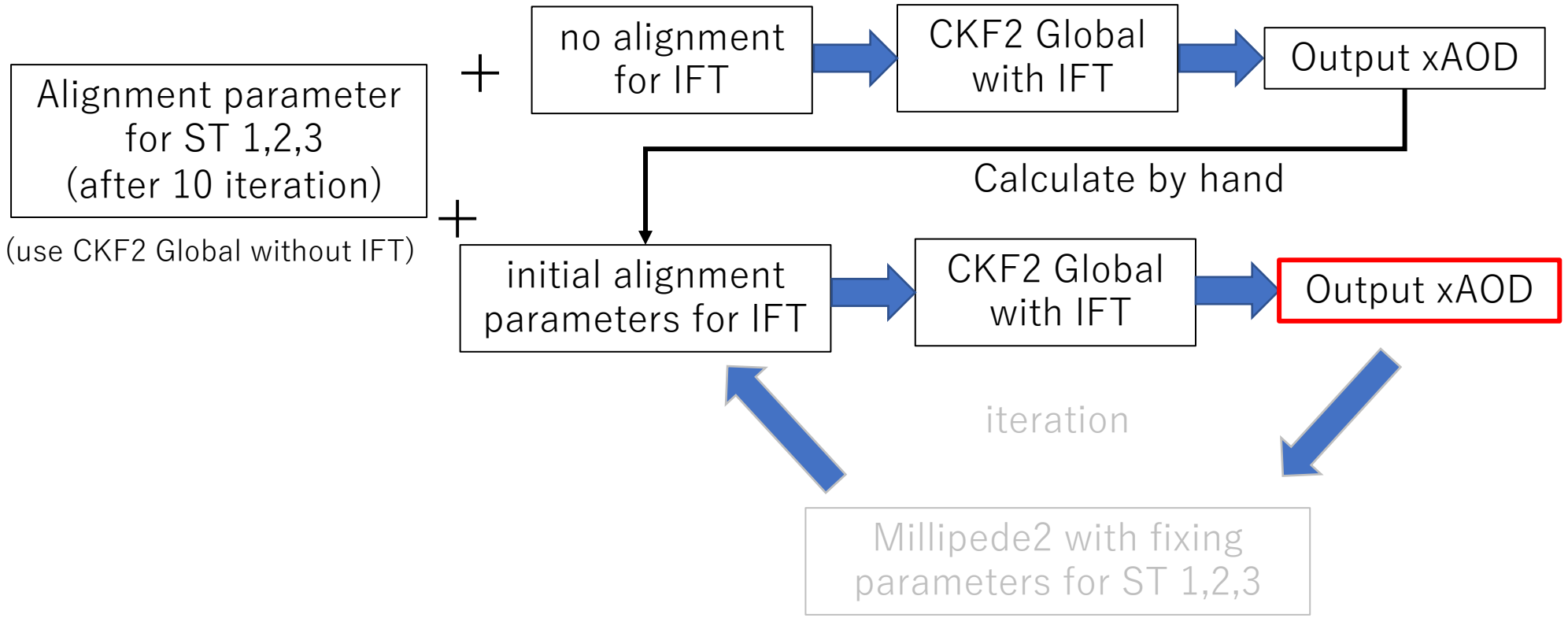
Also, we can see that the not small number of tracks pass the module 7 in IFT (though it does not pass the module 7 in ST1)







Global Alignment



Global Alignment

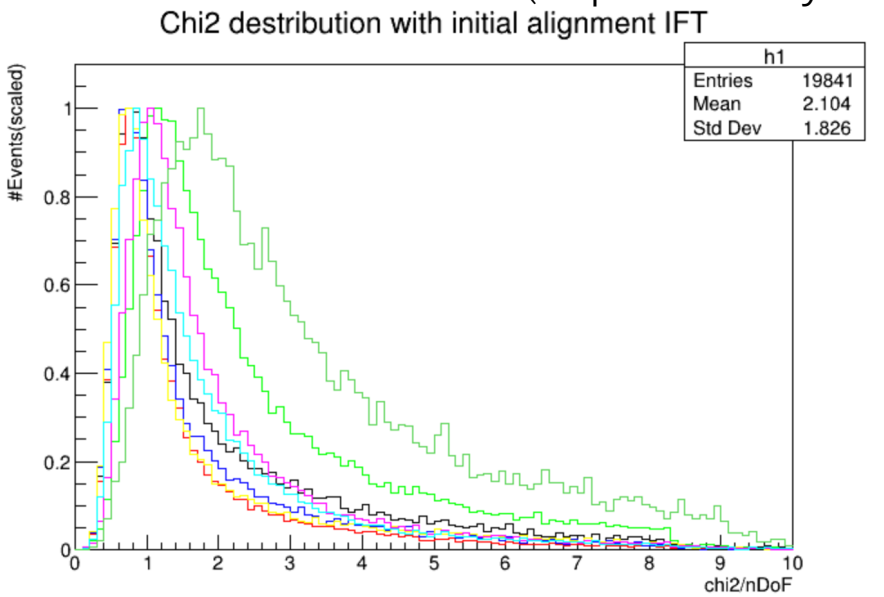
After initial parameters were reflected,

The mean value of chi2 is
- 1.6-2.1 for modules except module 7
- 3.15 for module 7

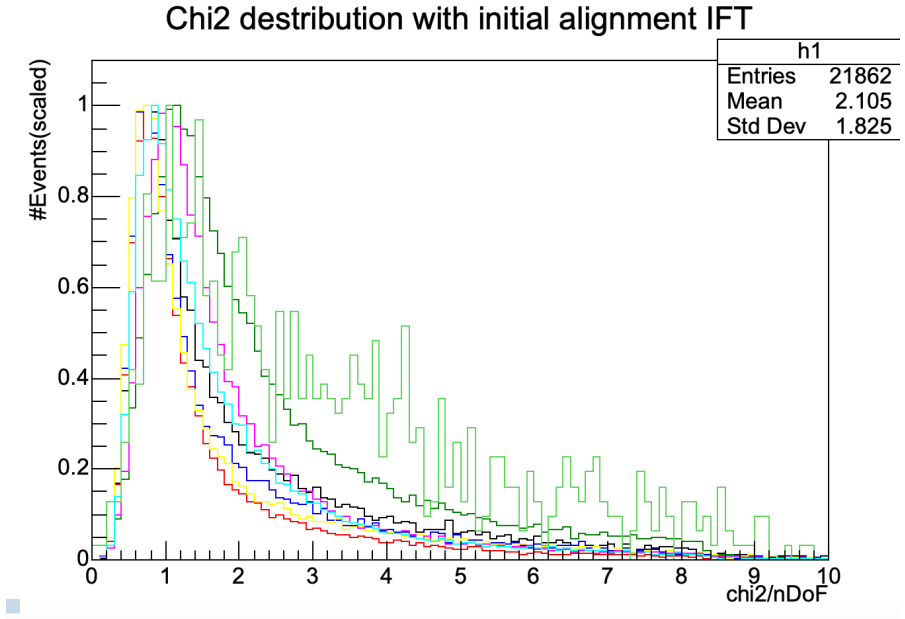
These values are not bad and parameters seem like to be near the correct value.

The bad result for the module 7 will be due to misalignment of ST 1,2,3

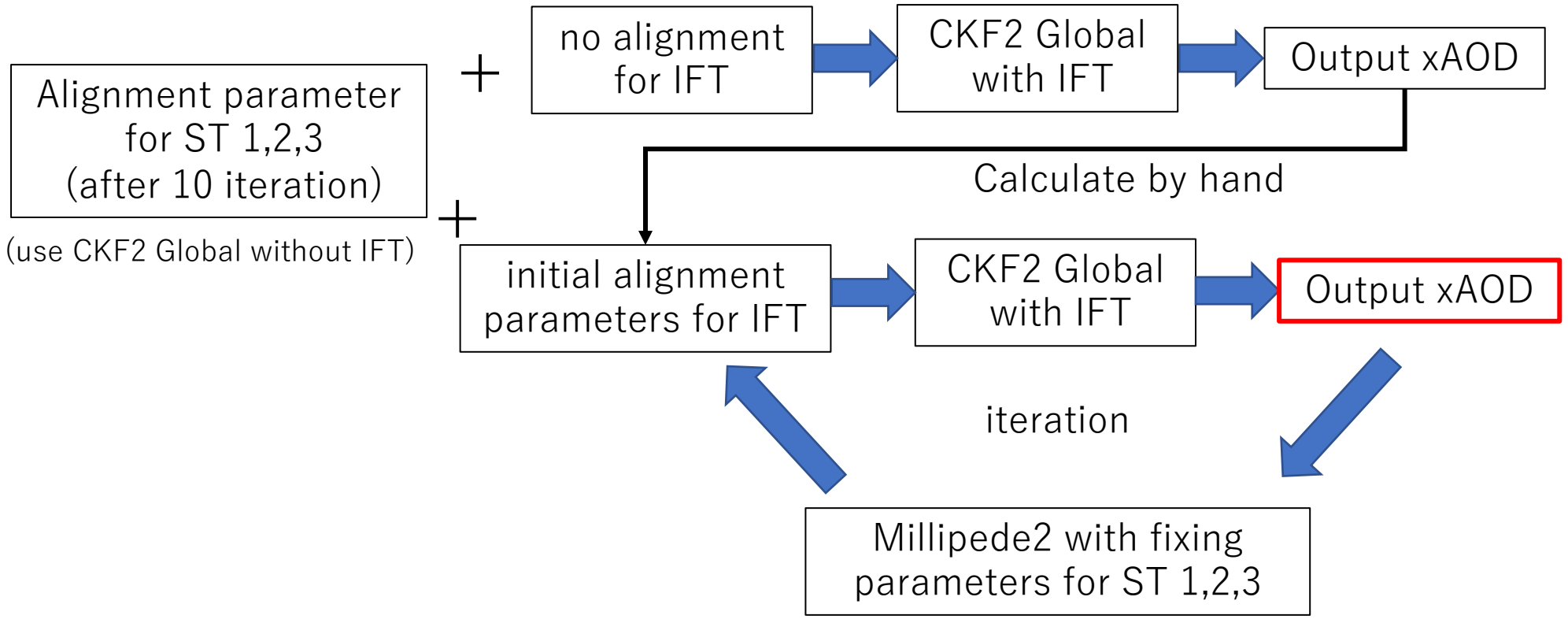
(separated by ST0 L0)



(separated by ST1 L0)



Global Alignment



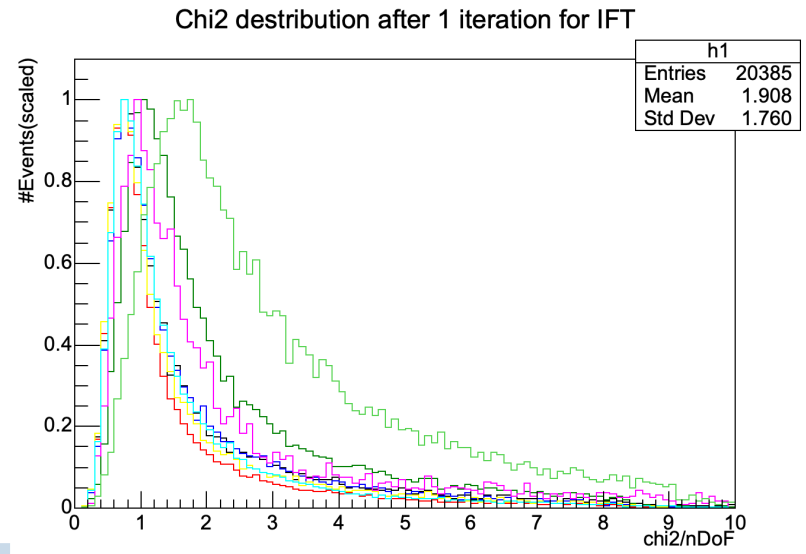
Global Alignment

(separated by ST0 L0)

After 1 iteration after I reflect initial parameter,

The mean value of chi2 is
- 1.5-2.2 for modules except module 7
- 3.04 for module 7

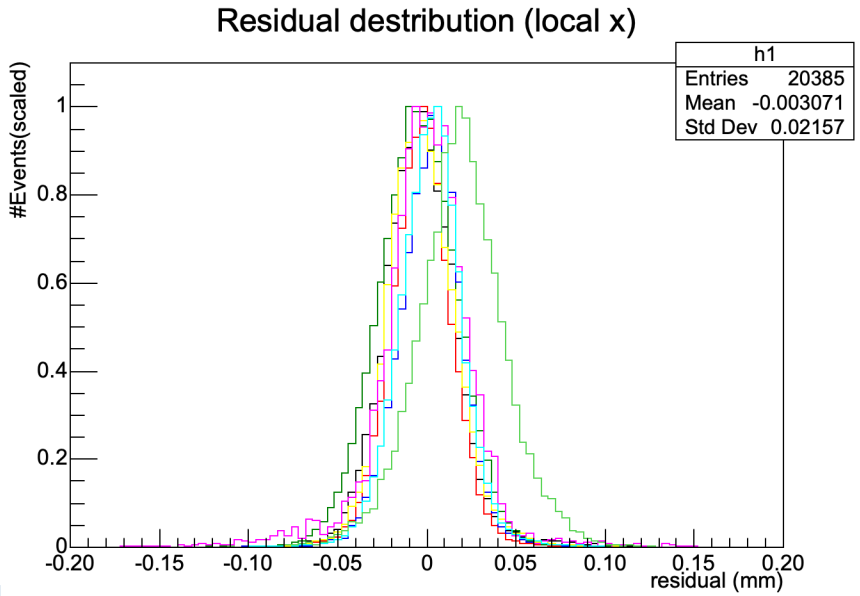
The number of track was also dexreased



The residual for local x direction for modules in ST0 L0 except for module 5 and 7,
- Mean value is -5um – 3um
- Standard Deviation is 18-23um

For module 5,
- Mean value is -1.4um
- Standard Deviation is 27um

For module 7,
- Mean value is 19um
- Standard Deviation is 25um



Global Alignment

(separated by ST0 L0)

The alignment parameter for y direction is shown in right figure

For module 2,
In ST 1,2,3 the shift was -50um,
but in IFT, 577,370, 280 um for L 1,2,3, respectively

For x direction there were O(1)mm

The setting of initial parameter was effective, but there may be misalignment in ST 1,2,3 even after global alignment without IFT and these initial values for IFT may be influenced by those misalignments

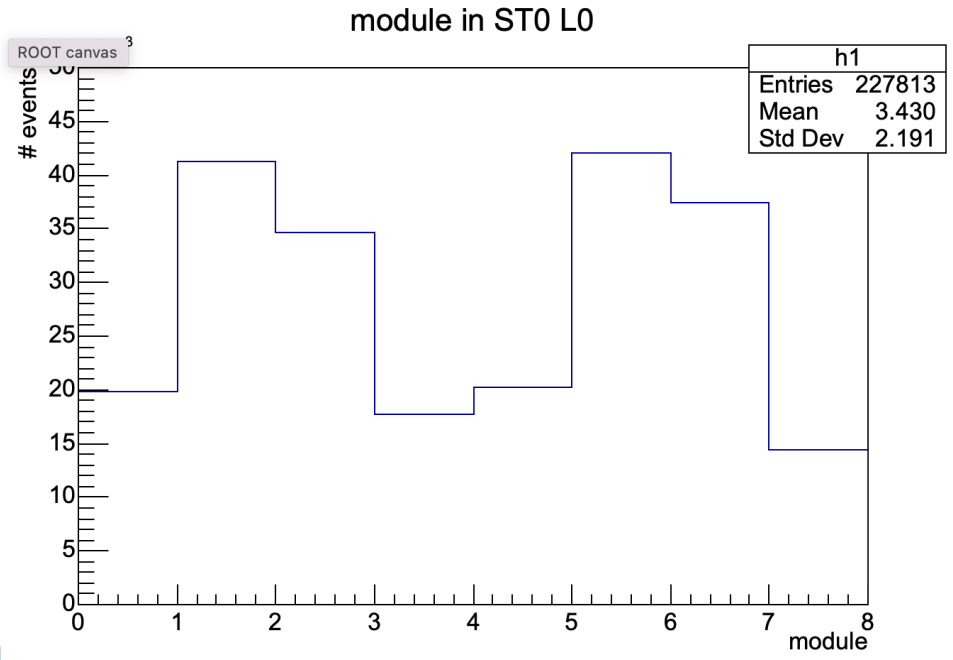
Now I am checking validity and tendency of parameters
And also, now considering about shift for global x direction by module

Alignment parameter (for global y)

Module	ST0 L0	ST1 L0
M0	73	-29
M1	-38	-20
M2	577	32
M3	-366	-129
M4	150	34
M5	(41)	(31)
M6	363	79
M7	(-405)	(-3)

Appendix

Before iteration after I reflect initial parameter



After 1 iteration after I reflect initial parameter