Emulsion-IFT Matching

UW team

Dataset

Ready to use — request — working

	Tracking Station Raw/HIT	Tracking Station xAOD	Tracking Station nTuples	Emulsion
MC (neutrino interaction data)	/eos/experiment/faser/sim/mdc/genie/200003/sim/s0007	/eos/experiment/faser/sim/mdc/genie/200003/rec/r0009	/eos/user/j/jlai/nTupleDumper/run/bin/r0009	Tomoko: 10 files
MC (single muon)	/eos/experiment/faser/sim/mdc/particle_gun/101307/sim	/eos/experiment/faser/sim/mdc/particle_gun/101307/	/eos/user/j/jlai/Faser_All/run/bin	Tomoko: reconstructing
Collision (July 5th -> 26th, 007733 -> 008051)	/eos/experiment/faser/raw/2022	/eos/experiment/faser/rec/2022/p0008	/eos/user/j/jlai/globalalign/run/r0013	Tomoko: 2.5x2.5 cm

All Faser MC:

https://twiki.cern.ch/twiki/bin/view/FASER/FaserMC

Collision Info. :

http://aagaard.web.cern.ch/aagaard/FASERruns.html

https://faser-runinfo.app.cern.ch/

All Data:

https://drive.google.com/drive/u/0/folders/1EmCwTDvTmjS-kD4KoFF5Jsu4Al6xatoN

Collision Data Details:

Tracking Station

- event run: 007733 -> 008051 (July 5th -> July 26th)
  - Before July 5th, LHC mostly doing test. little activity.
- xAOD -> nTuple: keep long tracks that contains hits for at least 3 tracking stations.
  - https://gitlab.cern.ch/dfellers/calypso/-/blob/ntupledumper/PhysicsAnalysis/NtupleDumper/src/NtupleDumperAlg.cxx

Emulsion

- March 15th -> July 26th
- area: 2.5 cm x 2.5 cm

Track Density

Collision Tracking Station:

$$\frac{456,975}{125mm * 125mm} = 29.25\ tracks/mm^2$$

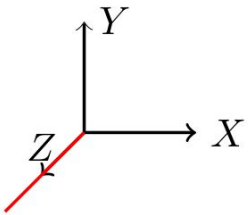
Collision Emulsion:

$$\frac{46,863}{25mm * 25mm} = 74.98\ microtracks/mm^2$$

Defined the nominal LoS: (125, 150) mm

	Default Center	Distance of default center to nominal LoS	FASERnu-position-Mar22.pdf	Sum (transformed center)
IFT	(0, 0) mm	x: +125 mm y: +150 mm	x: 0 mm y: -12 mm	(125, 138) mm
Emulsion	(125, 150) mm	x: 0 mm y: 0 mm	x: +10 mm y: -33 mm	(135, 117) mm

x-y distribution



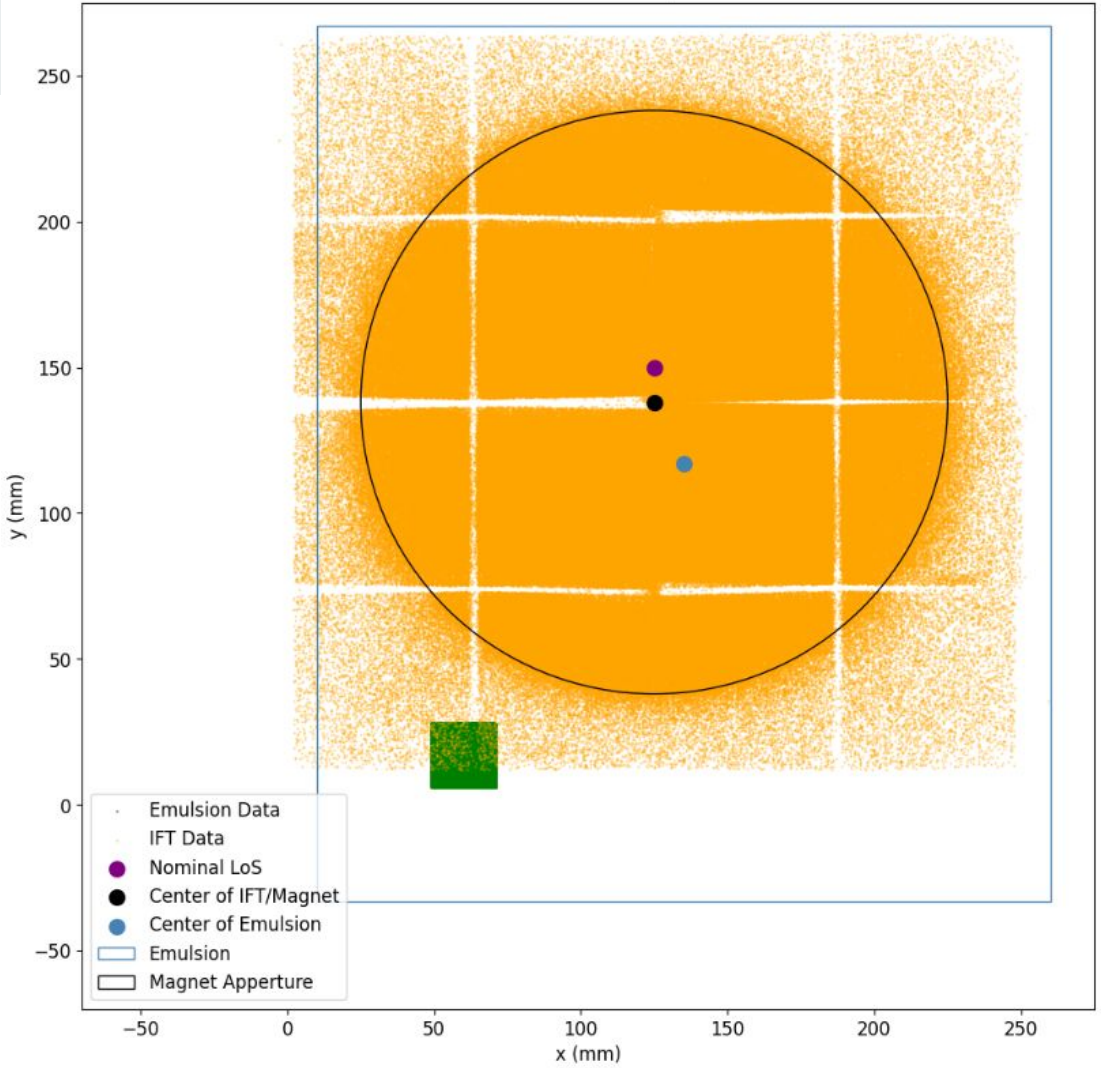
nominal LoS: (125, 150) mm

New center of emulsion: (135, 117) mm

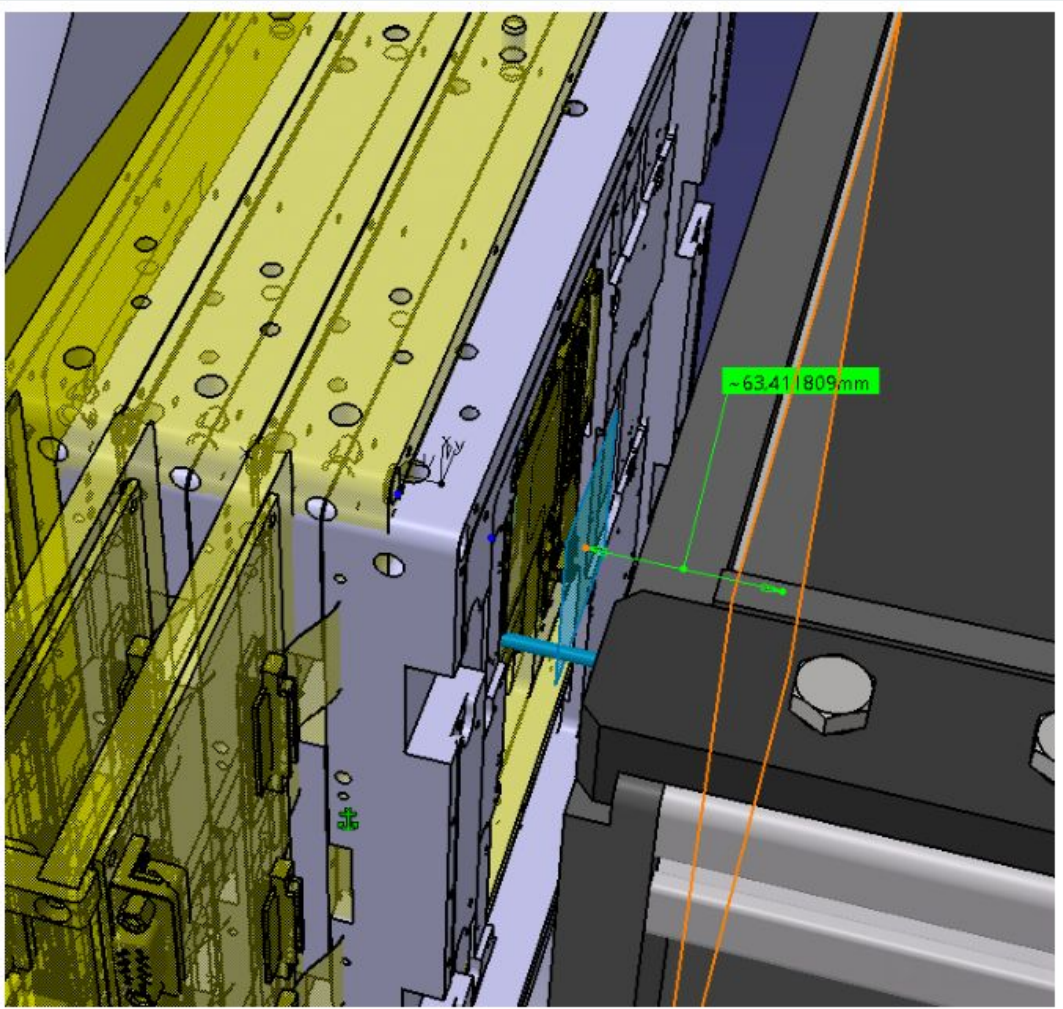
New center of Tracking Station: (125, 138) mm

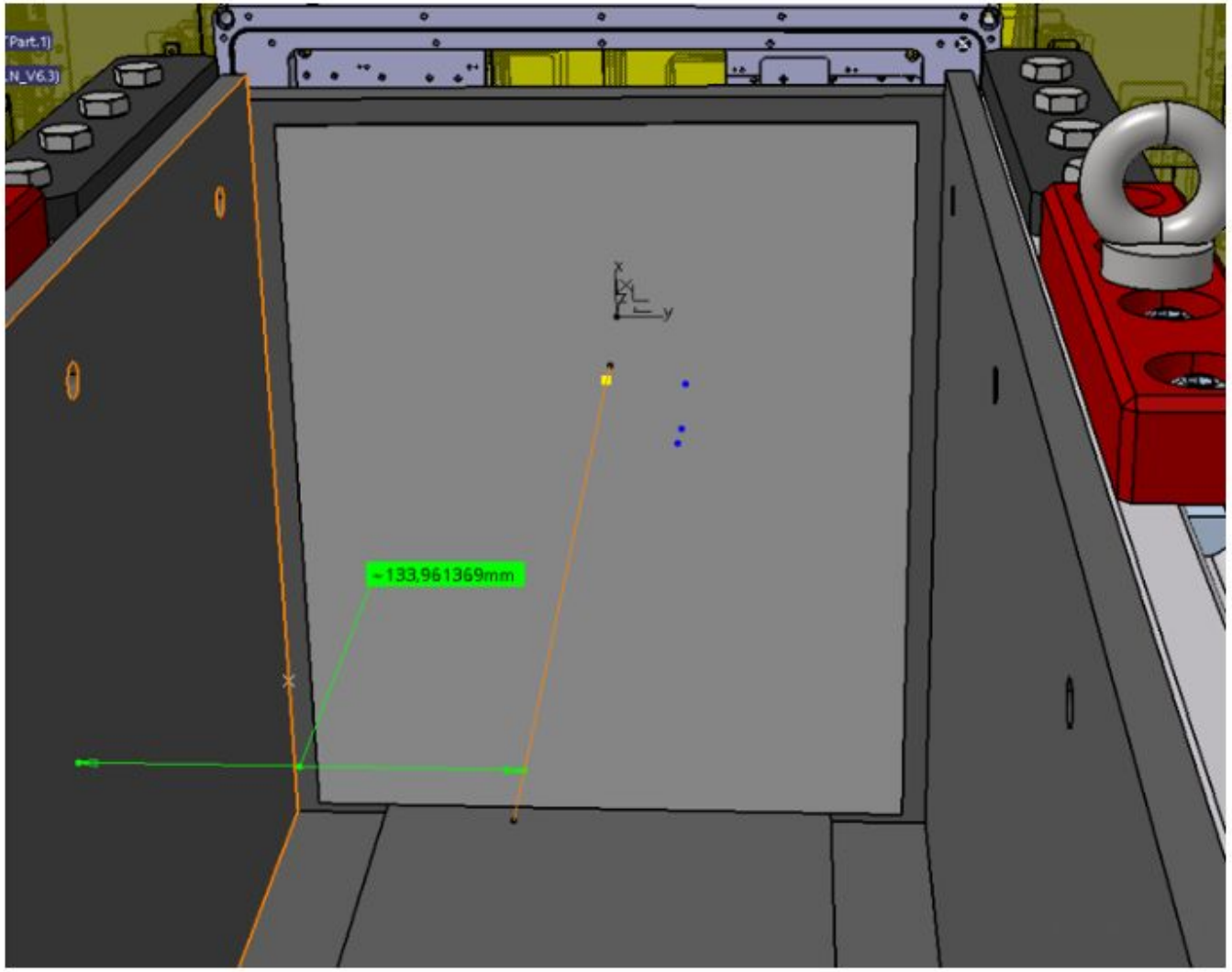
[FASERnu-position-Mar22.pdf]

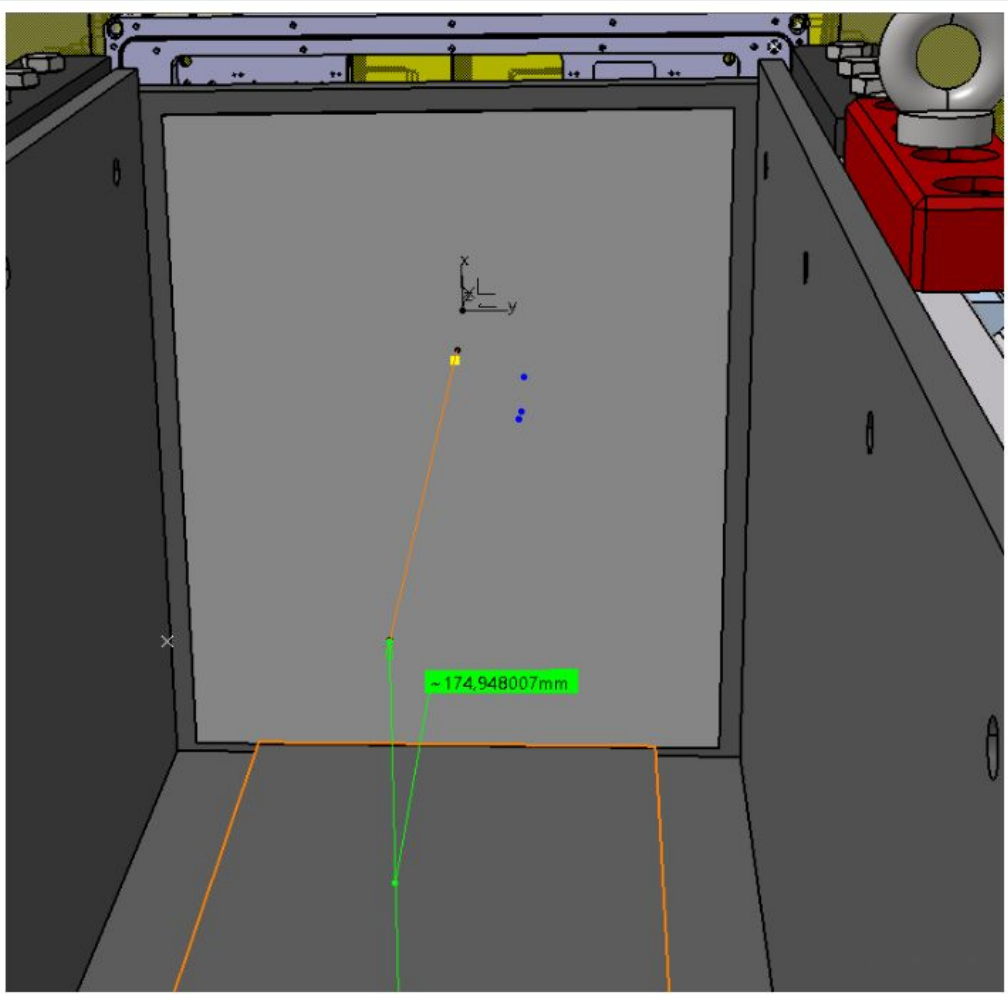
[FAS_FASER-Nu_survey_March18.pdf]



Distance between last film of emulsion & most front IFT module




Part.1]
N_V6.3]
x
y
z
-133,961369mm


x
y
~174,948007mm