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# Discussion about the geometry of Forward Tracker

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# Introduction

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1. **Old geometry**: there are 6 chambers each one with 8 planes and in the digitalization part the wires are calculated and inclined.
2. **First version**: there are 24 Double Layers. The wires are inclined in the geometry macro and will be calculated in the digitalization part. In this version we use the dimensions and the distances decided on December 2009.
3. **Possible future version**: construction of the tubes in the geometry part ?

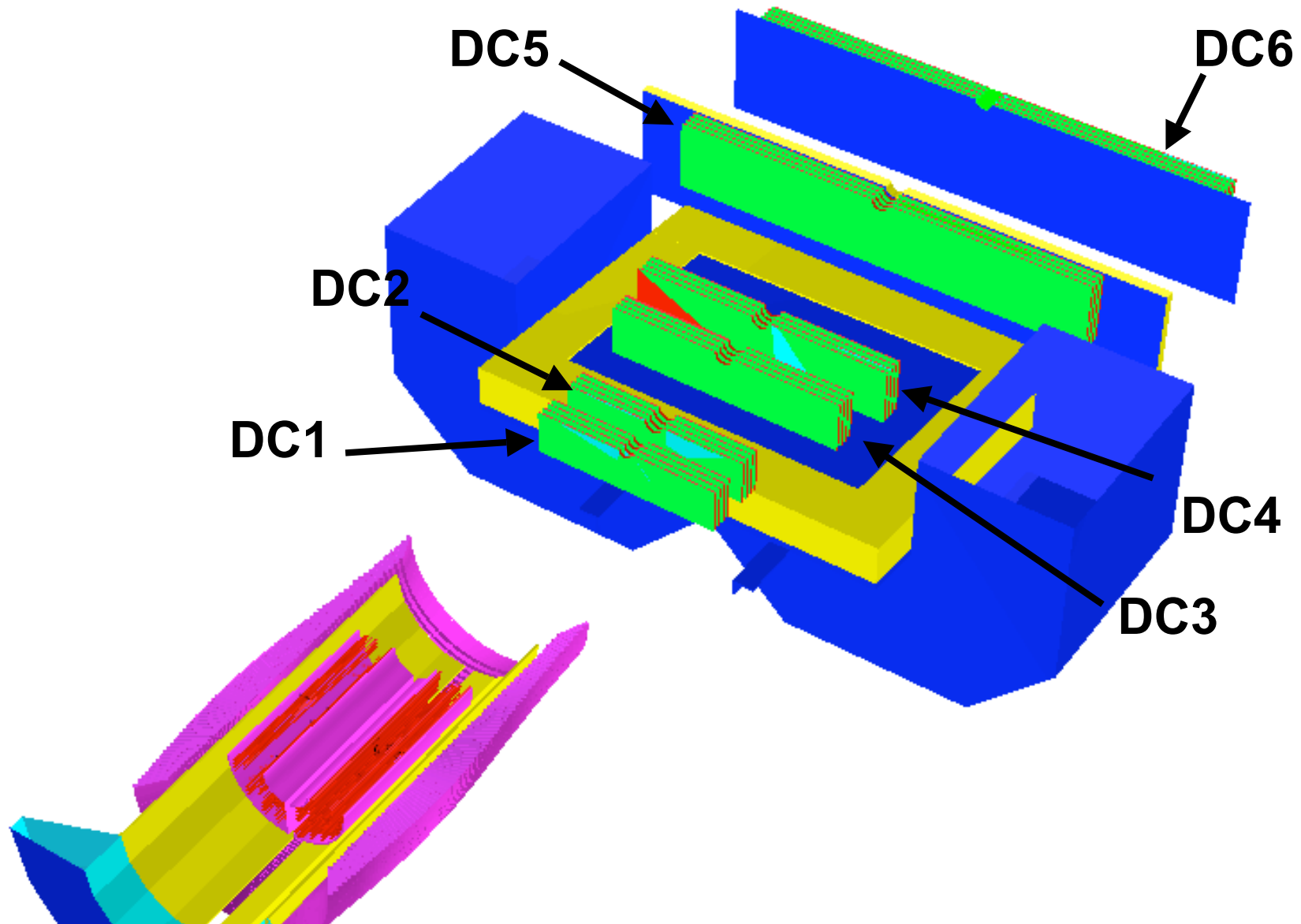
As comparison: number of STT tubes = 4210

number of FT tubes = 13056

Too much CPU?

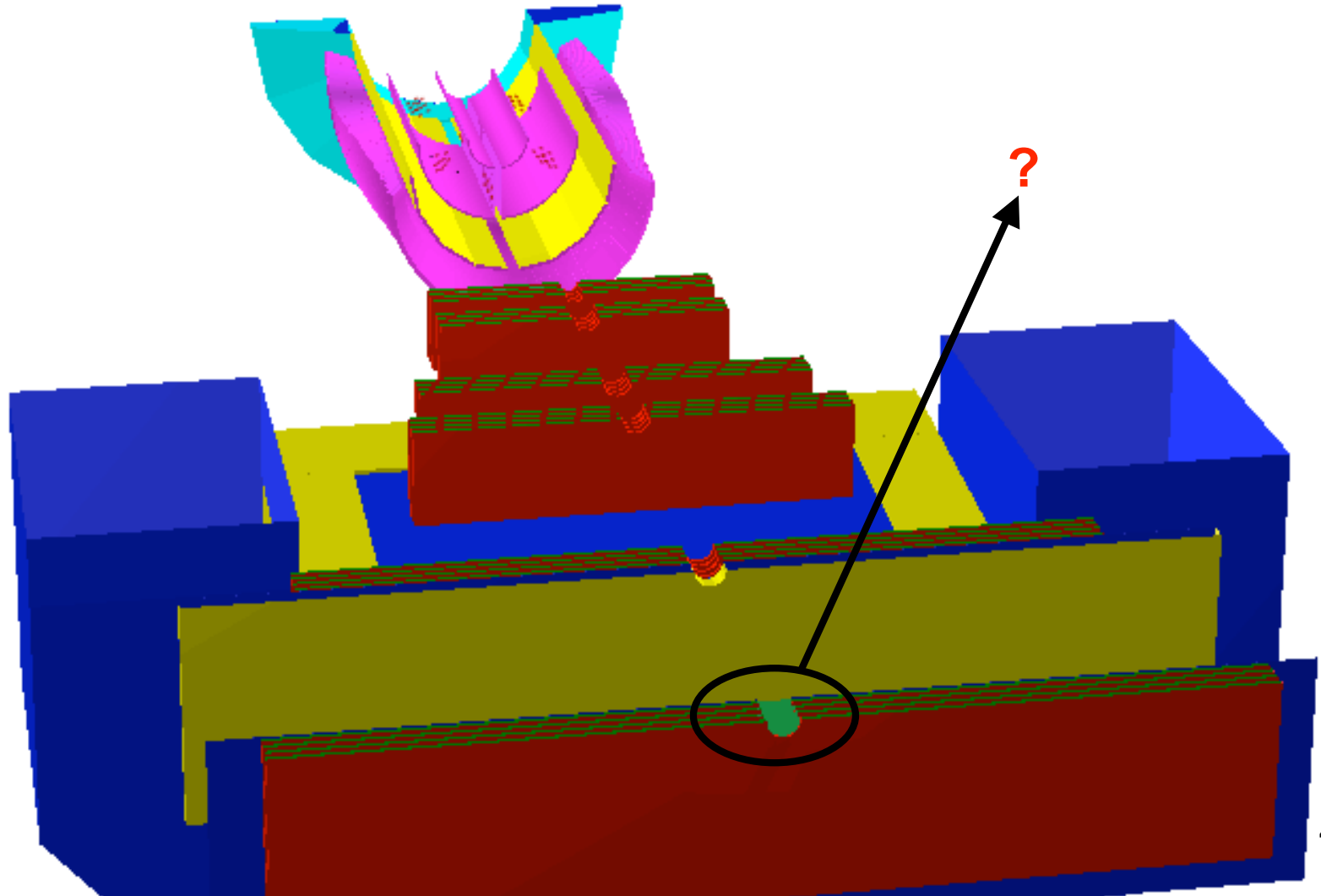
# Old geometry

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# Old geometry

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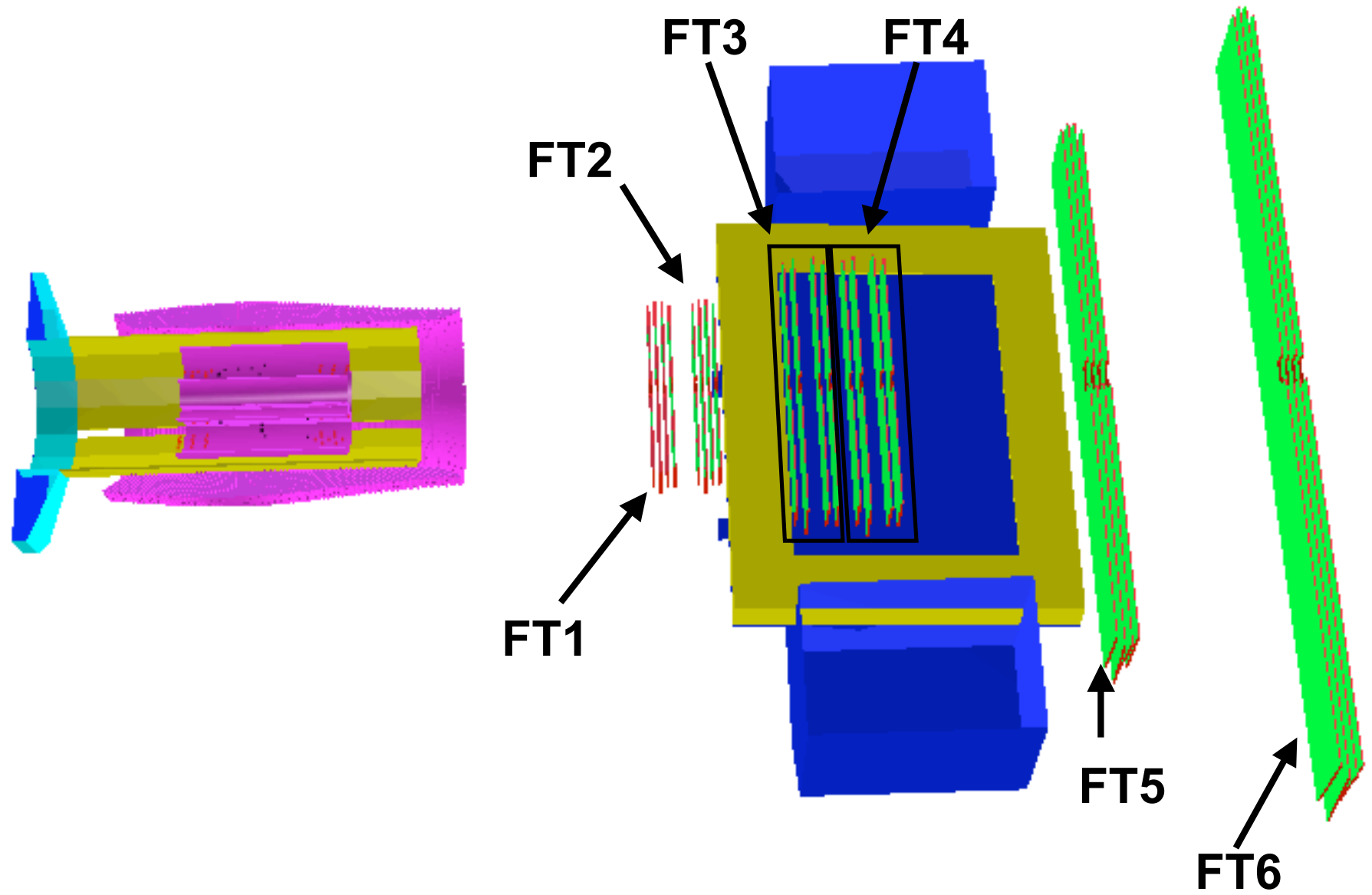
# Old geometry / First version

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1. createRootGeoFile.C → there are **6 chambers**;
  2. For each chambers there are 8 planes with the **same dimensions and distances**;
  3. The hole for the beam pipe is **round** and the **same** for all chambers;
  4. The inclination is **not done** in the createRootGeoFile.C but in the **PndDchStructure.cxx**;
  5. The inclination is implemented only for the **wires** and not for the planes;
  6. The **last four planes** of each chambers are inclined of  $+5^\circ$  and  $-5^\circ$  (it changes in the new geometry).
1. createRootGeoFile.C → there are **24 double layers**;
  2. For each double layers there are 2 planes. The **double layers have different dimesions and distances**;
  3. The hole for the beam pipe is **squared** and **inclined** and **different** for each double layers;
  4. The inclination of double layers **are done** in the **createRootGeoFile.C**;
  5. The inclination is implemented for the **double layers**;
  6. The **second** and the **third double layers** are inclined of  $+5^\circ$  and  $-5^\circ$  (the central planes of each chambers).

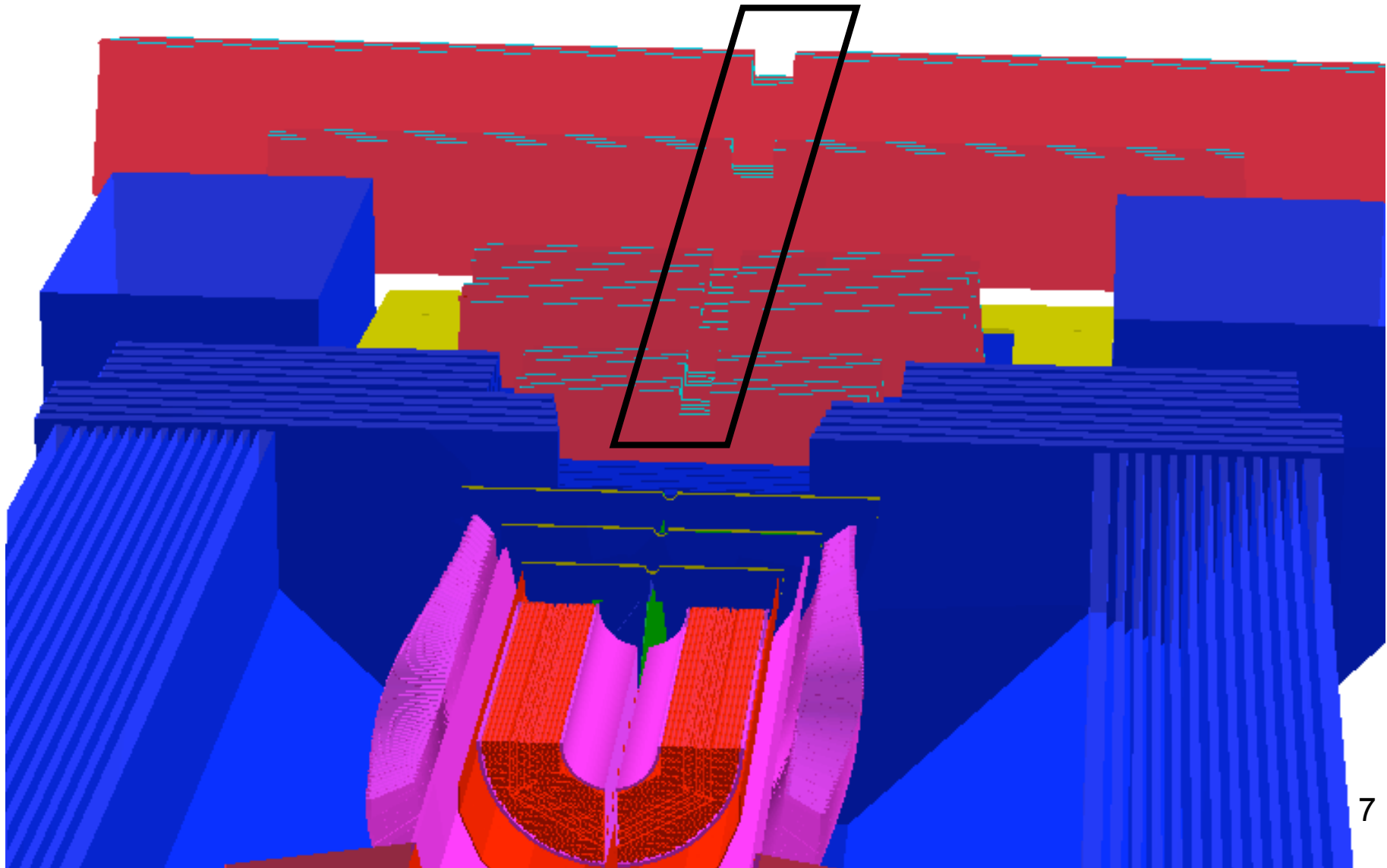
# First Version

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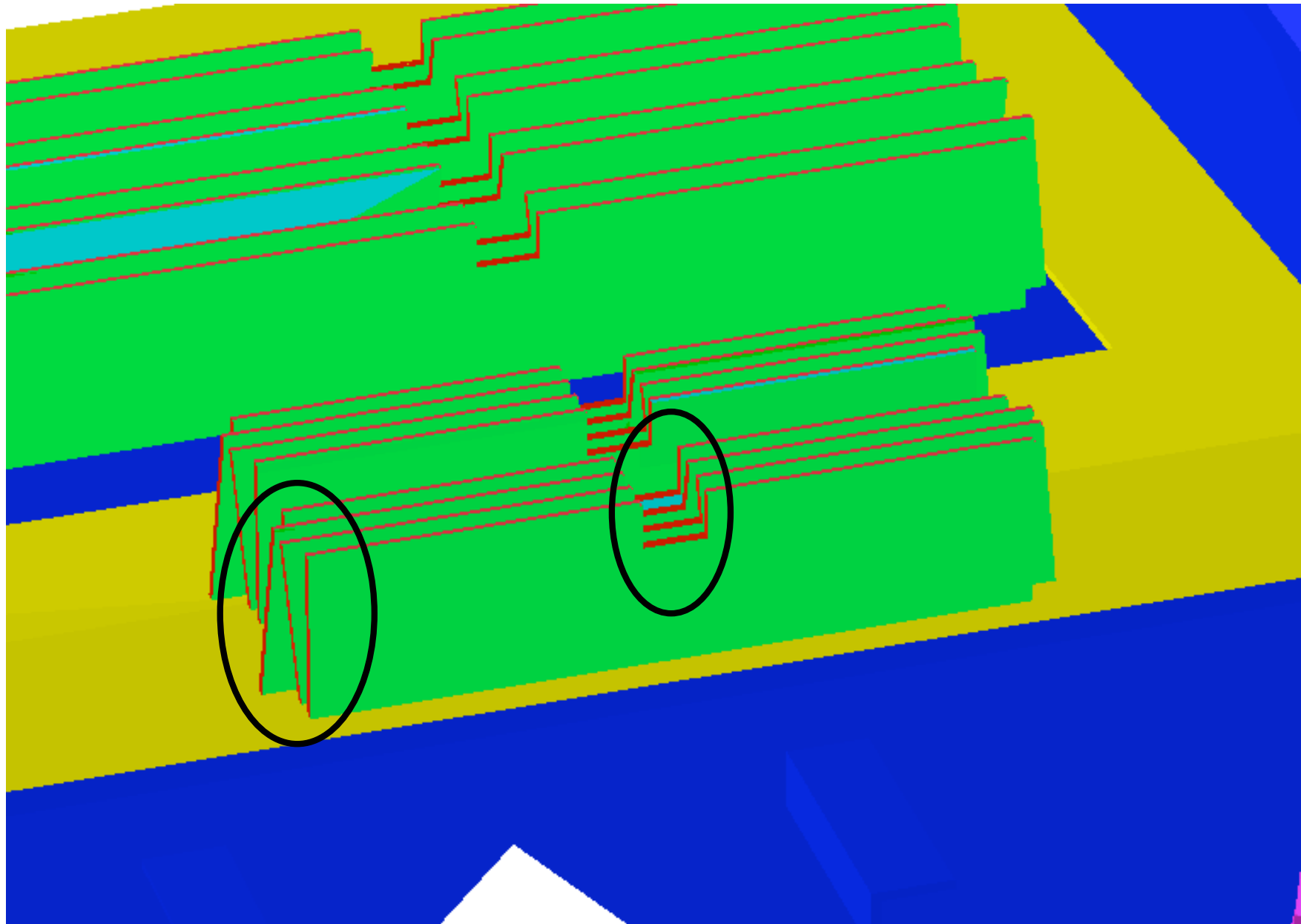
# First Version

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# First Version

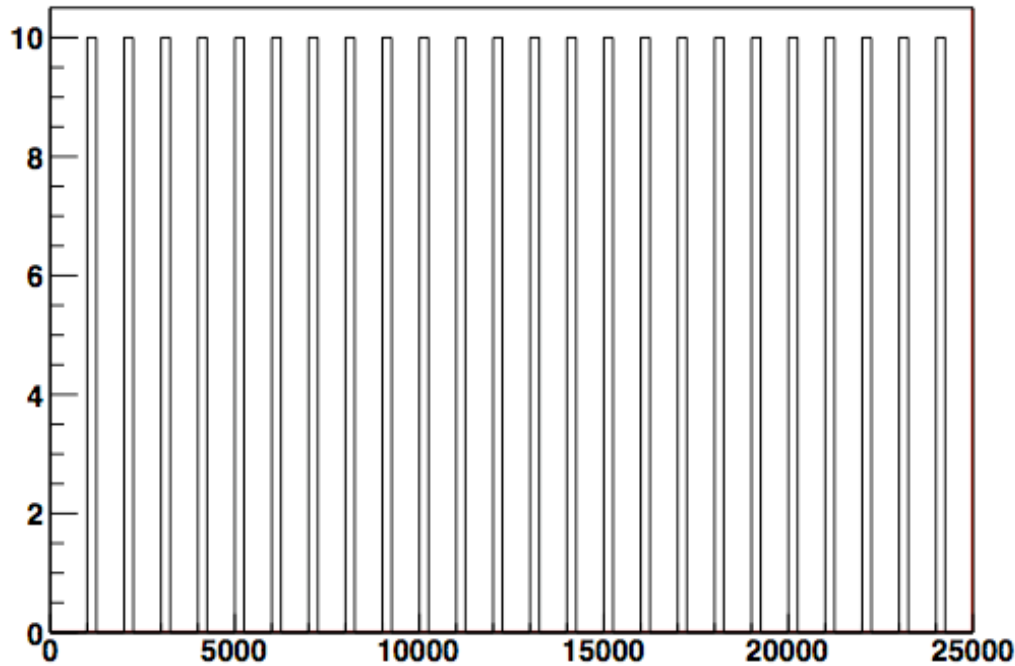
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# Simulation: PndDchPoint

PndDchPoint.fDetectorID



Double Layer → [1-24]

Plane → [1-2]

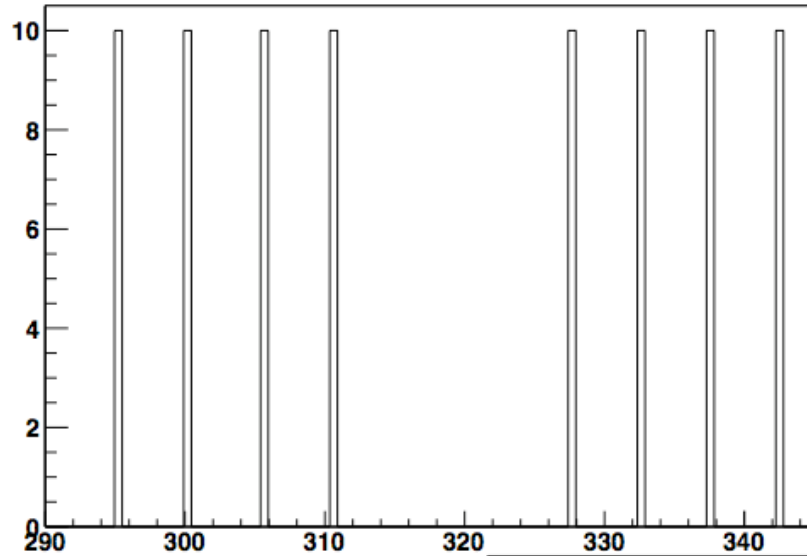
e.g. DetectorID = **20001**

Number of plane

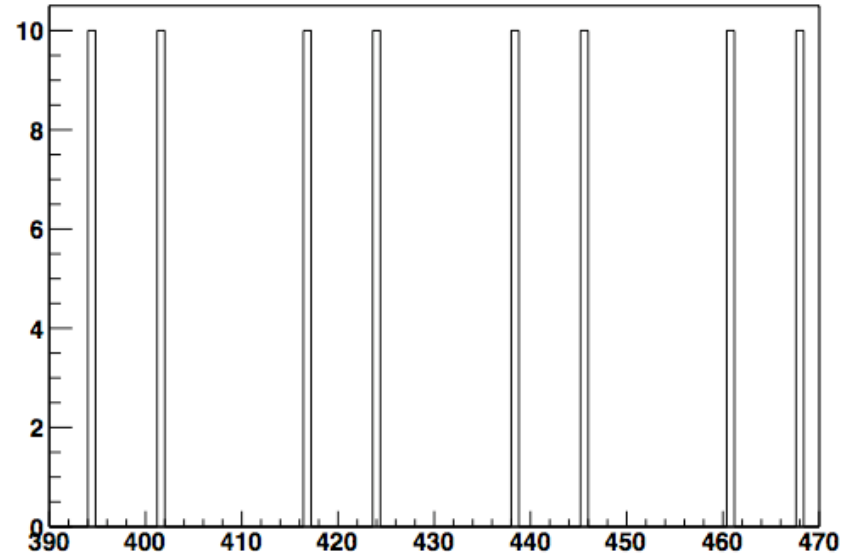
Number of double layers

# Simulation: PndDchPoint

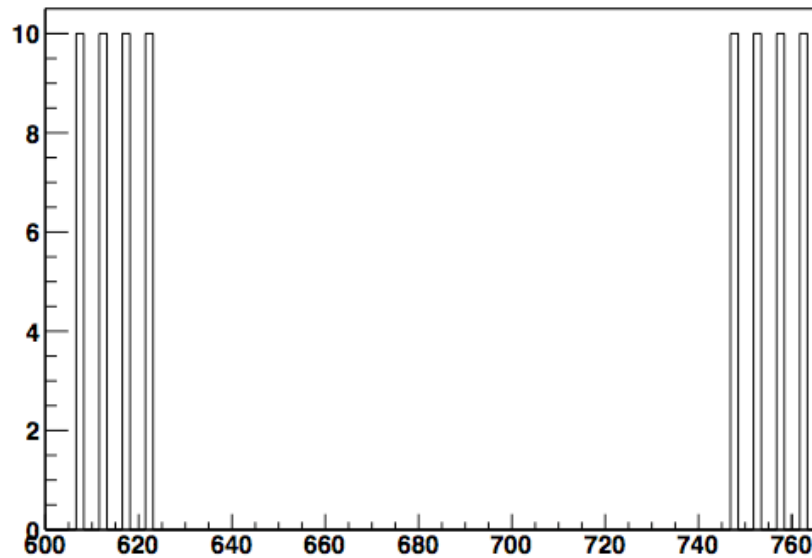
PndDchPoint.fZ: FT1 and FT2



PndDchPoint.fZ: FT3 and FT4



PndDchPoint.fZ: FT5 and FT6



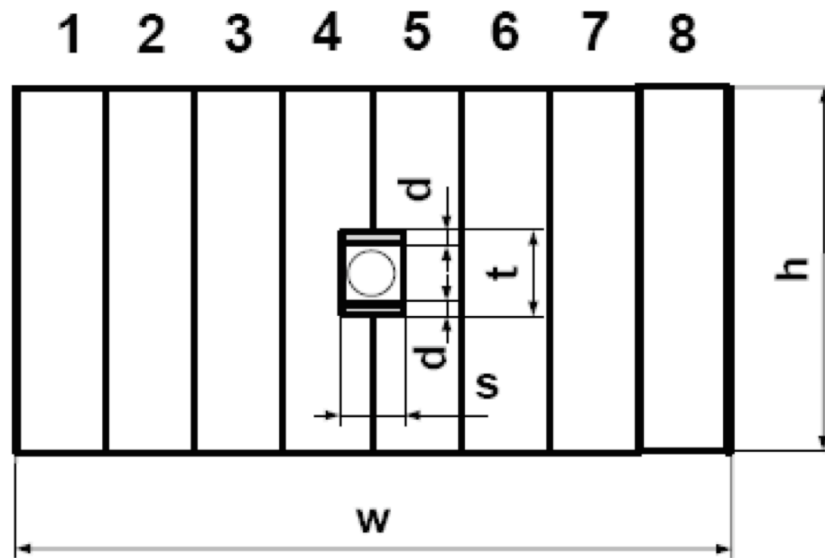
# Conclusion

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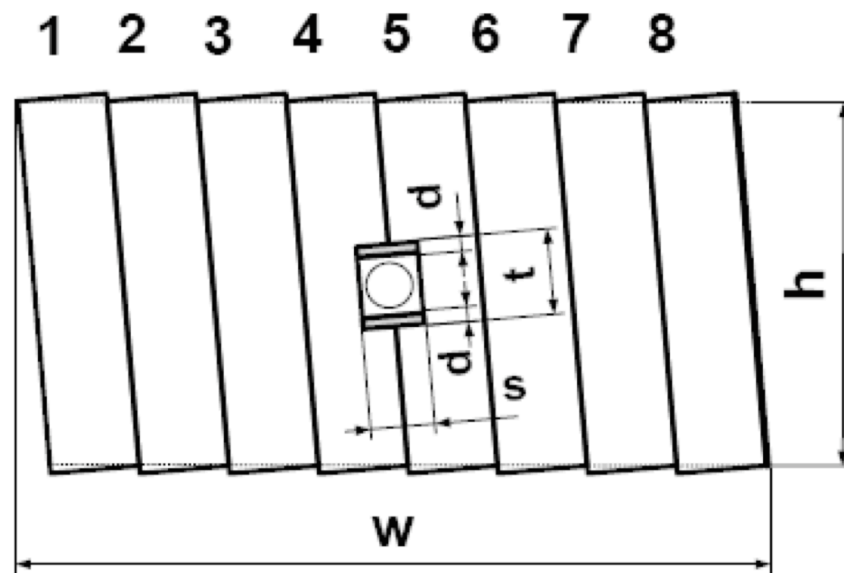
- The first version is updated and works
- The simulation (runMC.C) seems to work
- What about the second version?  
Is necessary/possible to construct each tube (13056) ?

# Back-up

a)



b)



Tracking station	Double layer	Straw inclination	Number of modules (straws)	z-coordinate [mm]	Active area	
					w [mm]	h [mm]
FT1	1	0°	8 (2x128)	2954	1297.9	640
	2	+5°	8 (2x128)	3004	1358.8	640
	3	-5°	8 (2x128)	3054	1358.8	640
	4	0°	8 (2x128)	3104	1297.9	640
FT2	1	0°	8 (2x128)	3274	1297.9	640
	2	+5°	8 (2x128)	3324	1358.8	640
	3	-5°	8 (2x128)	3374	1358.8	640
	4	0°	8 (2x128)	3424	1297.9	640
FT3	1	0°	12 (2x192)	3945	1944.3	690.3
	2	+5°	12 (2x192)	4019.75	2013.2	703.4
	3	-5°	12 (2x192)	4165	2015.4	728.8
	4	0°	12 (2x192)	4239.75	1944.3	741.9
FT4	1	0°	12 (2x192)	4385	1944.3	767.3
	2	+5°	12 (2x192)	4459.75	2020.0	780.4
	3	-5°	12 (2x192)	4605	2022.2	805.8
	4	0°	12 (2x192)	4679.75	1944.3	818.9
FT5	1	0°	25 (2x400)	6075	4045.1	1180.0
	2	+5°	25 (2x400)	6125	4163.7	1180.0
	3	-5°	25 (2x400)	6175	4163.7	1180.0
	4	0°	25 (2x400)	6225	4045.1	1180.0
FT6	1	0°	37 (2x592)	7475	5984.3	1480.0
	2	+5°	37 (2x592)	7525	6136.6	1480.0
	3	-5°	37 (2x592)	7575	6136.6	1480.0
	4	0°	37 (2x592)	7625	5984.3	1480.0

Tracking station	Double layer	Straw affected by opening (split straws) 1 <sup>st</sup> layer/2 <sup>nd</sup> layer	$s$ [mm]	$t$ [mm]
FT1	1	59-70 / 59-70	116	172
	2	59-70 / 59-70	116	172
	3	59-70 / 59-70	116	172
	4	59-70 / 59-70	116	172
FT2	1	59-70 / 59-70	116	172
	2	59-70 / 59-70	116	172
	3	59-70 / 59-70	116	172
	4	59-70 / 59-70	116	172
FT3	1	91-102 / 91-102	116	166
	2	91-102 / 91-102	116	166
	3	91-102 / 91-102	116	166
	4	91-102 / 91-102	116	166
FT4	1	91-102 / 92-103	116	166
	2	91-102 / 92-103	116	166
	3	91-102 / 92-103	116	166
	4	91-102 / 92-103	116	166
FT5	1	197-215 / 197-215	187	238
	2	197-215 / 197-215	187	238
	3	197-215 / 197-215	187	238
	4	197-215 / 197-215	187	238
FT6	1	298-316 / 299-317	187	238
	2	298-316 / 299-317	187	238
	3	298-316 / 299-317	187	238
	4	298-316 / 299-317	187	238