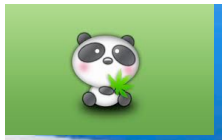

Forward Tracking Stations Summary

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Isabella Garzia

Groningen PANDA Collaboration Meeting,
30 August-3 September 2010

Outline

- Geometry definition.
- Simulation:
  Chambers, layers and tubes numbers definition;
  muons p=1GeV/c and p=5GeV/c;
- Conclusions.

INTRODUCTION

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. **New and definitive version**: simulation of each tubes (13056).

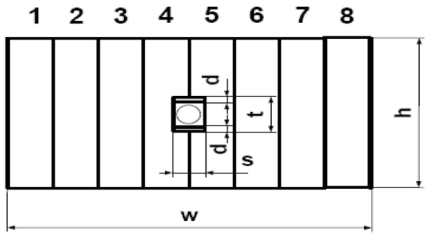
As comparison: number of STT tubes = 4210

number of FT tubes = 13728

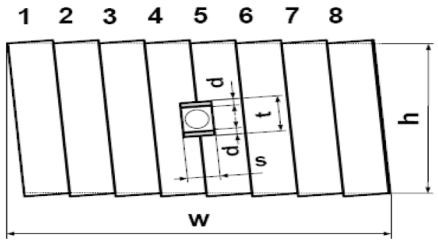
Geometry definition

1. ASCII file;
2. For the first and fourth double layers of each chambers the tubes are straight. For the second and the third double layers the tubes are inclined respectively of +5° and -5°;
3. We implement shorter tubes in order to build the neccessary space for the beam pipe following the configuration decided on december 2009;
4. The double layers for the chambers inside the dipole magnet have different sizes;

a)



b)

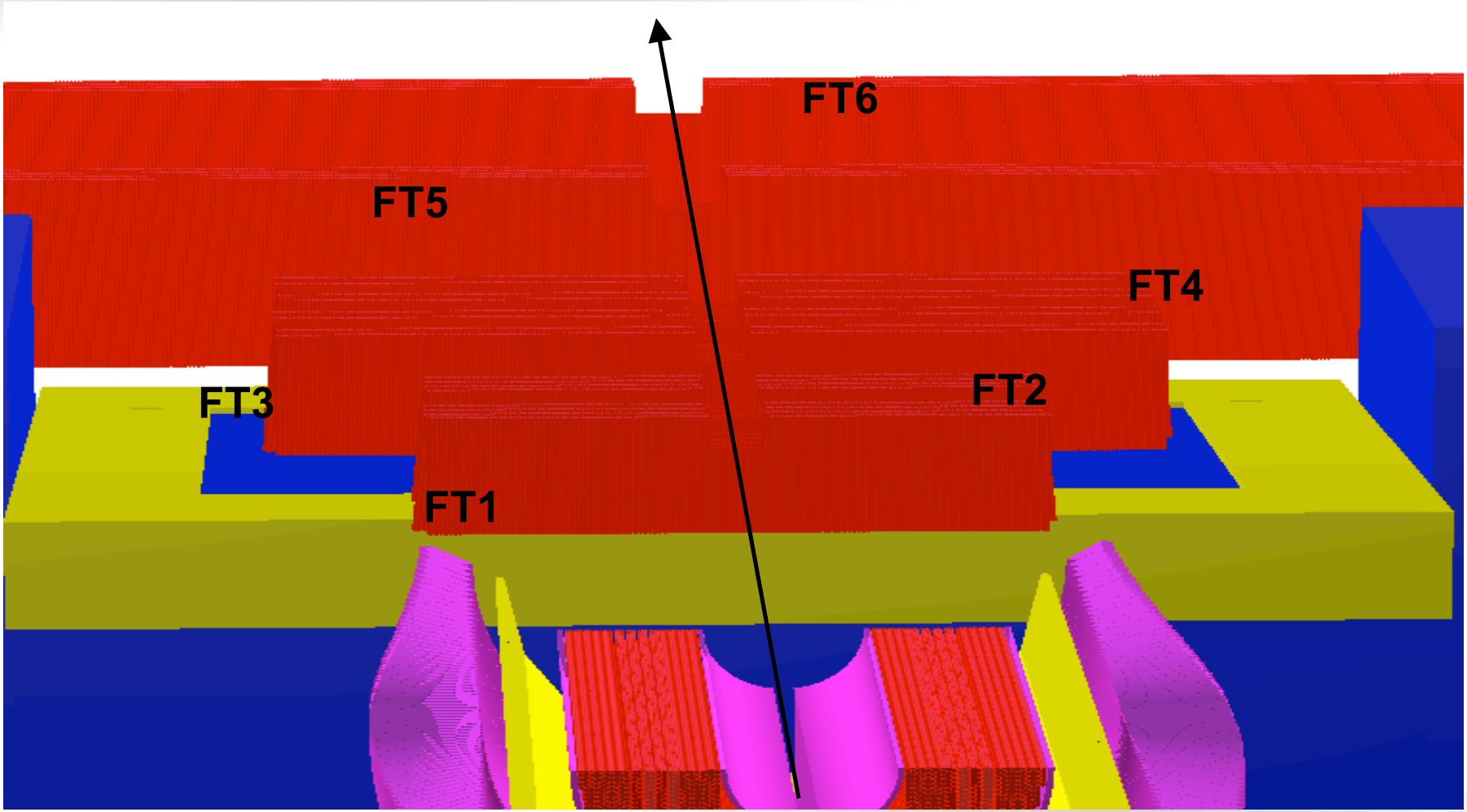


Properties of straws:

Straw diameter=10.1 mm;
Tube wall=0.03 mm Mylar;
Sense wire diameter=0.02 mm (W)
Gas filling: 90% Ar+10% CO_2 at 2 bar

Tracking station	Double layer	Straw inclination	Number of modules (straws)	*z*-coordi-nate [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

Geometry definition



Simulation

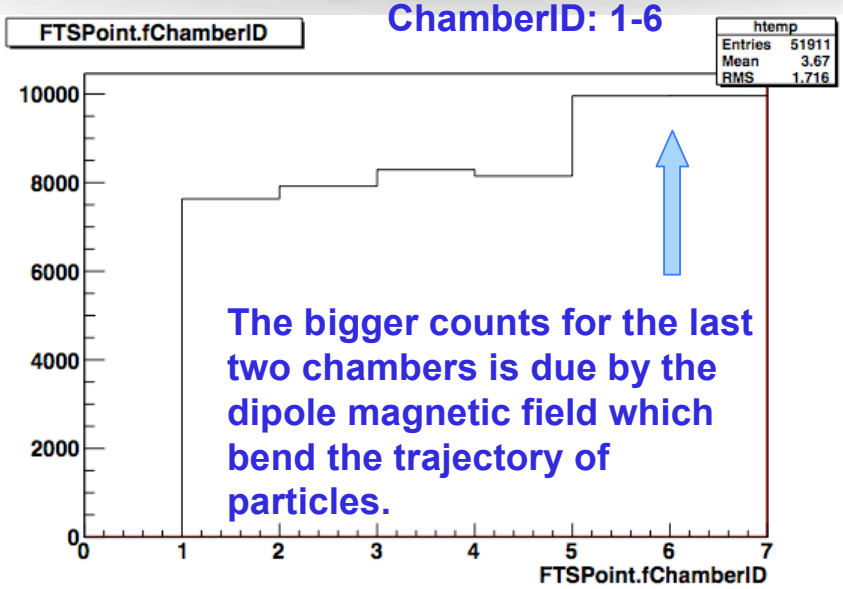
Detector identification: ChamberID, LayerID, TubeID
(FTS Mapper under construction: PndFtsMapCreator)

Simulation parameters:

1000 μ^- (μ^+) events simulated with BoxGenerator
p=1Gev/c (5GeV/c);
phi range: [0°-360°];
uniform distribution in cos(theta);
theta range: [1°-5°];
Beam momentum: 15 GeV/c

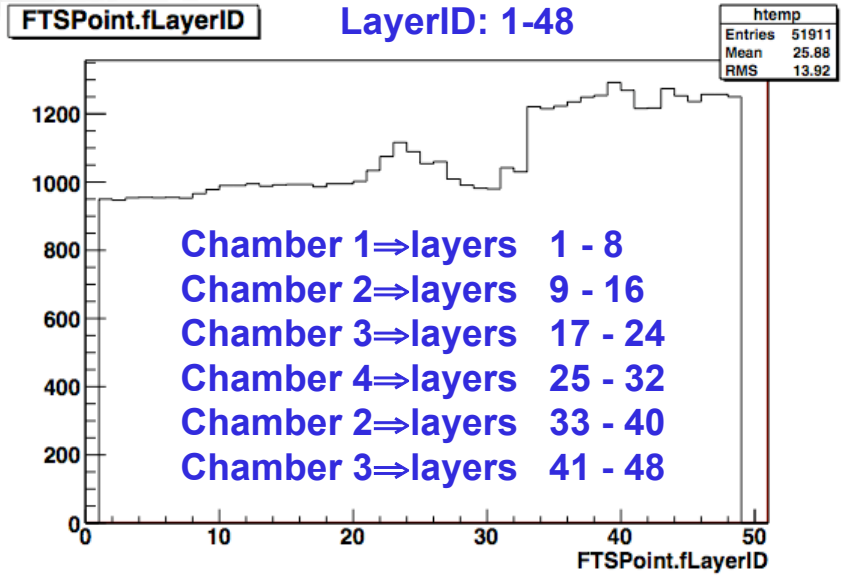
Simulation: 1GeV/c muons

ChamberID: 1-6



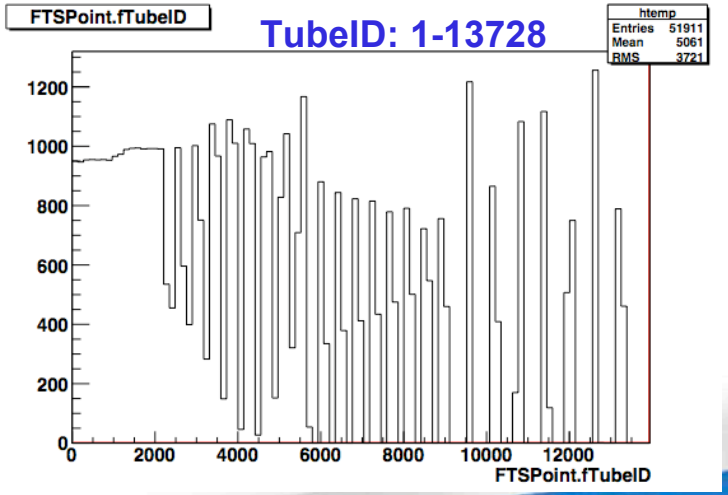
The bigger counts for the last two chambers is due by the dipole magnetic field which bend the trajectory of particles.

LayerID: 1-48



Chamber 1⇒layers 1 - 8
Chamber 2⇒layers 9 - 16
Chamber 3⇒layers 17 - 24
Chamber 4⇒layers 25 - 32
Chamber 2⇒layers 33 - 40
Chamber 3⇒layers 41 - 48

TubeID: 1-13728



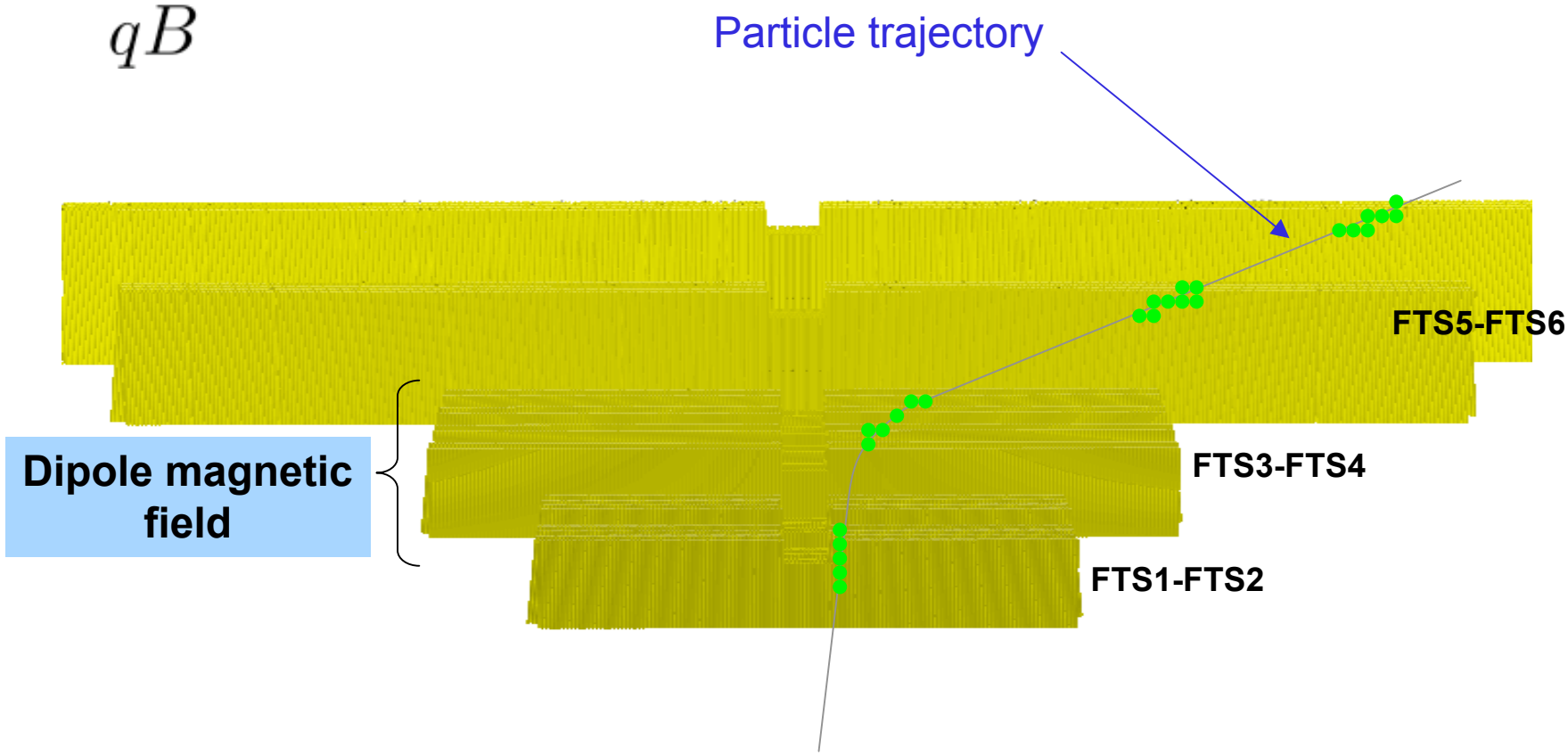
Chamber 1: TubeID 1-1120
Chamber 2: TubeID 1121-2240
Chamber 3: TubeID 2240-3872
Chamber 4: TubeID 3873-5504
Chamber 5: TubeID 5503-8848
Chamber 6: TubeID 8849-13728

Simulation: 1GeV/c muons

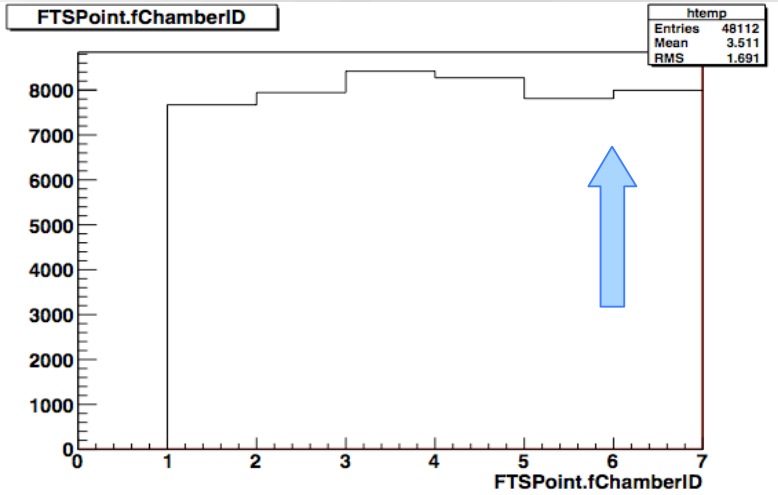
$$R = \frac{mv_0}{qB}$$

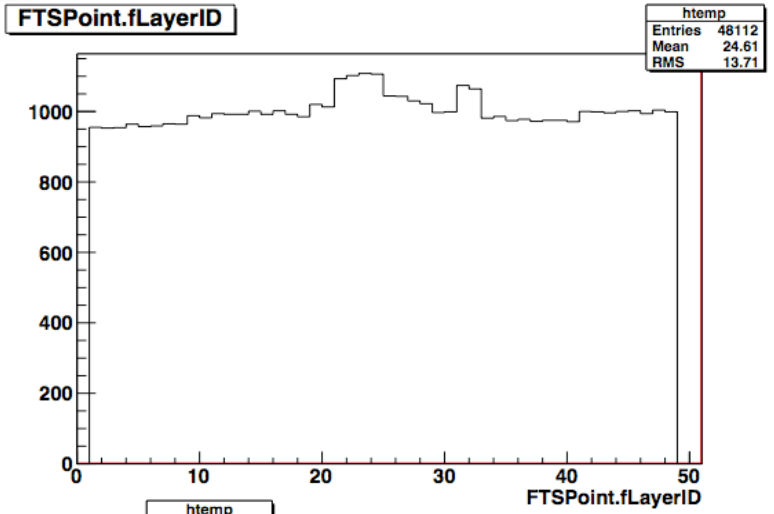
p=1GeV/c

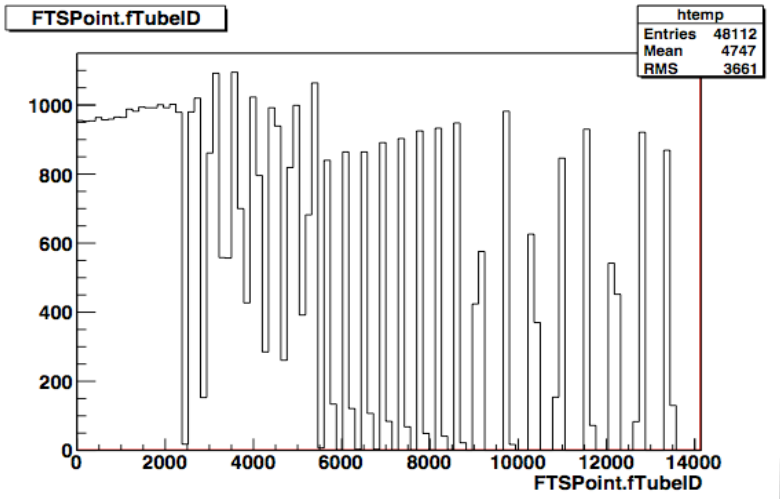
- Hit tube



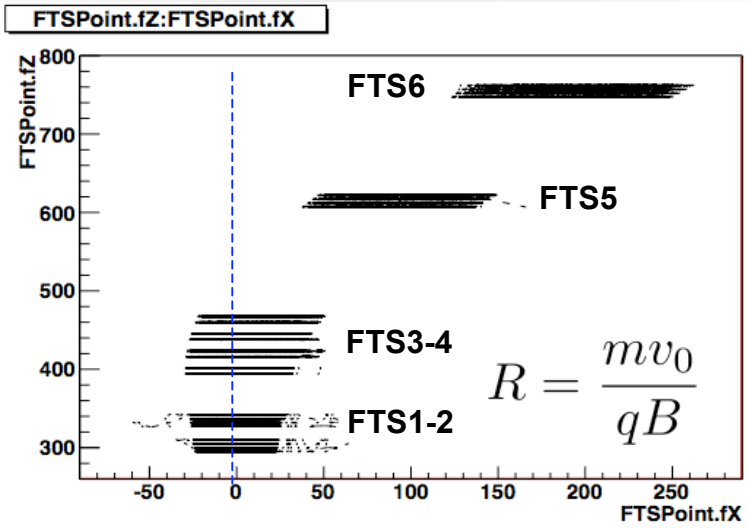
Simulation: 5GeV/c muons

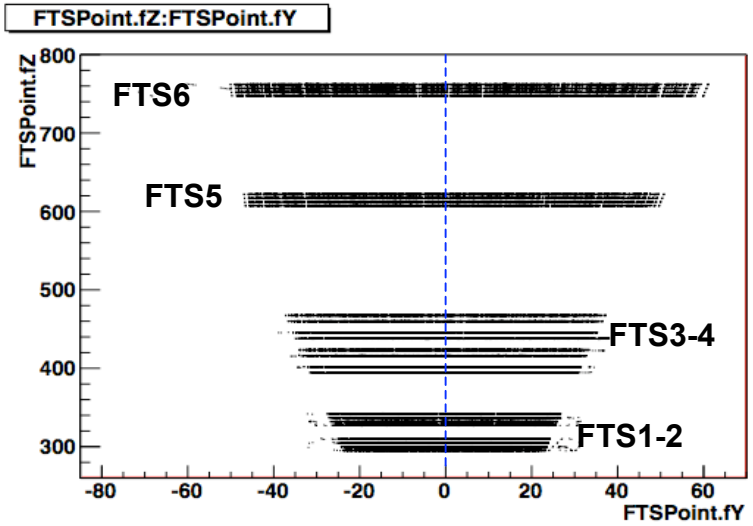


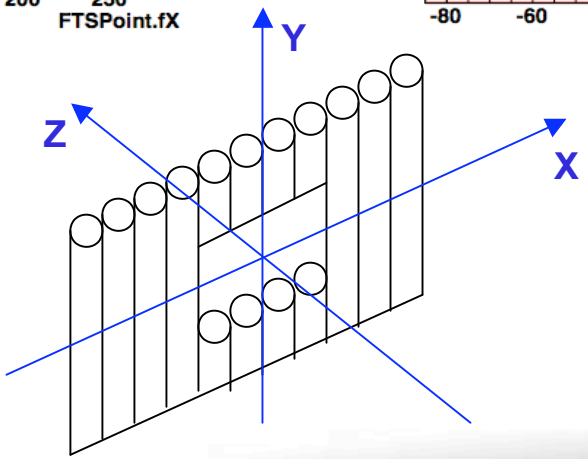




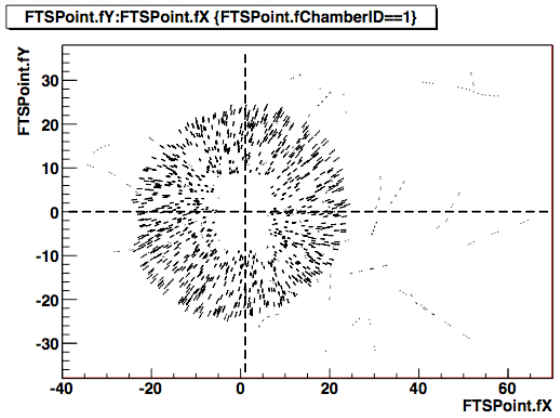
Simulation: 1GeV/c muons

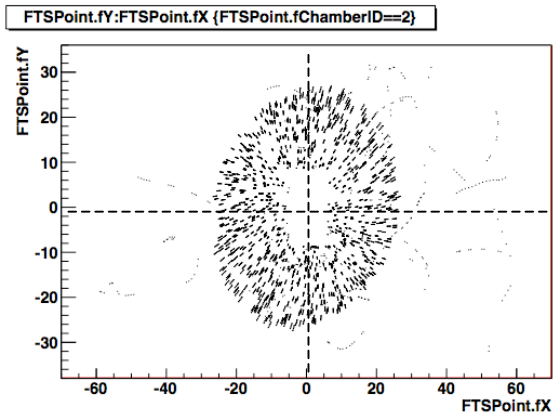


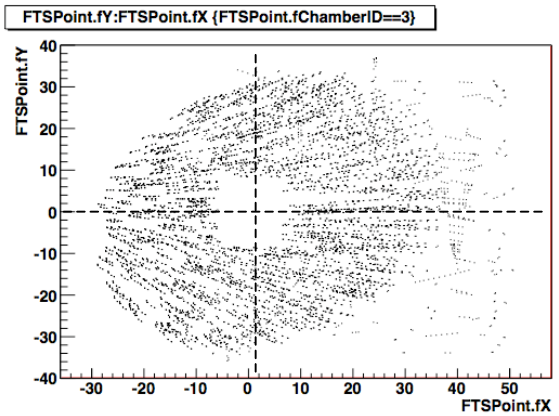


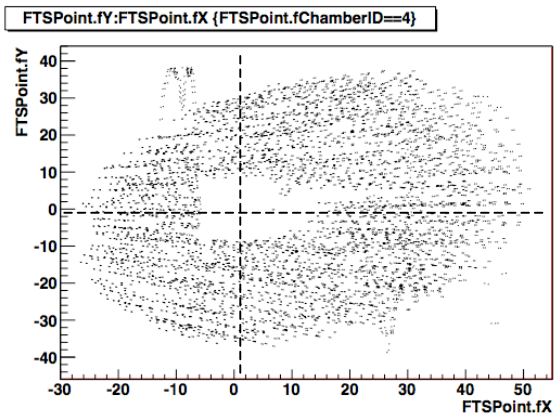


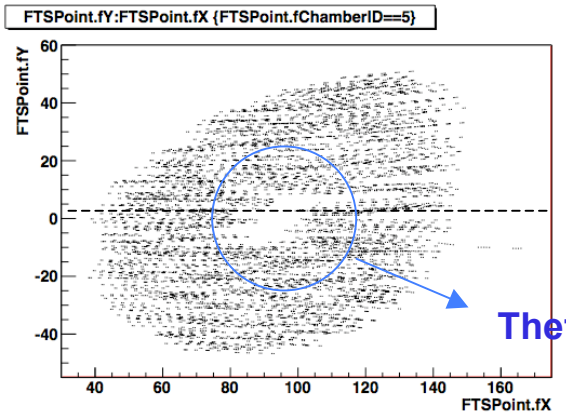
Simulation: 1GeV/c muons

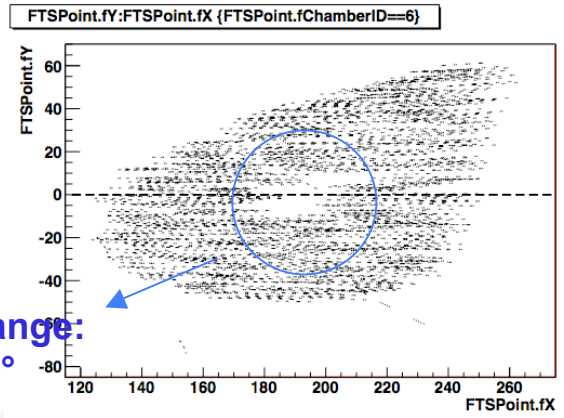










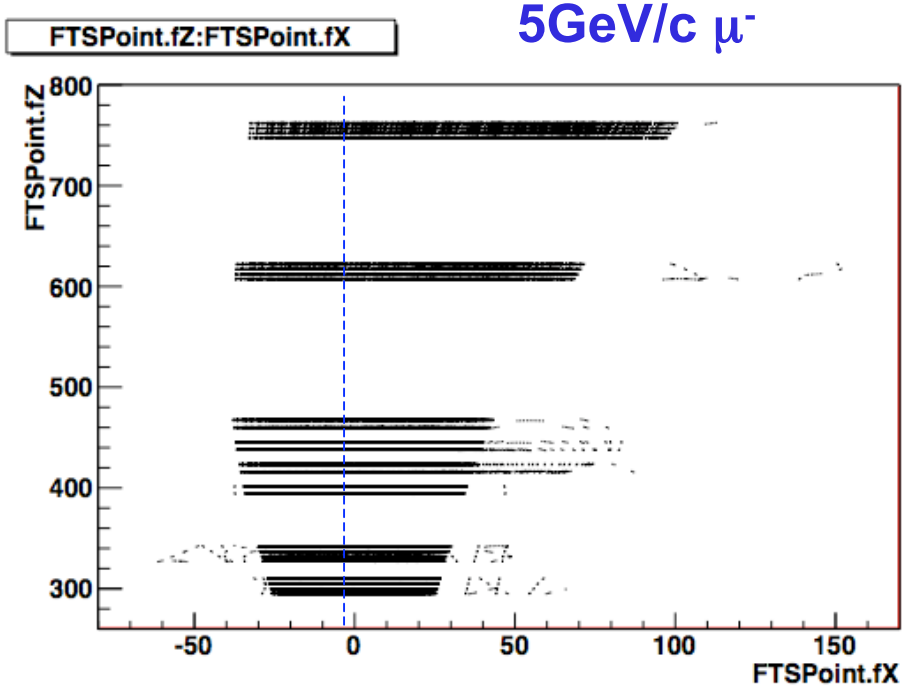


Theta range: 1°-5°

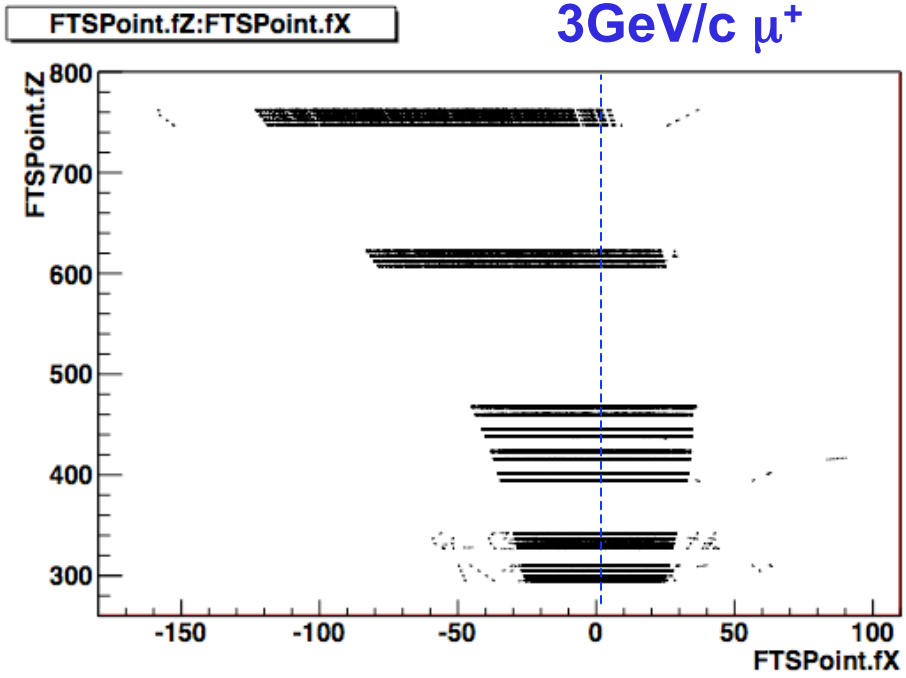
Simulation: muons

$$R = \frac{mv_0}{qB}$$

5GeV/c μ^-



3GeV/c μ^+



Conclusions

- The construction of geometry was done;
- The FTS Mapper (PndFtsMapCreator) is under construction;
- The simulation seems to work correcly;
- The digitalization is started (we hope to have good results for the next Panda Collaboration Meeting);

Thanks to Pavia group for the collaboration…

…Thanks for the attentions