

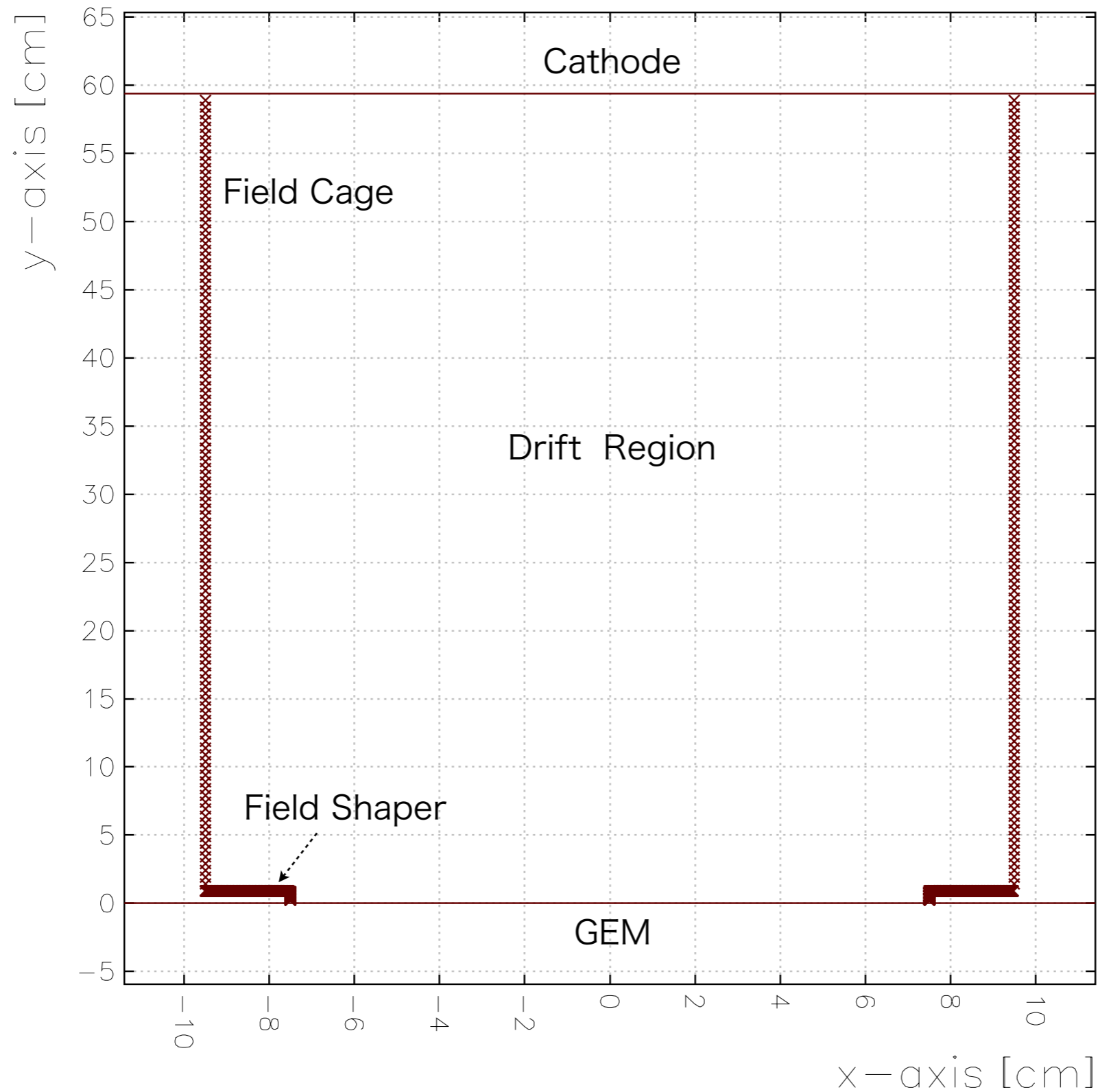
Distortion Study

Daisuke Arai

Geometry of LP1

LAYOUT OF THE CELL

Cell: CDC cell for JLC



Plotted at 16:38.08 on 12/11/10 with Garfield version 7.25.

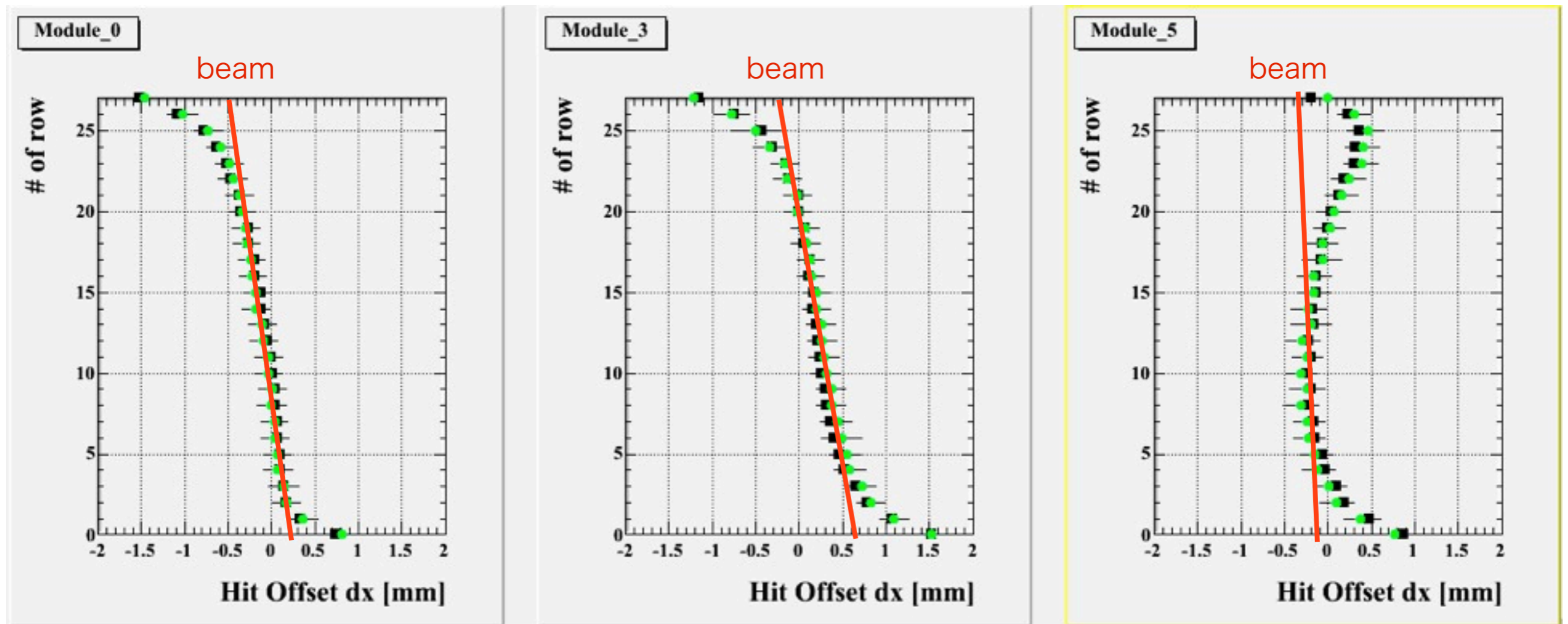
Results of this beam test

We had a little distortion near the modules in this beam test.

After the beam test, we found a mistake of voltage value for field shaper and field cage.

The mistake cause the distortion.

So I simulate the distortion.

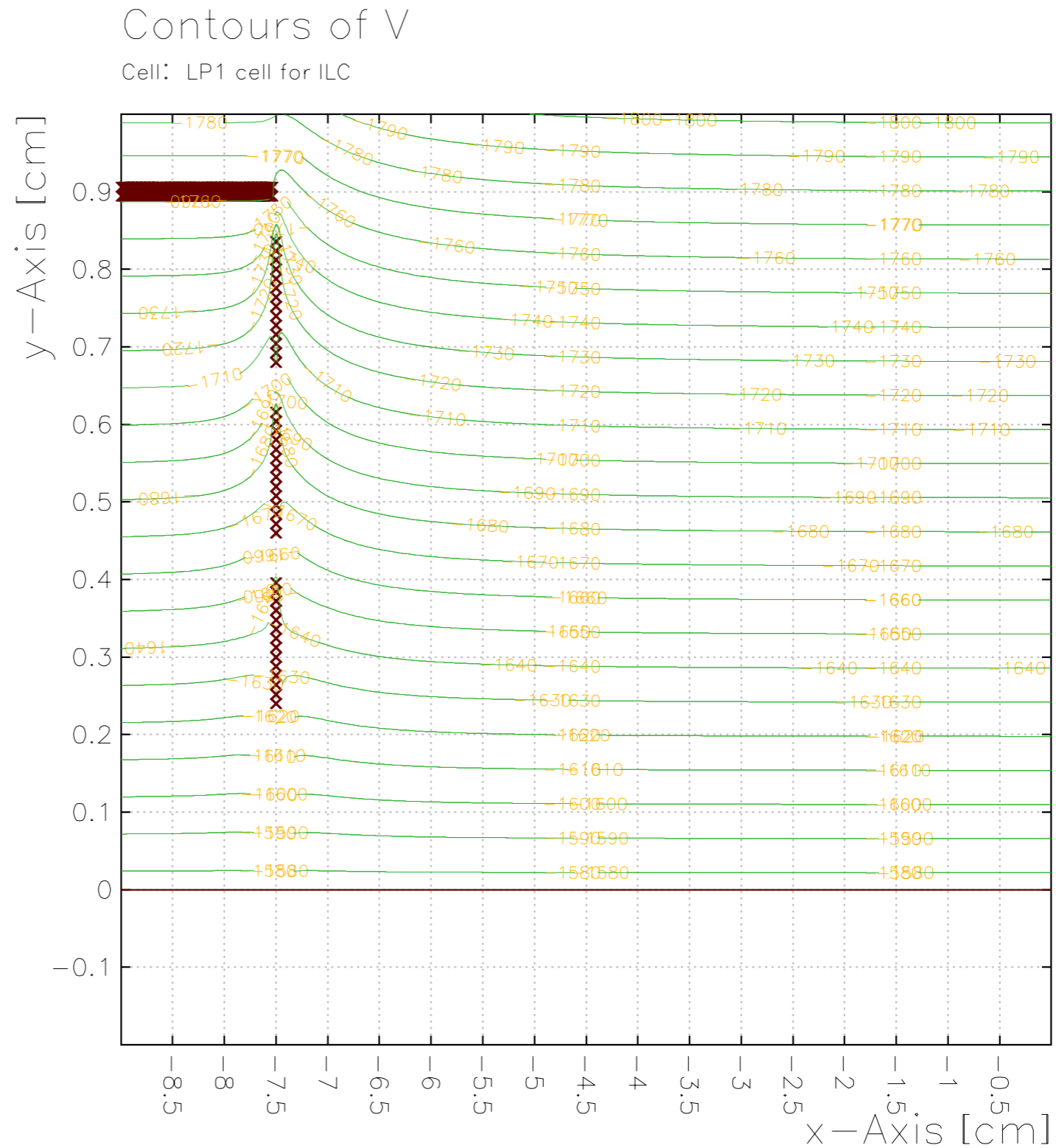


Distortion near the modules seems to be 1mm

Mistake value of Field Shaper

correct value		this beam test
-1782 V	----->	-1761 V
-1752 V	----->	-1711 V
-1702 V	----->	-1673 V
-1647 V	----->	-1635 V
-1575 V	----->	-1575 V

Field Cage : -15216 V



Plotted at 14.04.14 on 14/11/10 with Garfield version 7.25.

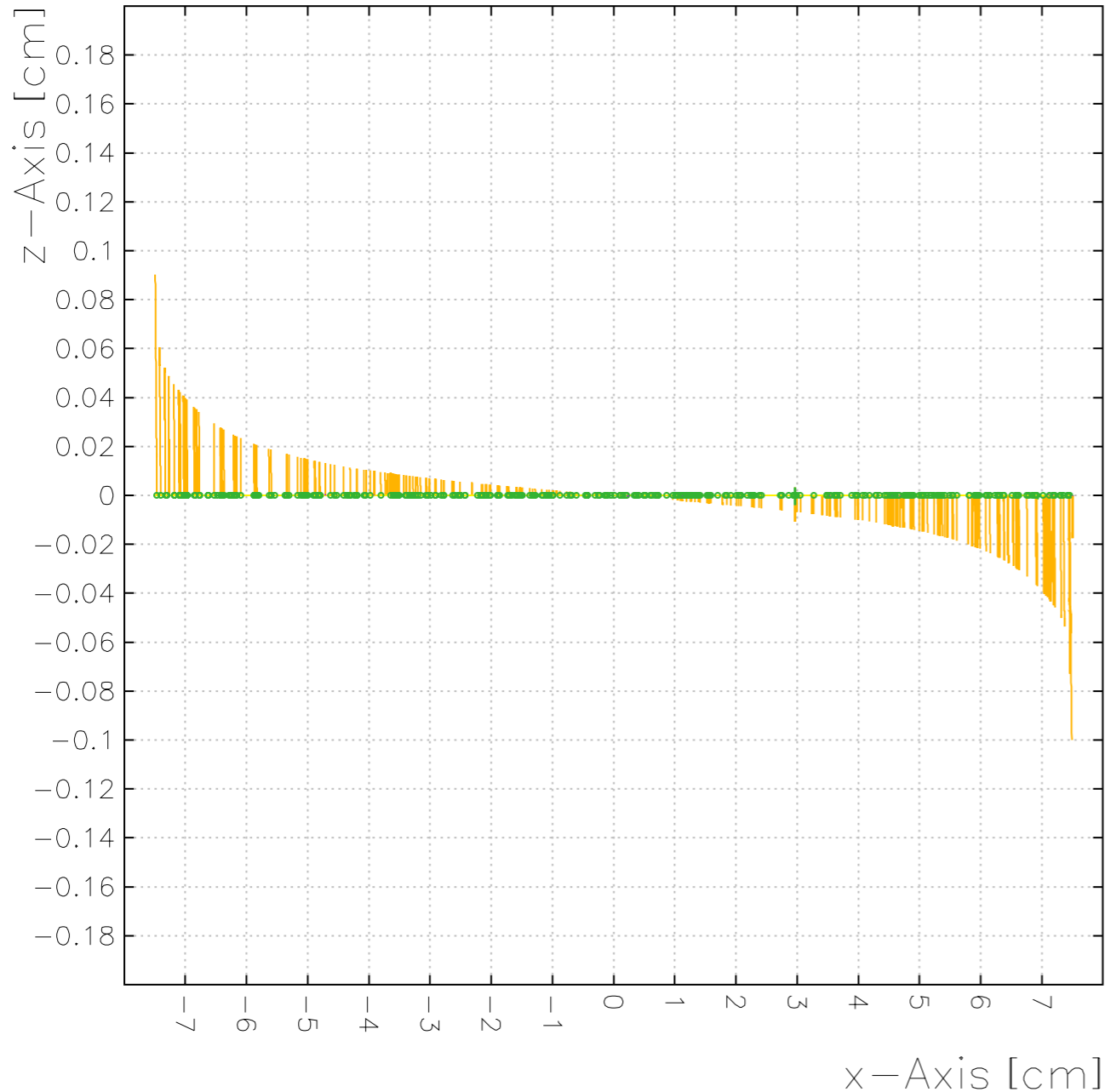
GEM

Results of the Simulation

distortion of the track

Electron drift lines from a track

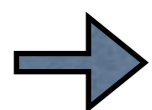
Cell: LP1 cell for ILC Particle: μ^- , $E_{kin}=1$ GeV
Gas: CF_4 2.9994%, iC_4H_{10} 1.9996%, H_2O 0.019996%, Ar 94.981%, $T=290$ K, $p=1$ atm



Plotted at 14.12.33 on 14/11/10 with Garfield version 7.25.

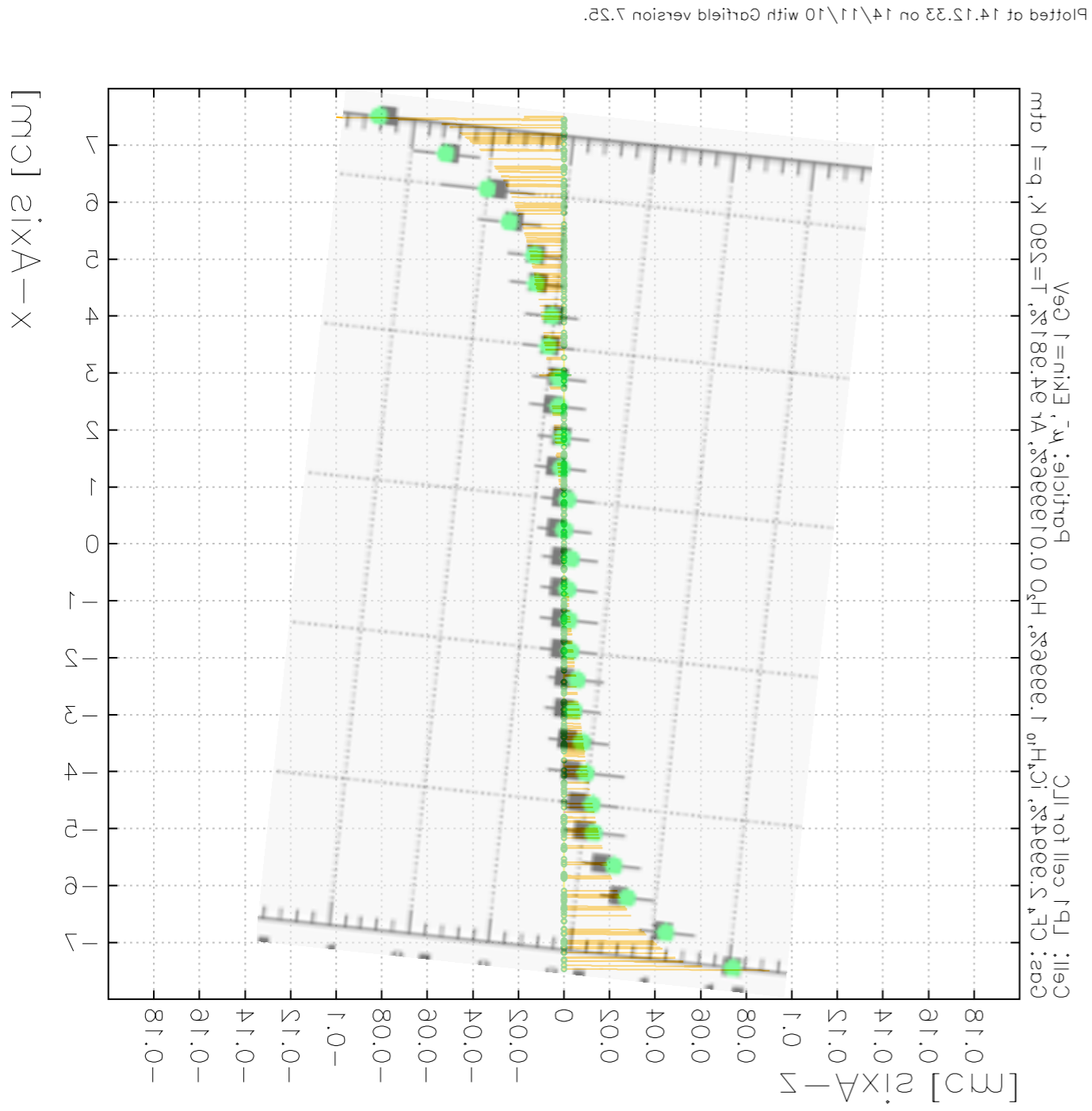
gas T2K
(Ar 95 Cf4 3 ISO 2 H2O 0.02)
 $T = 290$ K
 $p = 1$ atm
 $E = 1$ GeV
DriftDistance = 10 cm

(Software)
MagBoltz
Garfield



From this simulation we have got about **0.6 mm** distortion near the module.

Comparison

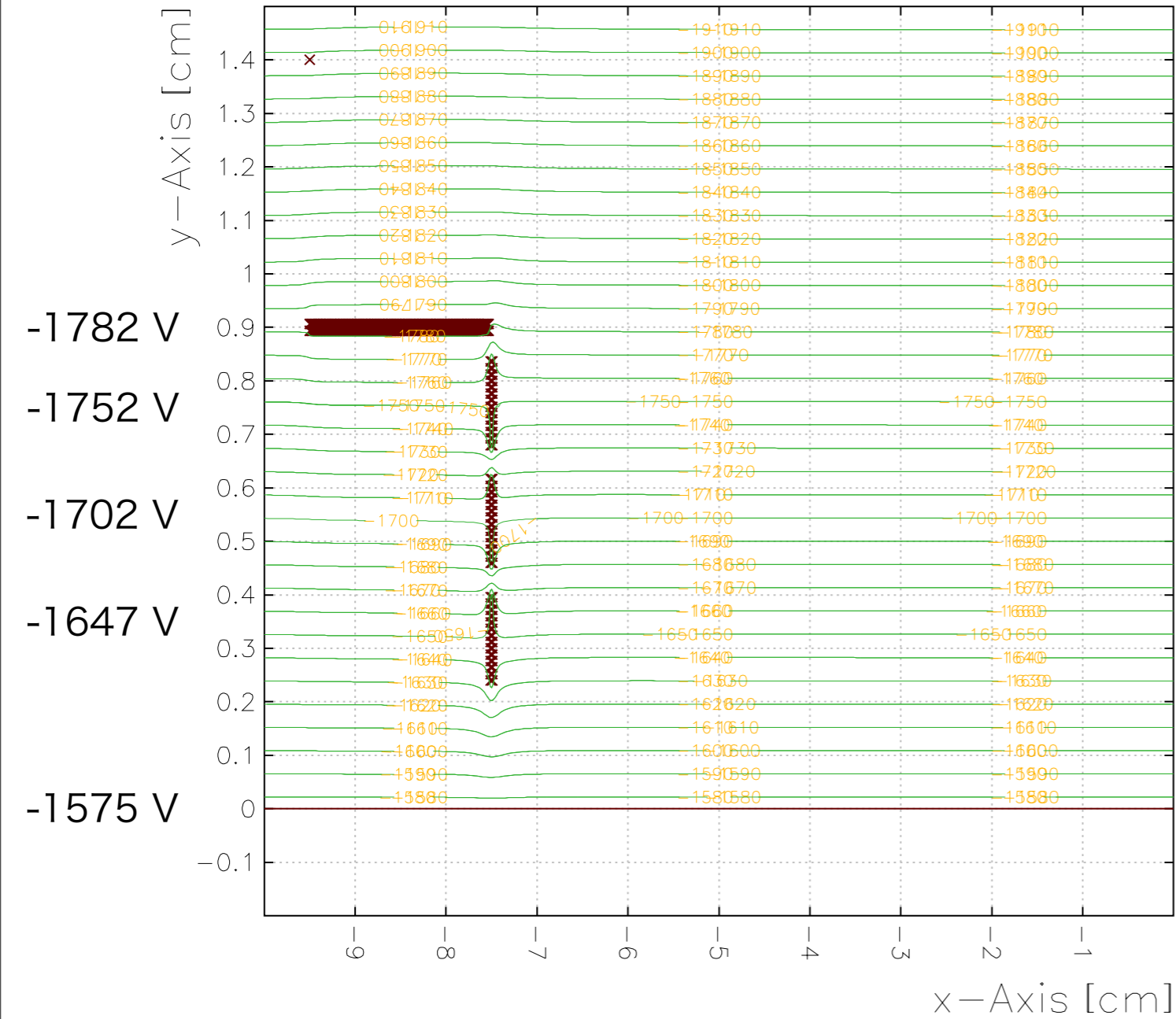


Comparison a track of module 3 and simulation seems to be fit well.

Correction

Contours of V

Cell: LP1 cell for ILC



Plotted at 14:21:21 on 14/11/10 with Garfield version 7.25.

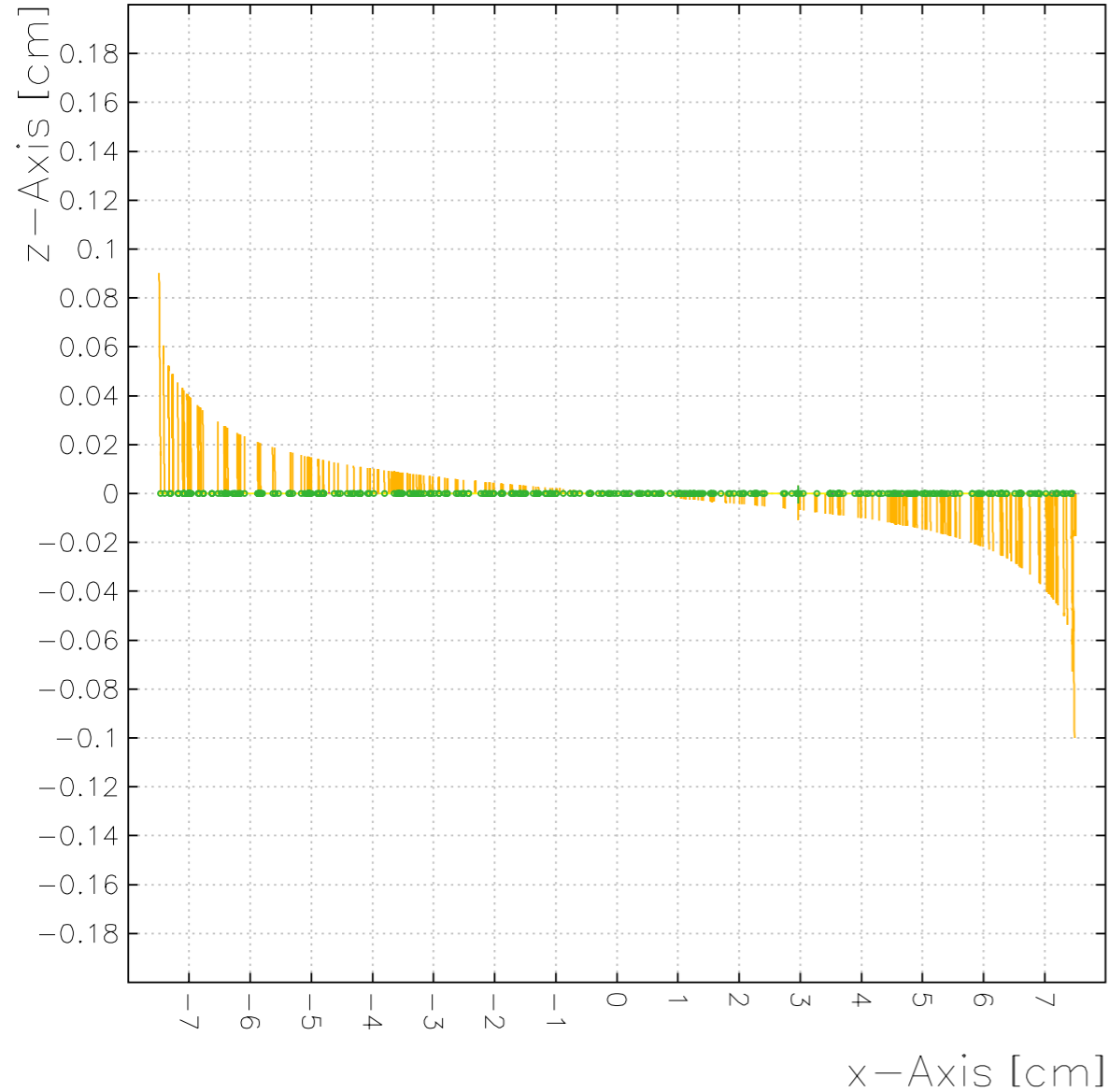
After the correction of Voltage value.
Electric Field seems to be corrected.

Correction

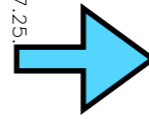
This beam test

Electron drift lines from a track

Cell: LP1 cell for ILC Particle: μ^- , $E_{kin}=1$ GeV
Gas: CF_4 2.9994%, iC_4H_{10} 1.9996%, H_2O 0.019996%, Ar 94.981%, $T=290$ K, $p=1$ atm



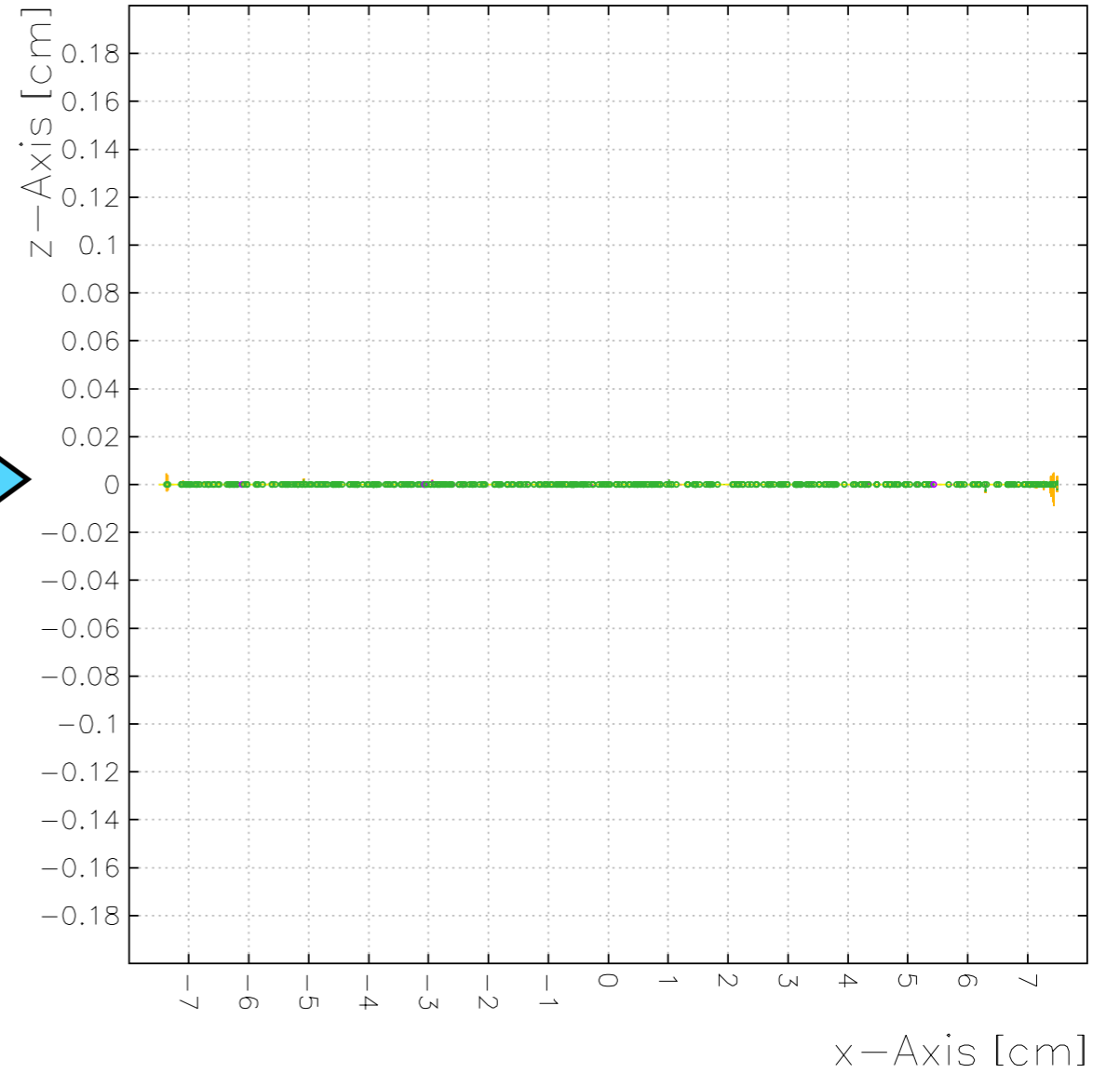
Plotted at 14.12.33 on 14/11/10 with Garfield version 7.25.



After correction

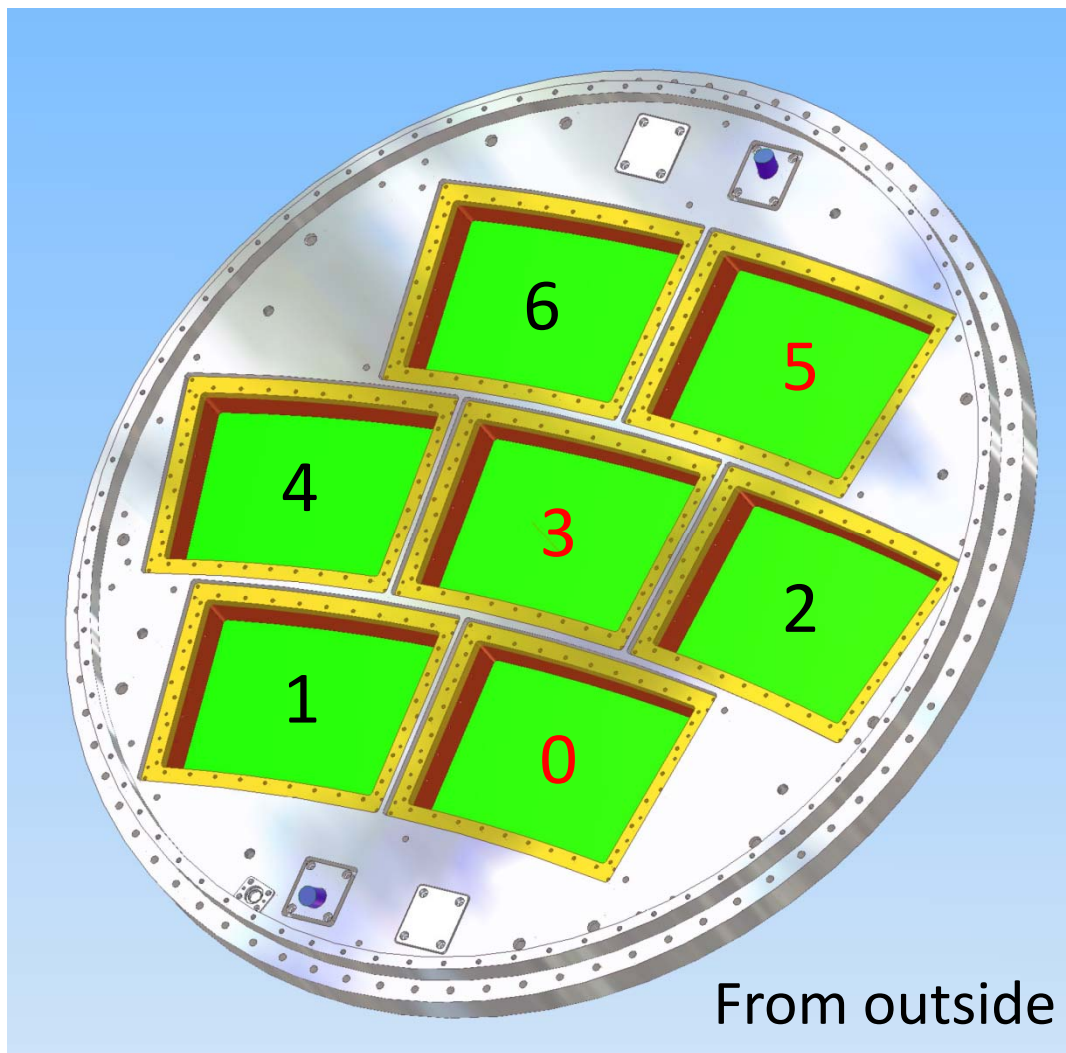
Electron drift lines from a track

Cell: LP1 cell for ILC Particle: μ^- , $E_{kin}=1$ GeV
Gas: CF_4 2.9994%, iC_4H_{10} 1.9996%, H_2O 0.019996%, Ar 94.981%, $T=290$ K, $p=1$ atm



Plotted at 14.25.13 on 14/11/10 with Garfield version 7.25.

Position at LP1-EP



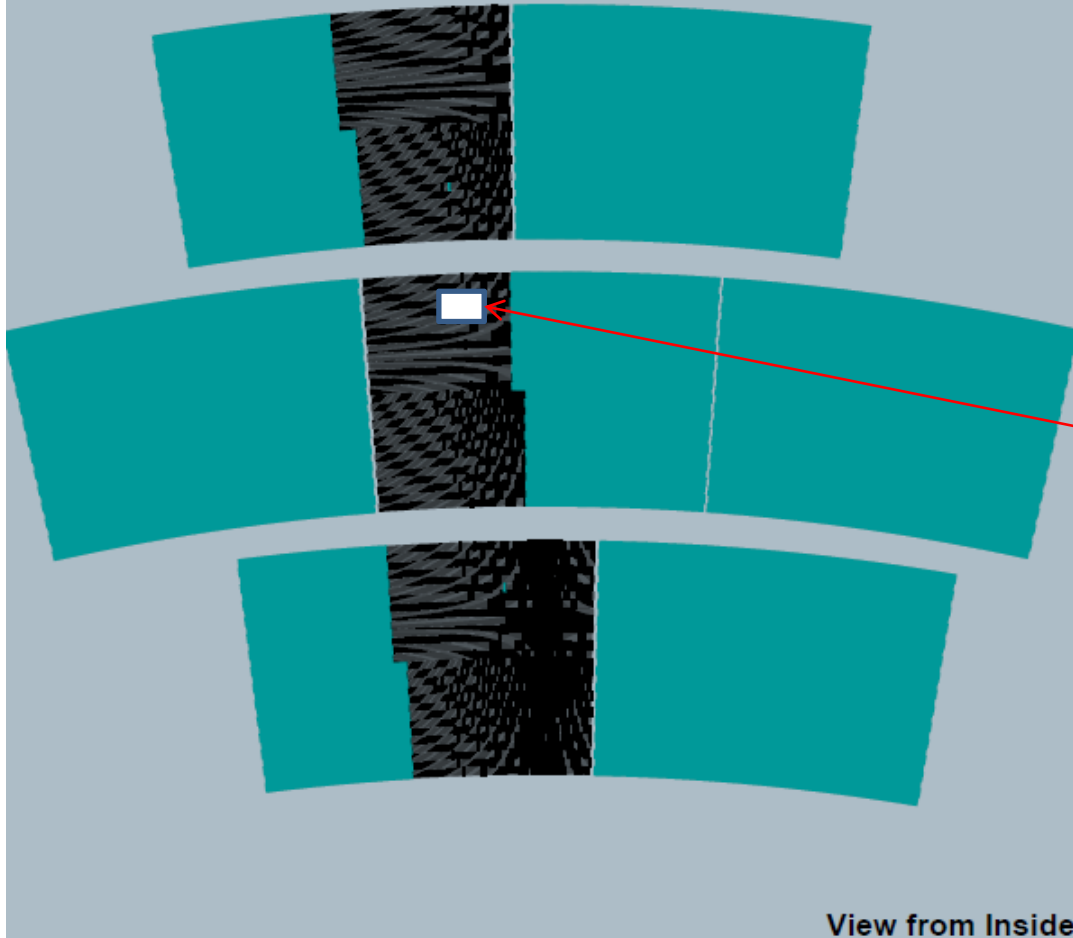
2010年3月からは左記のように
Position 0, 3, 5を使用

2009年2, 3, 4月はPosition 1, 3, 6
(ただしPosition 6のAmp. GEMの
故障のため有効なデータは
Position 1, 3のみ)

		2010.Mar.	2010.Sep.
Module1	Install Position	0	Installせず
	Amp. GEM	下記の理由でAnode側のGEMが故障	
	PCB	Gate電極付近での銅製ワッシャの脱落のためPCB上で放電	T2Kガス中でPCBのみの試験で nominal + 100Vまで電圧はかかることを確認
Module2	Install Position	3	5
	Amp. GEM	Anode側のGEMが故障	新品への交換、install後の交換を経て現在はAnode側-新品、Cathode側-(3月時点の)Module1のCathode GEM
	PCB	銅製ワッシャの脱落はなかったが、PCB上 (Gate電極)で放電	T2Kガス中で(上部構造含む) nominalまで電圧はかかることを確認
Module3	Install Position	試験段階でのGate破損により使用せず	3
	Amp. GEM		3月時点から損傷なし
	PCB		
Module4	Install Position	5	0
	Amp. GEM		3月時点から損傷なし
	PCB	損傷なし	

Readout Region

Run 17218 Event 0

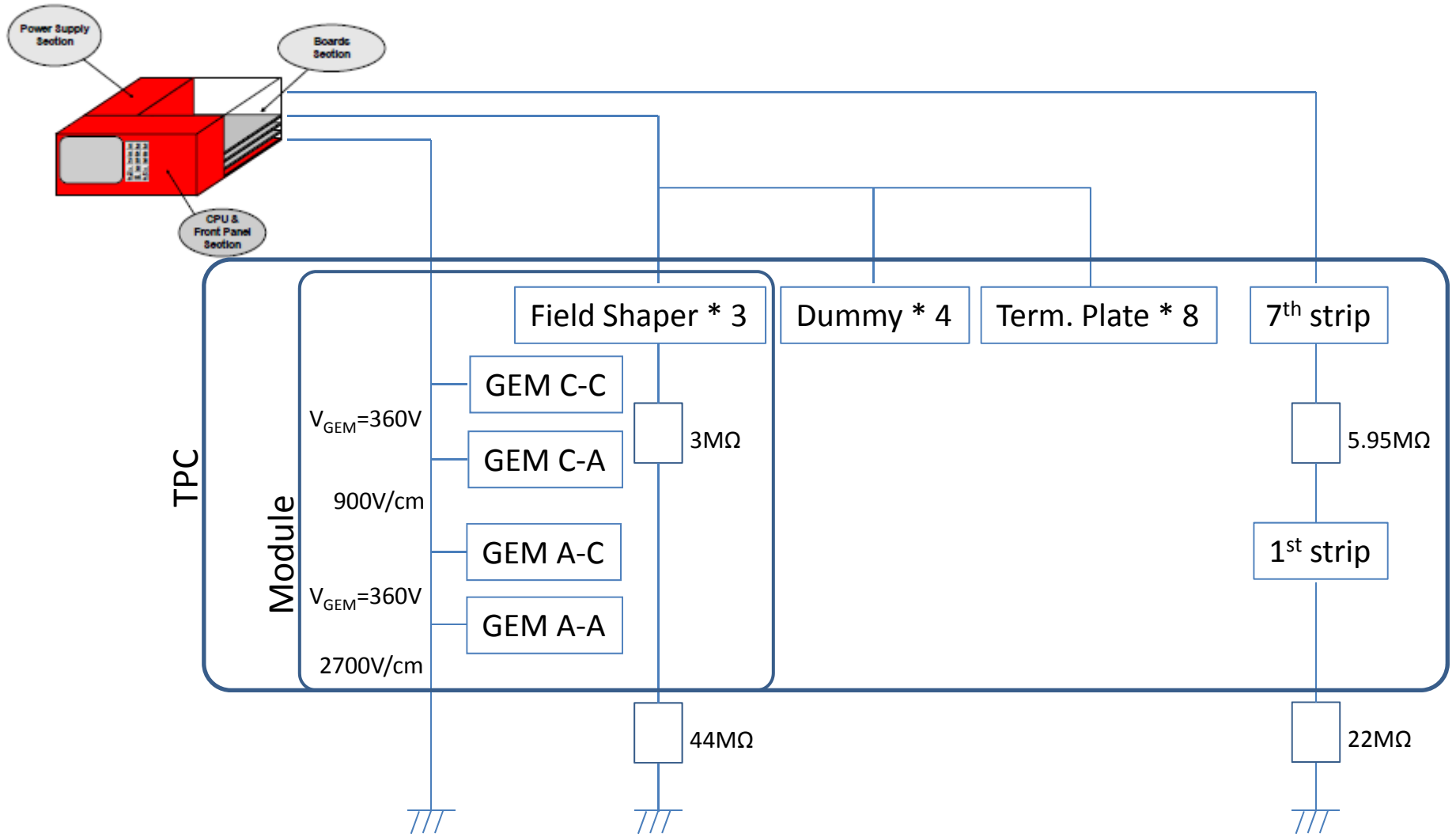


3 RCUs
63 FECs
7616 ch.

DAQ rate = 30Hz

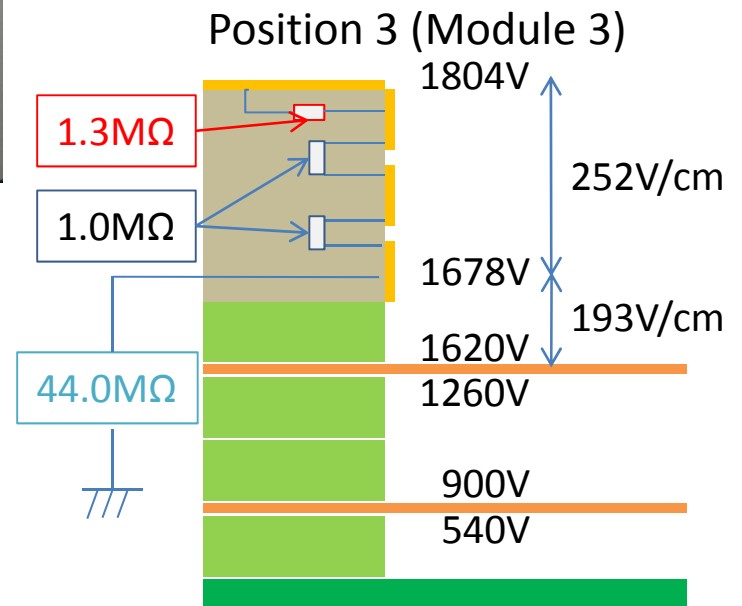
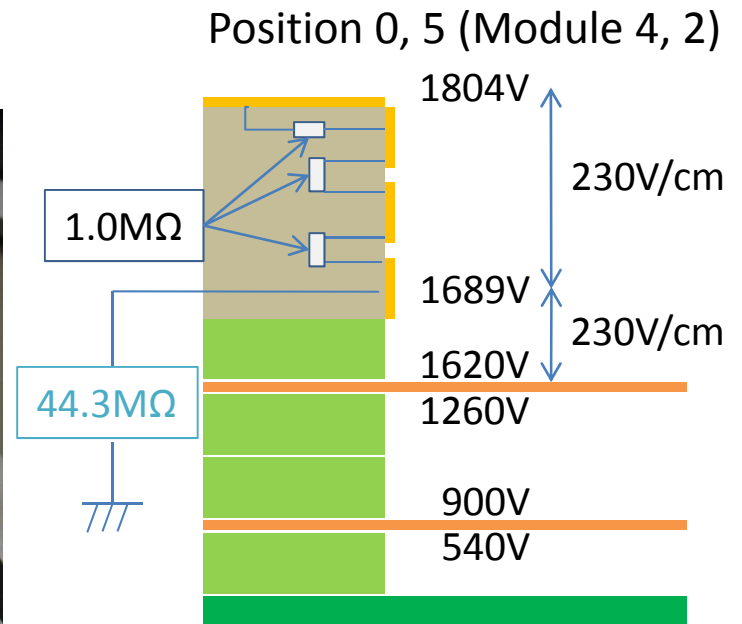
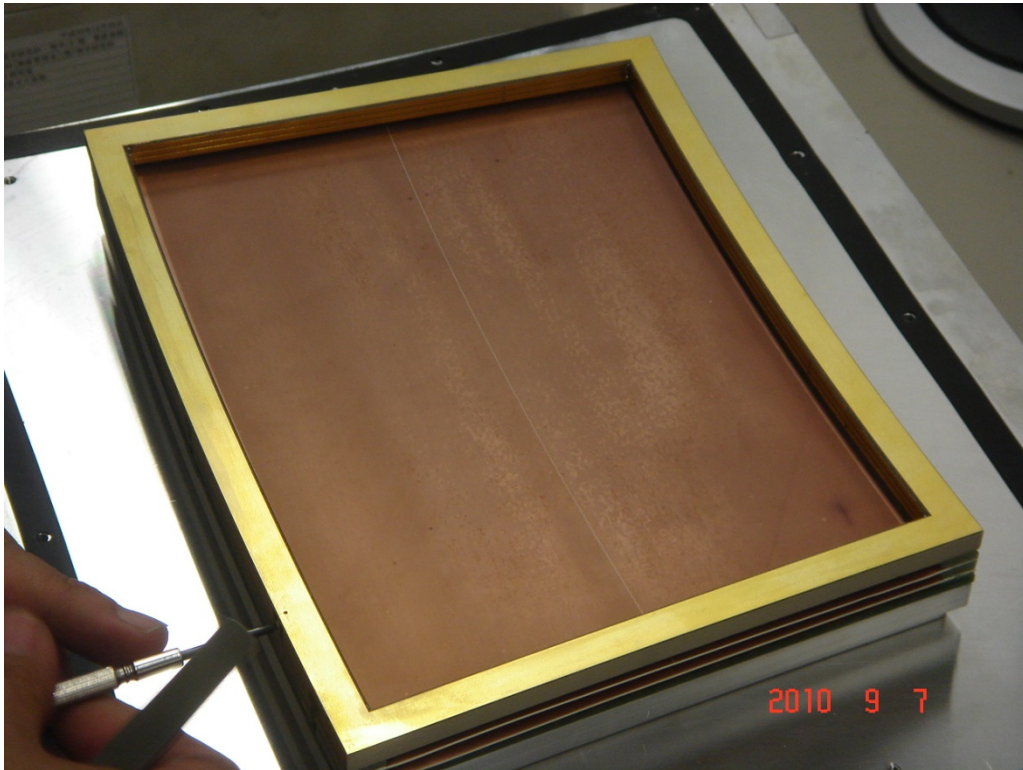
Dead ch. (connect loose)
Module 3, D44 – RCU 1, FEC 23, cable 4

H.V. System



Field Shaper

strip
2mm pitch



Geometry model of Field Shaper

