ScECAL software status

5th, March 2012 CALICE meeting in Shinshu

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In Heidelberg

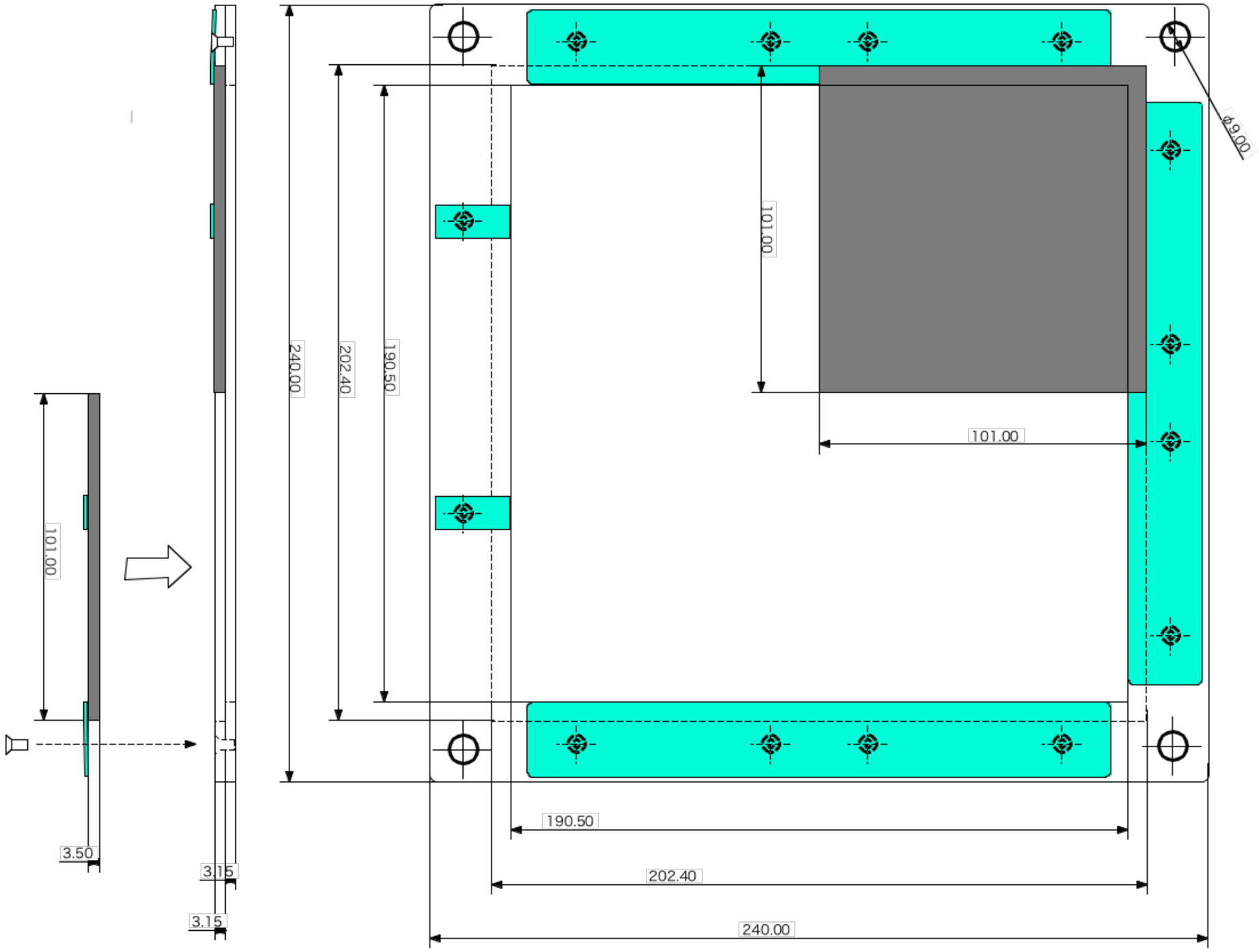
Inputs for analysis	Current status
DAQ-strip Mapping	Data base class▶not yet
adc/MIP conversion factor	- Analyzing processor--done, - data handling processor--done, - data base was already uploaded.
Inter calibration constants	- Analyzing processor--not yet (root analysis) - data handling processor--done, - data base was already uploaded.
Gain (one p.e. sensitivity)	- Analyzing processor--done, - data handling processor--done, - data base was already uploaded.
Temperature (stand alone meas. for 2009)	- read out processor for each event not yet - data base upload has not been yet done.
Noisy channels	- Local data file
AHCAL layer pos(z)	- Local data file
MPPC Npix	Basic study is on going in Shinsu

Today

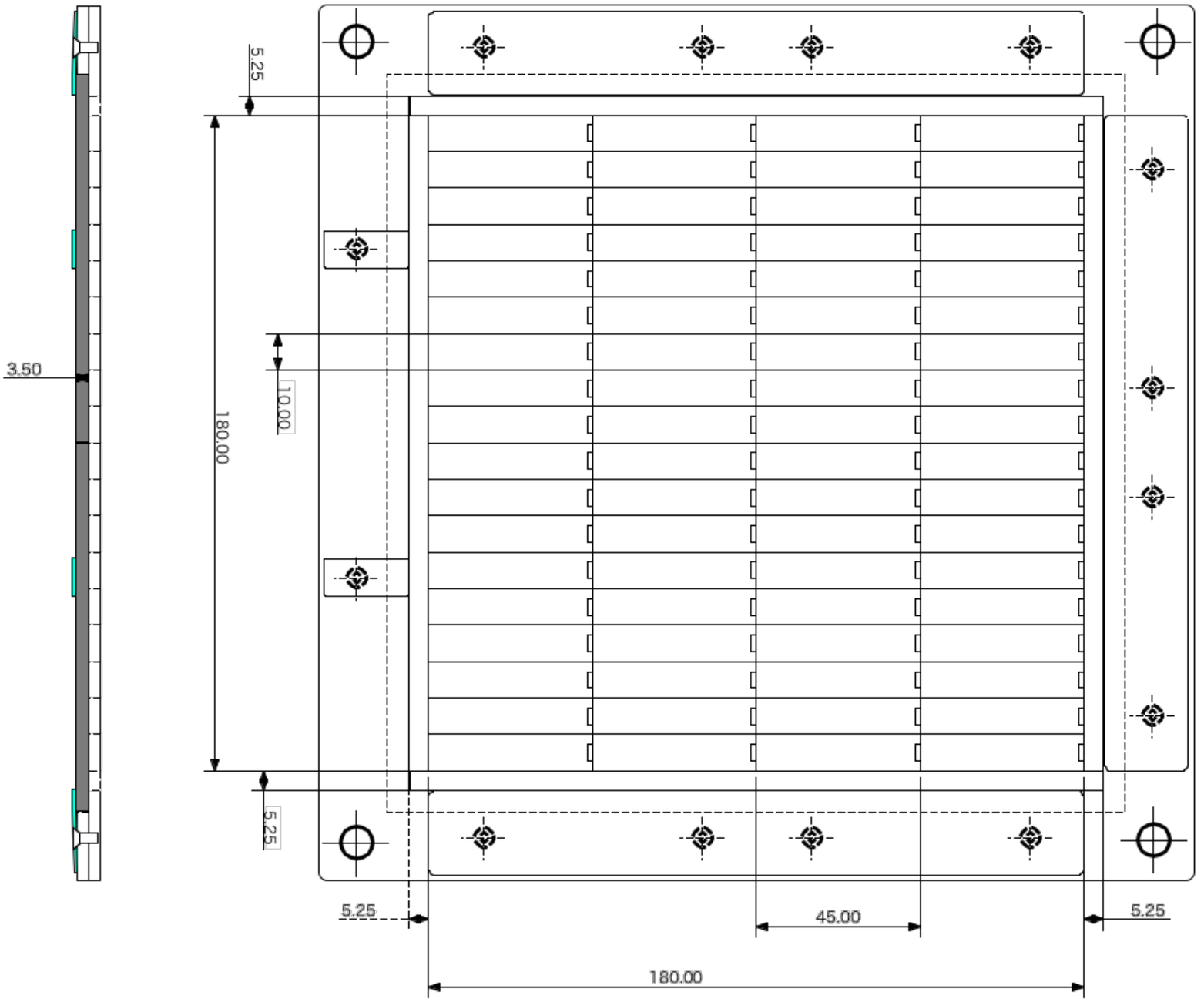
Inputs for analysis	Current status
DAQ-strip Mapping	Data base class▶ done and uploaded.
adc/MIP conversion factor	- Analyzing processor--done, - data handling processor--done, - data base was already uploaded.
Inter calibration constants	- Analyzing processor--not yet (root analysis) - data handling processor--done, - data base was already uploaded.
Gain (one p.e. sensitivity)	- Analyzing processor--done, - data handling processor--done, - data base was already uploaded.
Temperature (stand alone meas. for 2009)	- Temp. readout processor (Temp.Getter) for each event has been made and DB was uploaded.
Noisy channels	- data handling processor--done, not uploaded
AHCAL layer pos(z)	- tried to read AHCAL DB, faild
MPPC Npix	for 72/2160 channel, each Npix is measured.

ScECAL prototype module driver in Mokka

- Status
  - There was no driver of ScECAL FNAL prototype in MOKKA.
  - To make it was a task on me at Heidelberg.
- Steps
  - 1st stage:
    - non-uniformity of materials in lateral direction are averaged.
  - 2nd stage:
    - detail structure of materials will be implemented.



100 x 100 mm² four absorber plates are set in a frame.

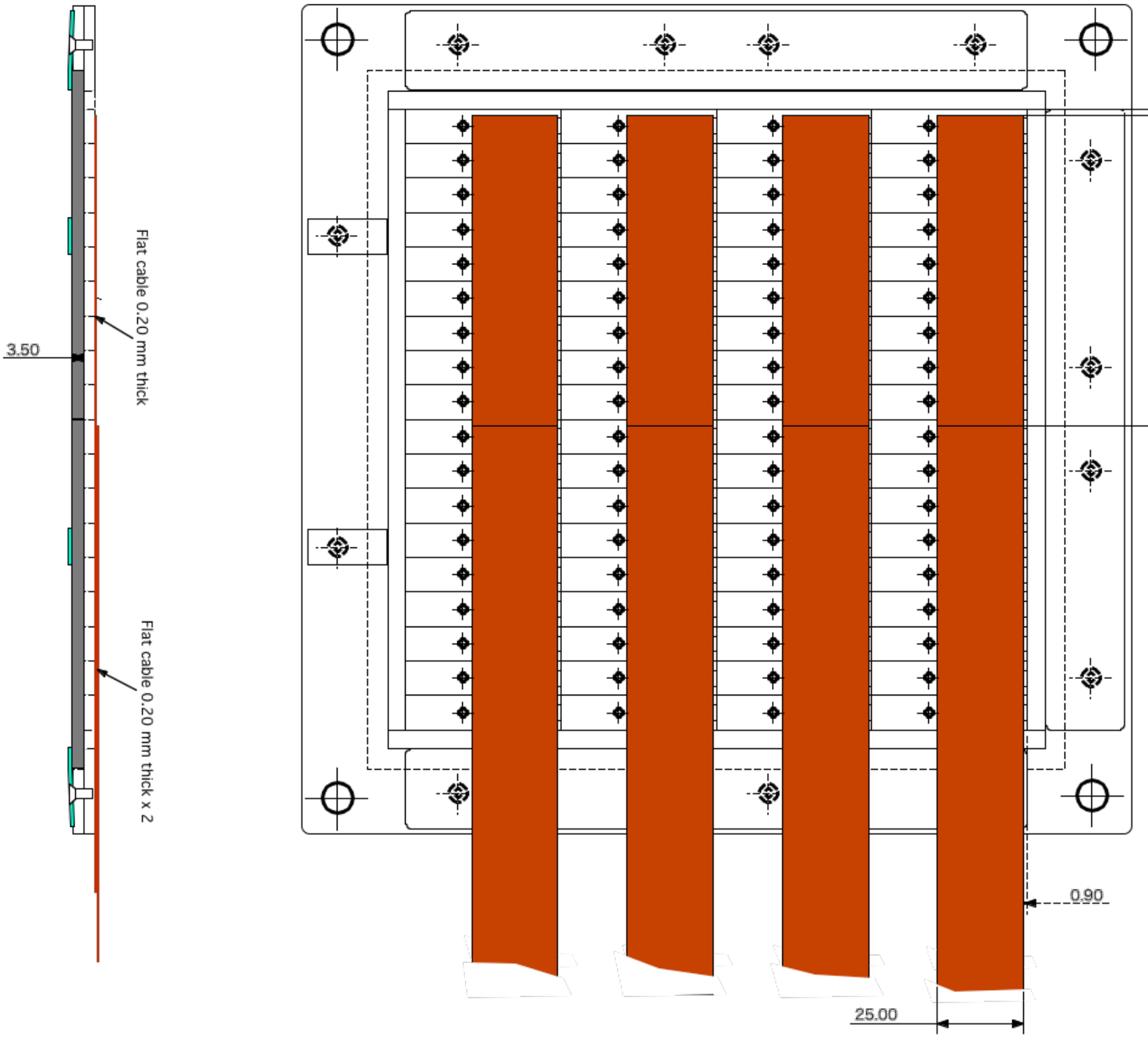


72 scintillator strips enveloped in reflector are put on the absorbers.

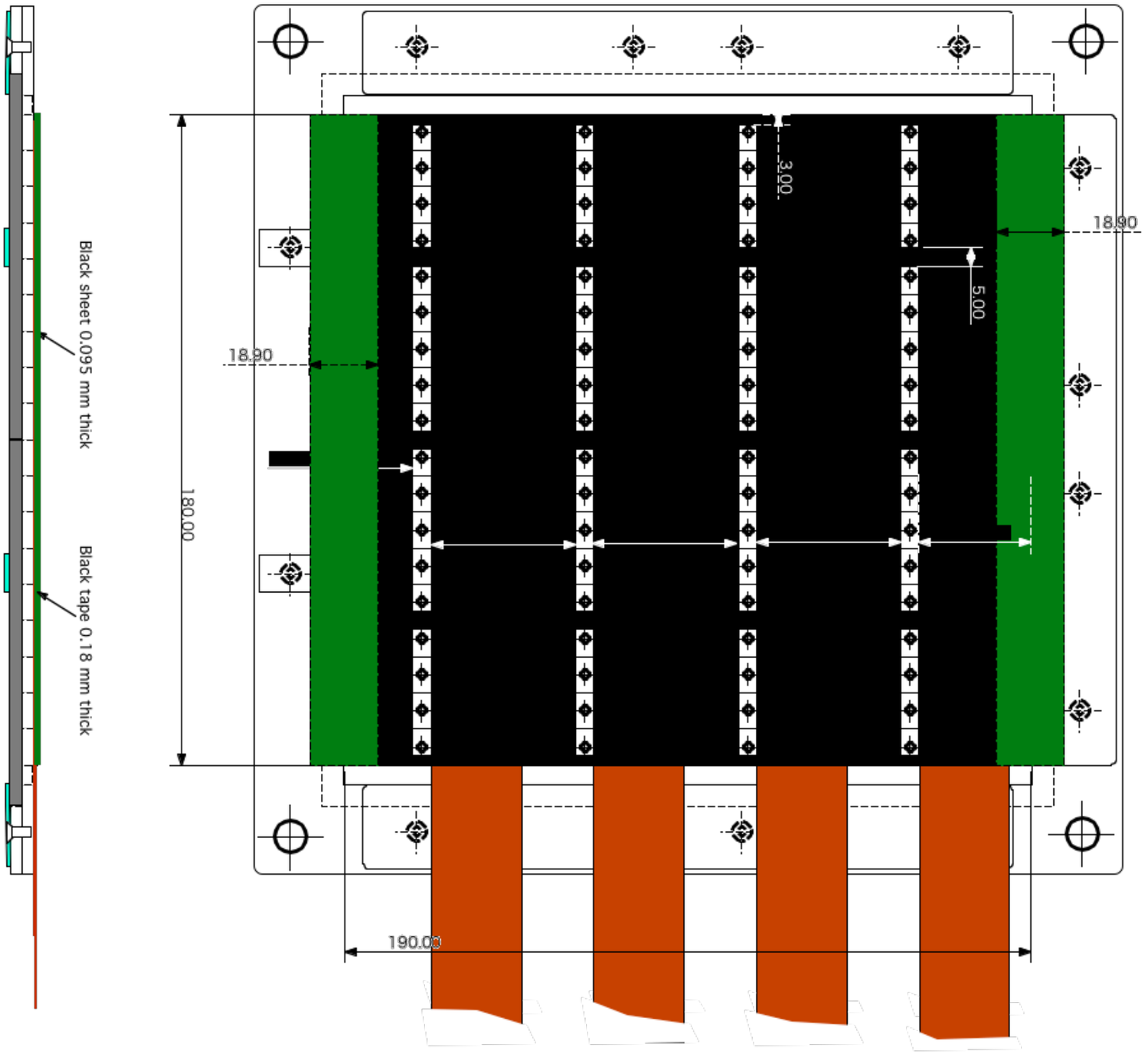
Thickness and density of materials

	ingredients	density (g/cm^3)	Thick (mm)
absorber	W:C:Co:Cr*	14.7	3.500
reflector	PET	1.35	0.114
Scintillator	polystyrene	1.032	3.019
reflector	PET	1.35	0.057

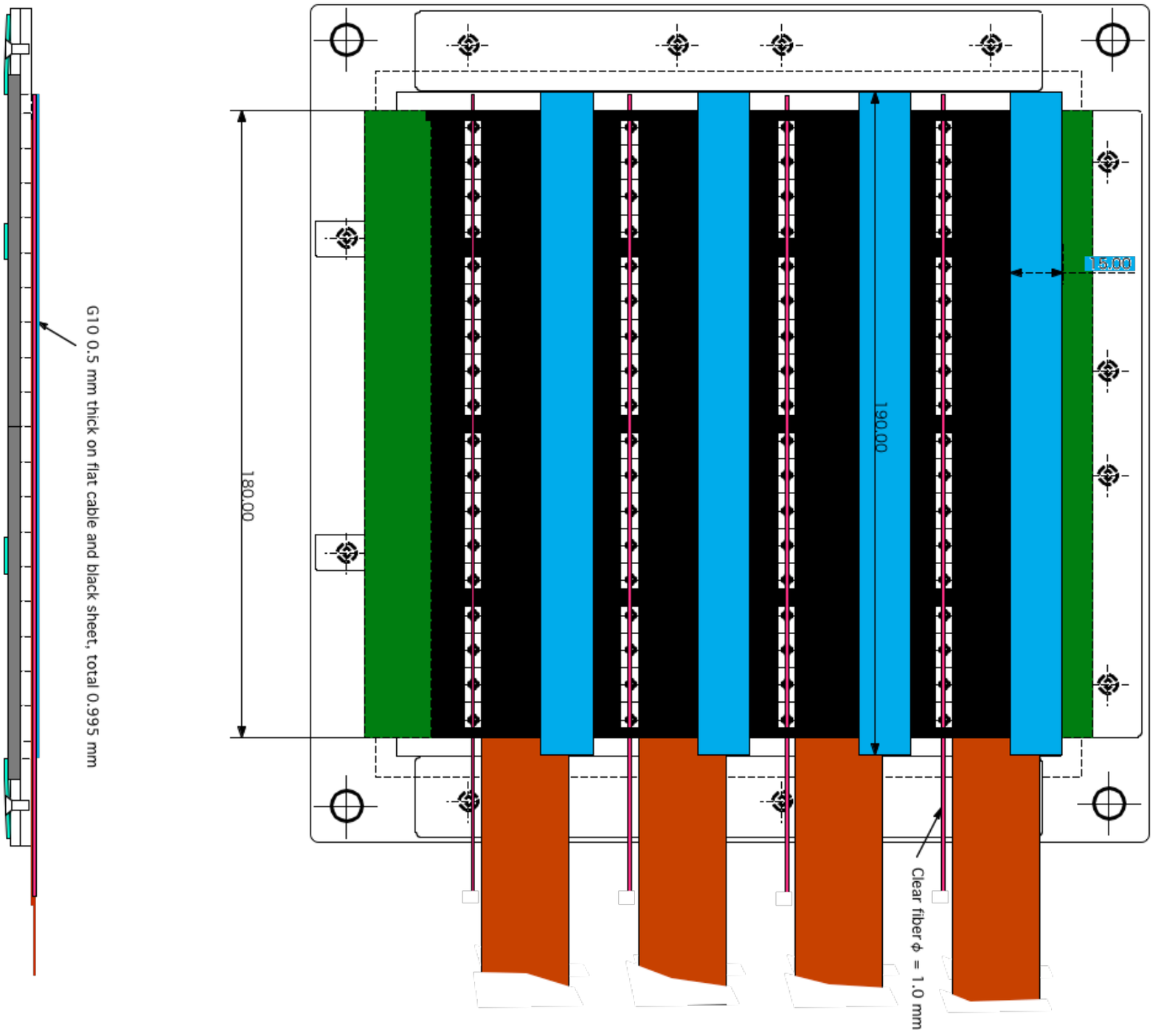
* Chemical compound of absorber was determined by using energy dispersive X-lay spectrometer and X-lay diffraction analyzer.



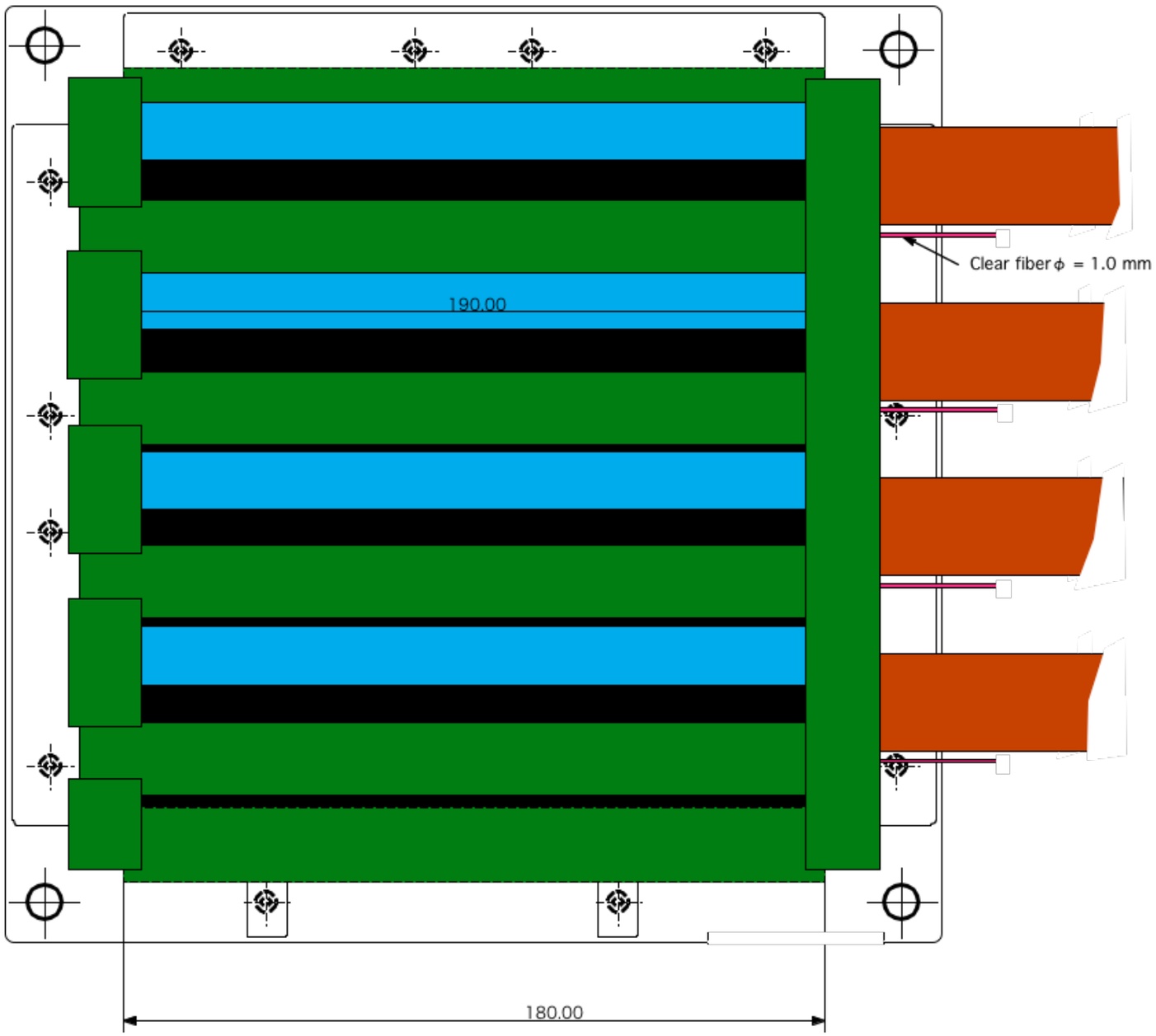
72 MPPC kept on 8 flat cables are inserted into MPPC housing on strips.

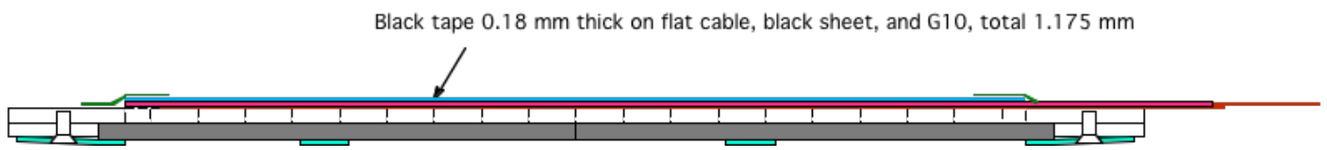


covered with black sheet.



G10 plates are used to fix MPPCs and clear fibers for LED calibration.



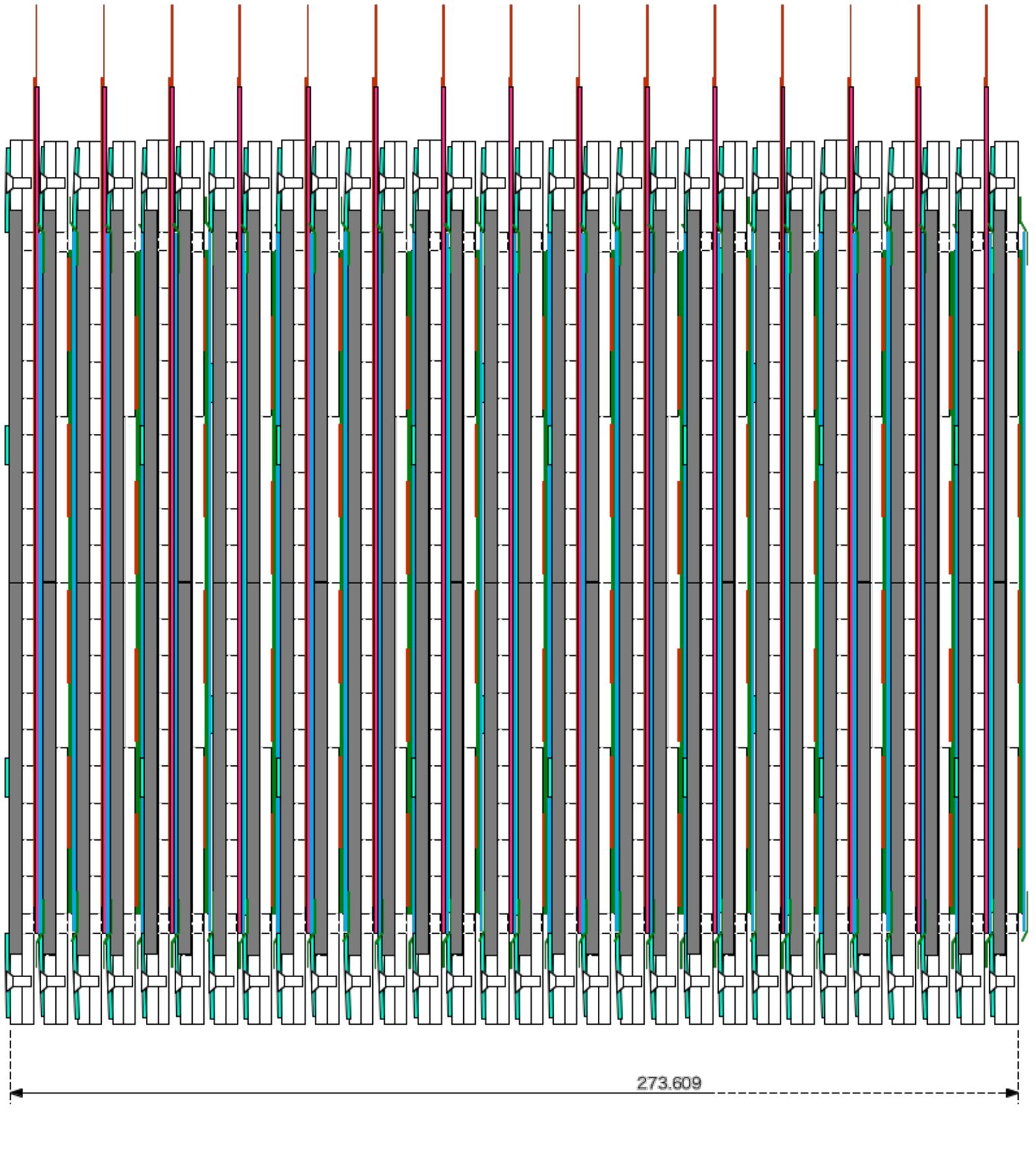


completely covered with black tape.

Thickness and density of materials

	ingredients	density (g/cm^3)	Thick (mm)
absorber	W:C:Co:Cr*	14.7	3.500
reflector	PET	1.35	0.114
Scintillator	polystyrene	1.032	3.019
reflector	PET	1.35	0.057
Flat cable etc	mix*	0.829	0.995

* Flat cable-polyimide, black sheet-PVC, G10-from Geant4, Clear fiber-polyacrylate, black tape-PVC, air vacancy.



30 layers are stacked. gaps are summed up as air gap.

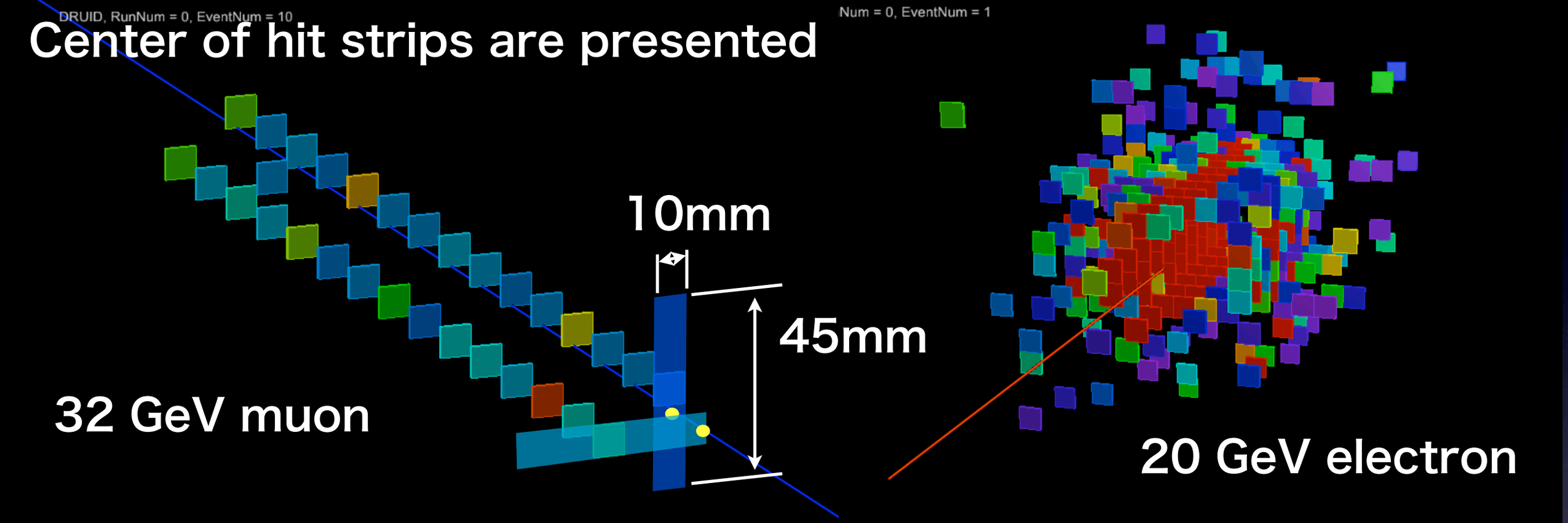
Thickness and density of materials

	ingredients	density (g/cm^3)	Thick (mm)
absorber	W:C:Co:Cr*	14.7	3.500
reflector	PET	1.35	0.114
Scintillator	polystyrene	1.032	3.019
reflector	PET	1.35	0.057
Flat cable_etc	mix*	0.829	0.995
Air gap	N2,O2,Ar	1.18x10^{-3}	1.238

TBscecal00 (in Boris's talk)

TBscecal01 45 x 10 mm² strips

displayed by Dluid



Parameters:
Density of absorber and cable_etc,
Rotation angle, Translate x and y, grid size,
Mass fraction ration of compounds of absorber.

Data base issues:
x center, y center and z center are 0 mm, 0 mm, and -200 mm,
x-y lateral size (180 mm), the number of layers 30,
thickness of materials in table.

Summary

- DB
  - Data base for ScECAL prototype is almost done.
    - We need blush up and then release it.
- Implementation of ScECAL prototype in Mokka.
  - 1st stage is already done.
  - comparing energy resolution, longitudinal and lateral projection, position resolution, ... with data
  - More real geometry will be implemented if it will be needed.

Backup

as the first version

grid 1mm x 1 mm

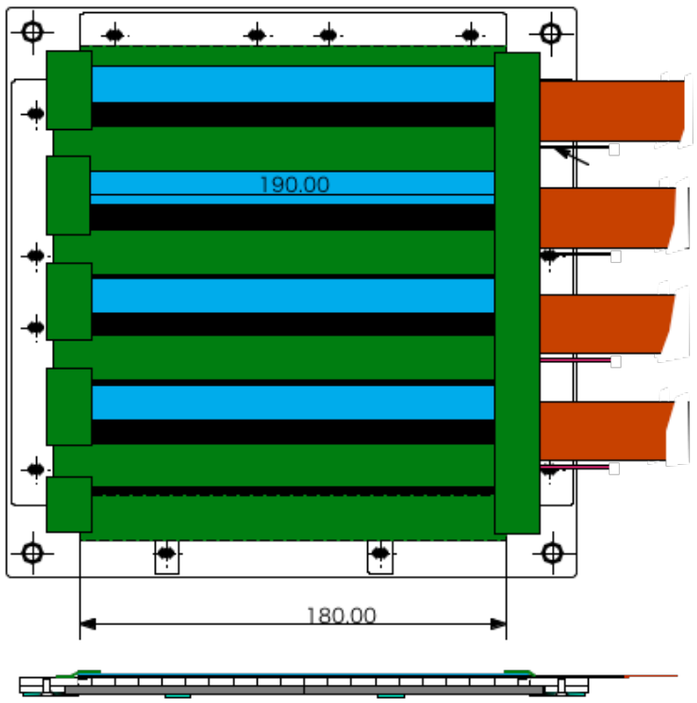
	ingradientsfi	density (g/cm^3)	Thick (mm)
absorber	W:C:Co:Cr	14.7	3.500
reflector	PET	1.35	0.114
Scintillator	polystyrene	1.032	3.019
reflector	PET	1.35	0.057
Flat cable etc	table*	0.829	0.995
Air gap	N2,O2,Ar	1.18x10^{-3}	1.238

table

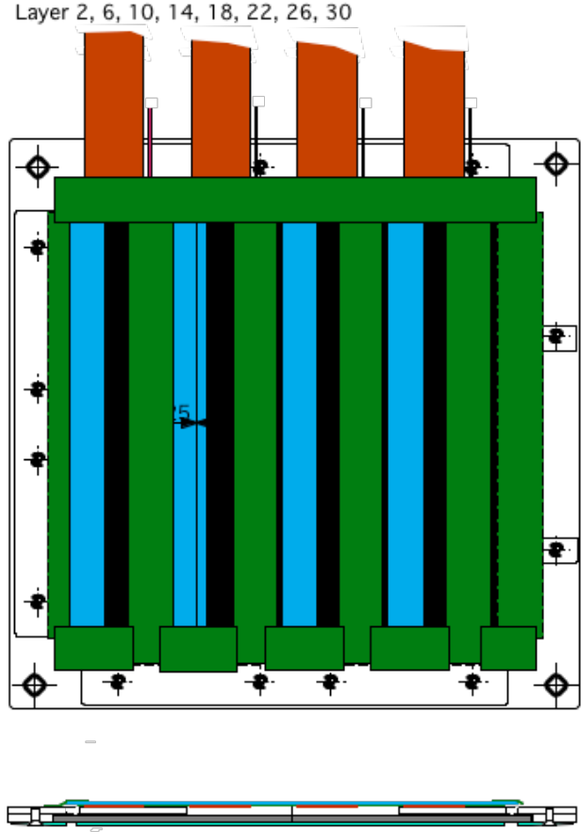
	material	density (g/cm^3)	weight(%)
Flat cable	polyimide	1.42	28.26
Black sheet	PVC	1.44	16.58
G10	?	1.88	37.97
Clear fiber	Polyaclilate	1.19	0.63
Black tape	PVC	1.44	16.49
Air vacancy	N2,O2,Ar	1.18x10^{-3}	0.07

ScECAL prototype module driver in Mokka

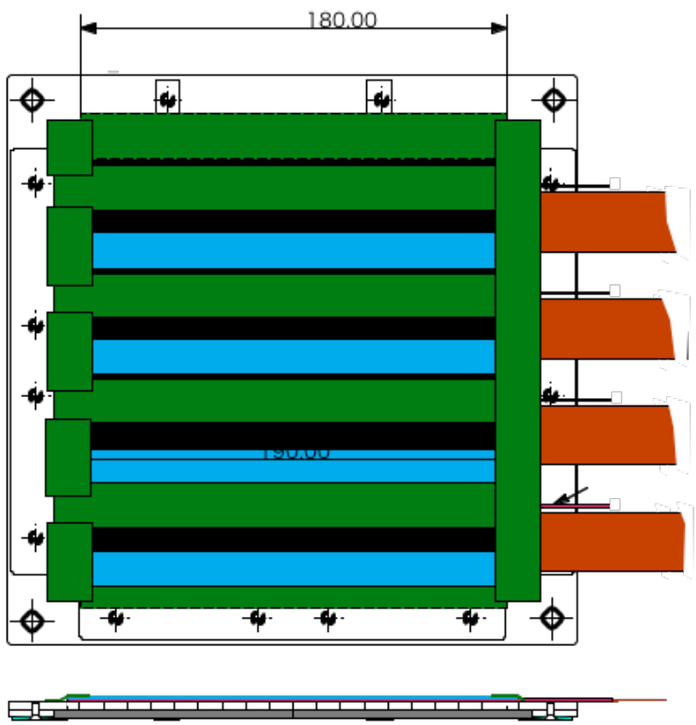
Layer 1, 5, 9, 13, 17, 21, 25, 29



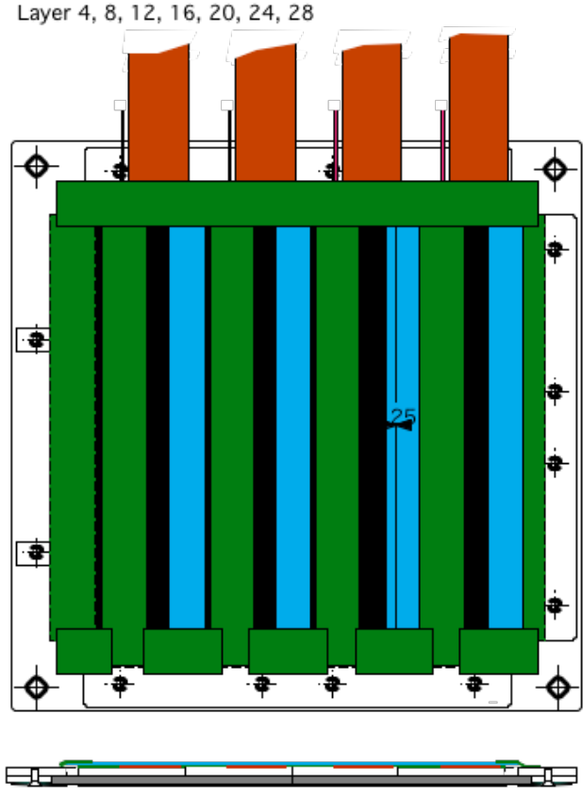
Layer 2, 6, 10, 14, 18, 22, 26, 30



Layer 3, 7, 11, 15, 19, 23, 27



Layer 4, 8, 12, 16, 20, 24, 28

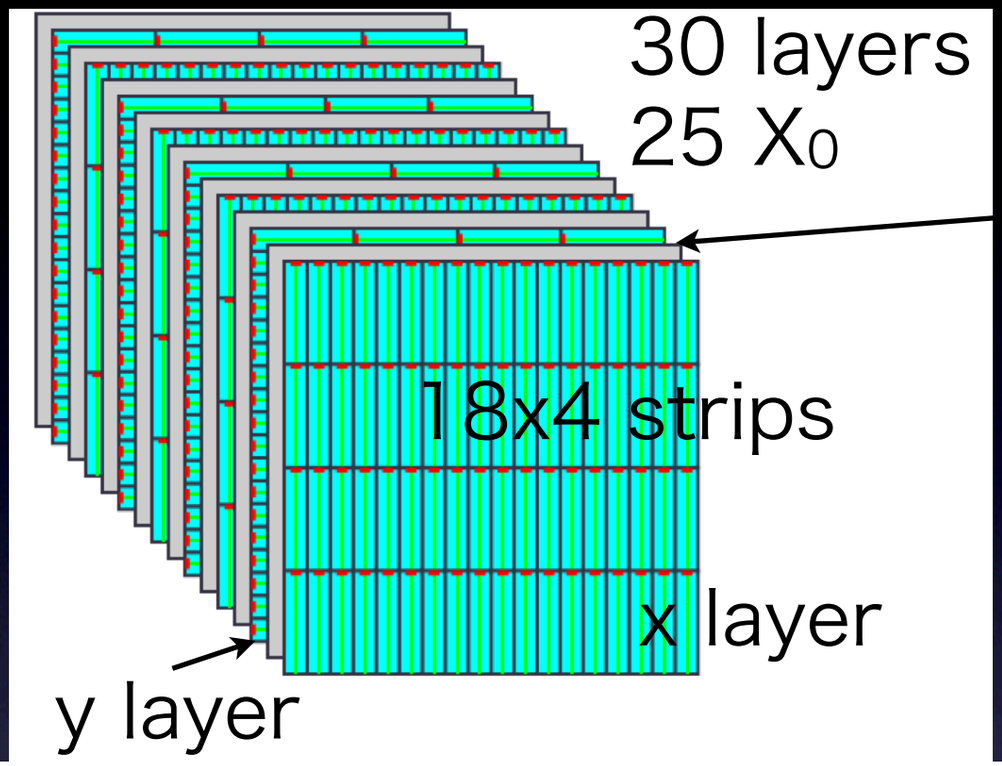


CB-ID … connector board ID-board type
Format : LayerID-connectorID

CyR CyL
CxR CxL

CB-ID	20L	19R	18L	17R	16L	15R	14L	13R	12L	11R	10L	9R	8L	7R	6L	5R	4L	3R	2L	1R
CN5	2-3	2-1	4-1	6-1	8-3	8-1	10-1	12-1	14-3	14-1	16-1	18-1	20-3	20-1	22-1	24-1	26-3	26-1	28-1	30-1
CN6	2-4	2-2	4-2	6-2	8-4	8-2	10-2	12-2	14-4	14-2	16-2	18-2	20-4	20-2	22-2	24-2	26-4	26-2	28-2	30-2
CN7	2-5	4-5	4-3	6-3	8-5	10-5	10-3	12-3	14-5	16-5	16-3	18-3	20-5	22-5	22-3	24-3	26-5	28-5	28-3	30-3
CN8	2-6	4-6	4-4	6-4	8-6	10-6	10-4	12-4	14-6	16-6	16-4	18-4	20-6	22-6	22-4	24-4	26-6	28-6	28-4	30-4
CN9	2-7	4-7	6-7	6-5	8-7	10-7	12^7	12-5	14-7	16-7	18-7	18-5	20-7	22-7	24-7	24-5	26-7	28-7	30-7	30-5
CN10	2-8	4-8	6-8	6-6	8-8	10-8	12-8	12-6	14-8	16-8	18-8	18-6	20-8	22-8	24-8	24-6	26-8	28-8	30-8	30-6
CN11	1-1	3-1	5-1	5-3	7-1	9-1	11-1	11-3	13-1	15-1	17-1	17-3	19-1	21-1	23-1	23-3	25-1	27-1	29-1	29-3
CN12	1-2	3-2	5-2	5-4	7-2	9-2	11-2	11-4	13-2	15-2	17-2	17-4	19-2	21-2	23-2	23-4	25-2	27-2	29-2	29-4
CN13	1-3	3-3	3-5	5-5	7-3	9-3	9-5	11-5	13-3	15-3	15-5	17-5	19-3	21-3	21-5	23-5	25-3	27-3	27-5	29-5
CN14	1-4	3-4	3-6	5-6	7-4	9-4	9-6	11-6	13-4	15-4	15-6	17-6	19-4	21-4	21-6	23-6	25-4	27-4	27-6	29-6
CN15	1-5	1-7	3-7	5-7	7-5	7-7	9-7	11-7	13-5	13-7	15-7	17-7	19-5	19-7	21-7	23-7	25-5	25-7	27-7	29-7
CN16	1-6	1-8	3-8	5-8	7-6	7-8	9-8	11-8	13-6	13-8	15-8	17-8	19-6	19-8	21-8	23-8	25-6	25-8	27-8	29-8

Structure I



- Consequently this has 2160 channels

Orthogonally placed x and y layers
interleaving 3.5 mm thick W absorbers