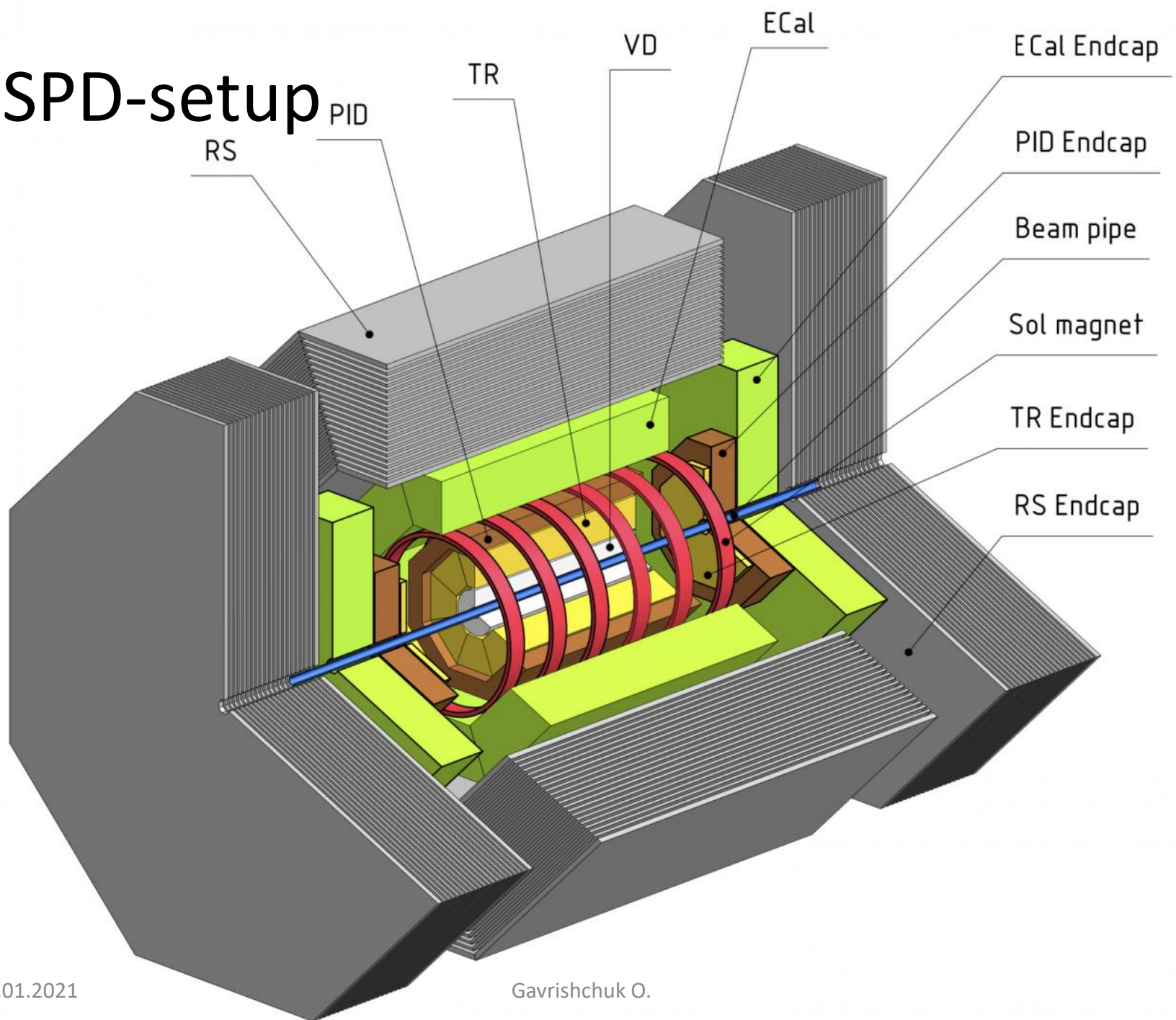


SPD ECAL

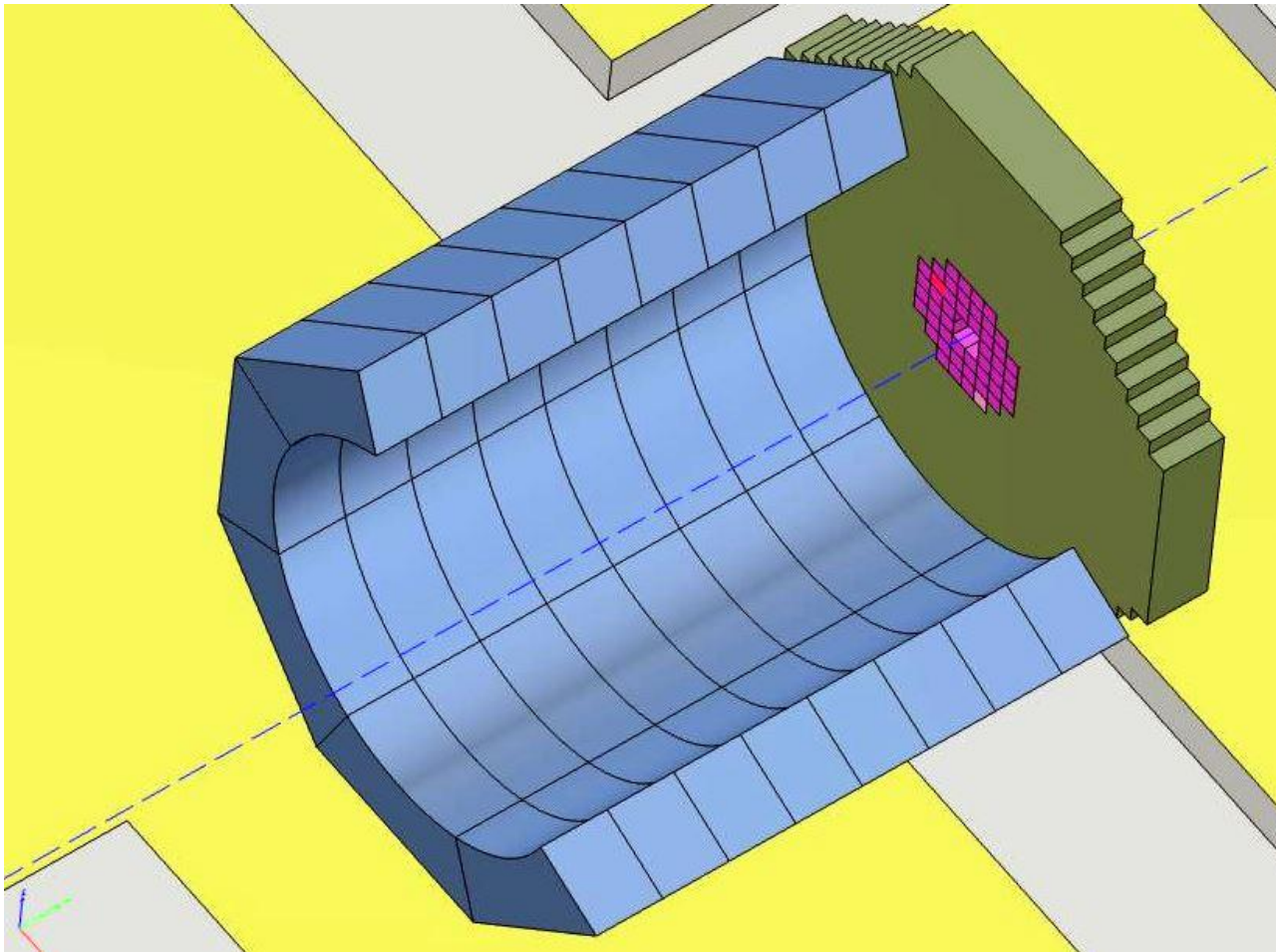
Outlook

- General design
- Integration is SPD
- Module design
- Frontend units
- ADC64 digitizer
- Frame for ECAL support

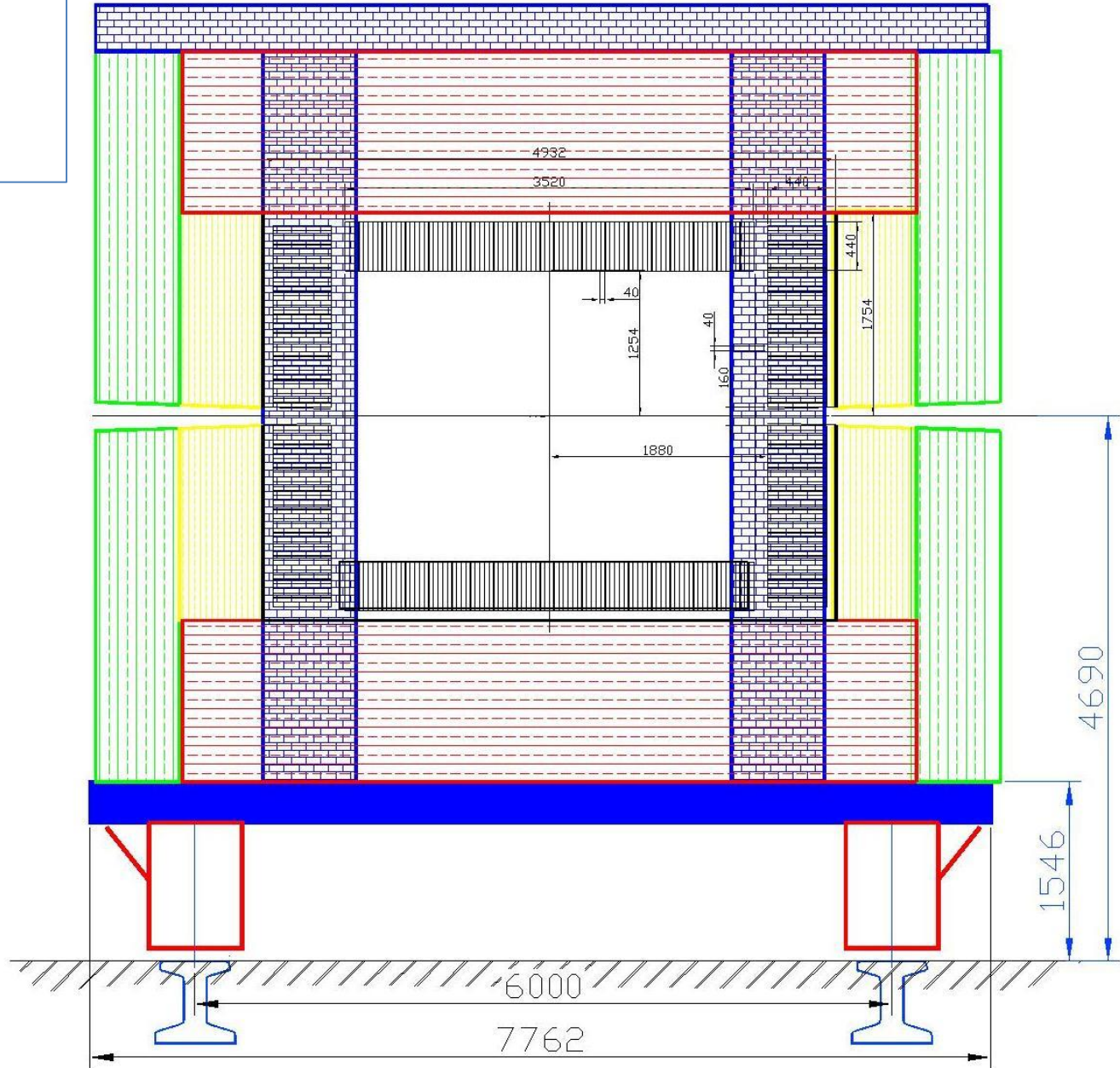
SPD-setup



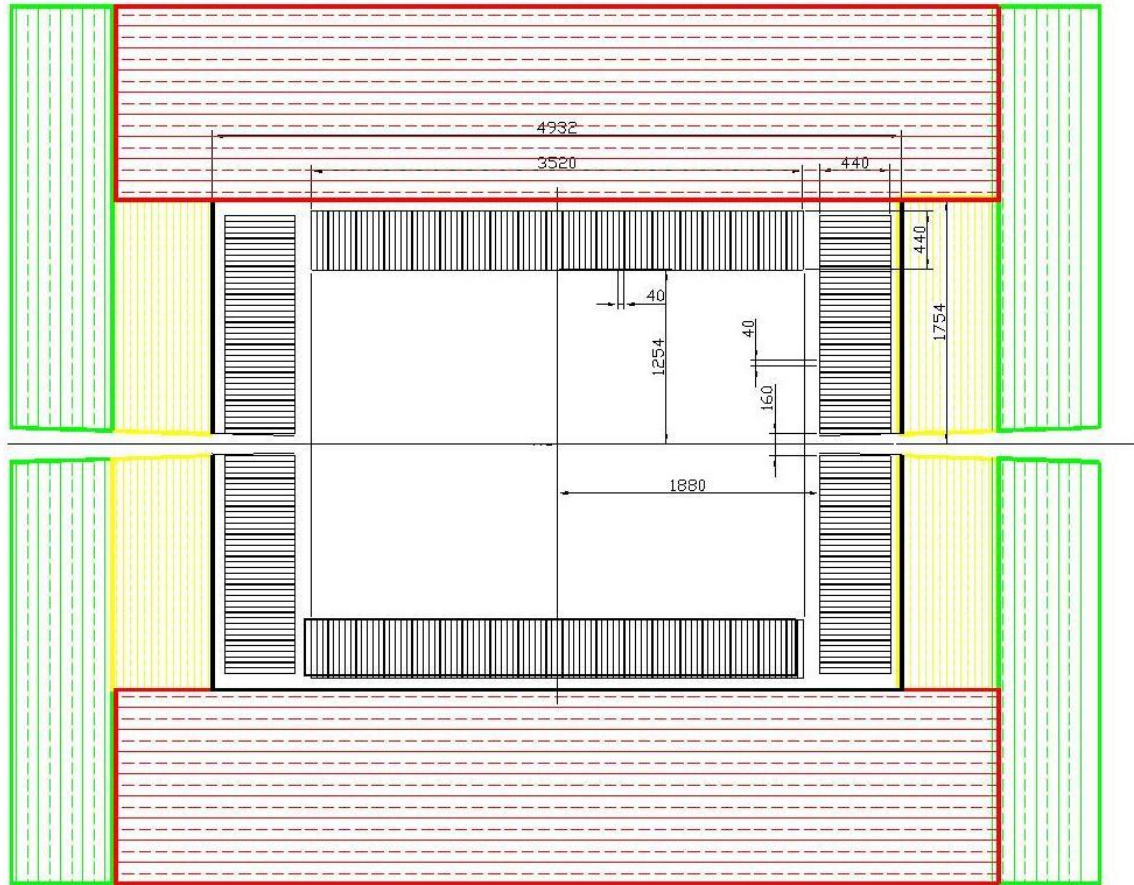
ECAL-3D



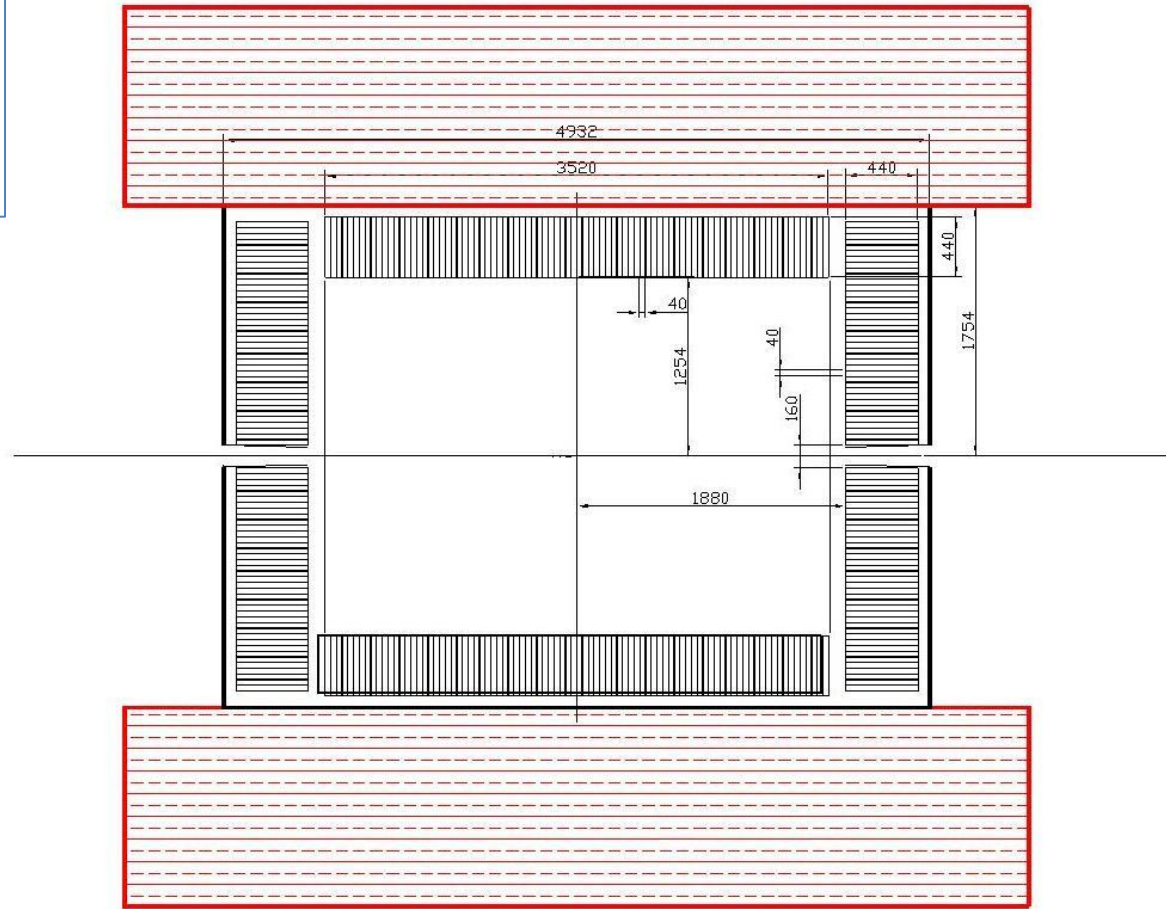
SPD
general
view



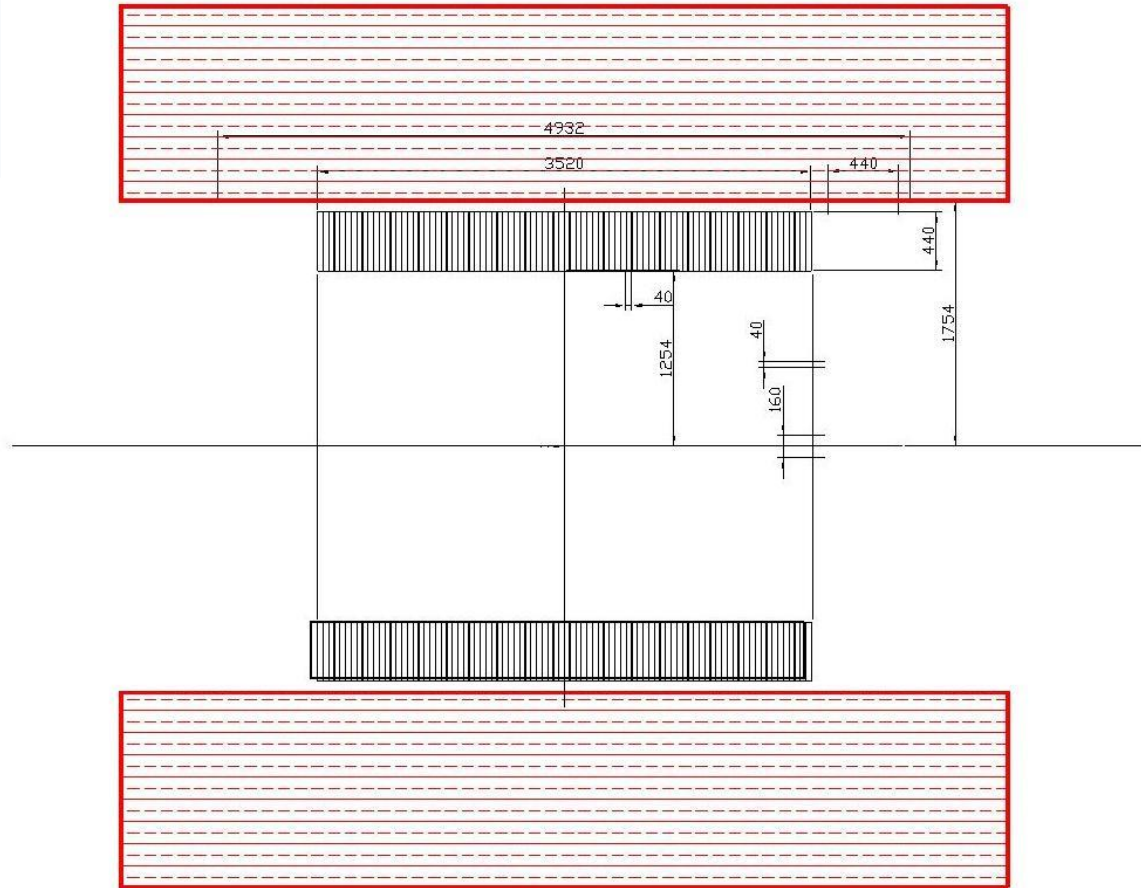
SPD
without
frame



ECAL
Barell
EndCups



ECAL
Barrel
inside of RS



Barrel – 8 sectors

φ – 28 cells (1/8)

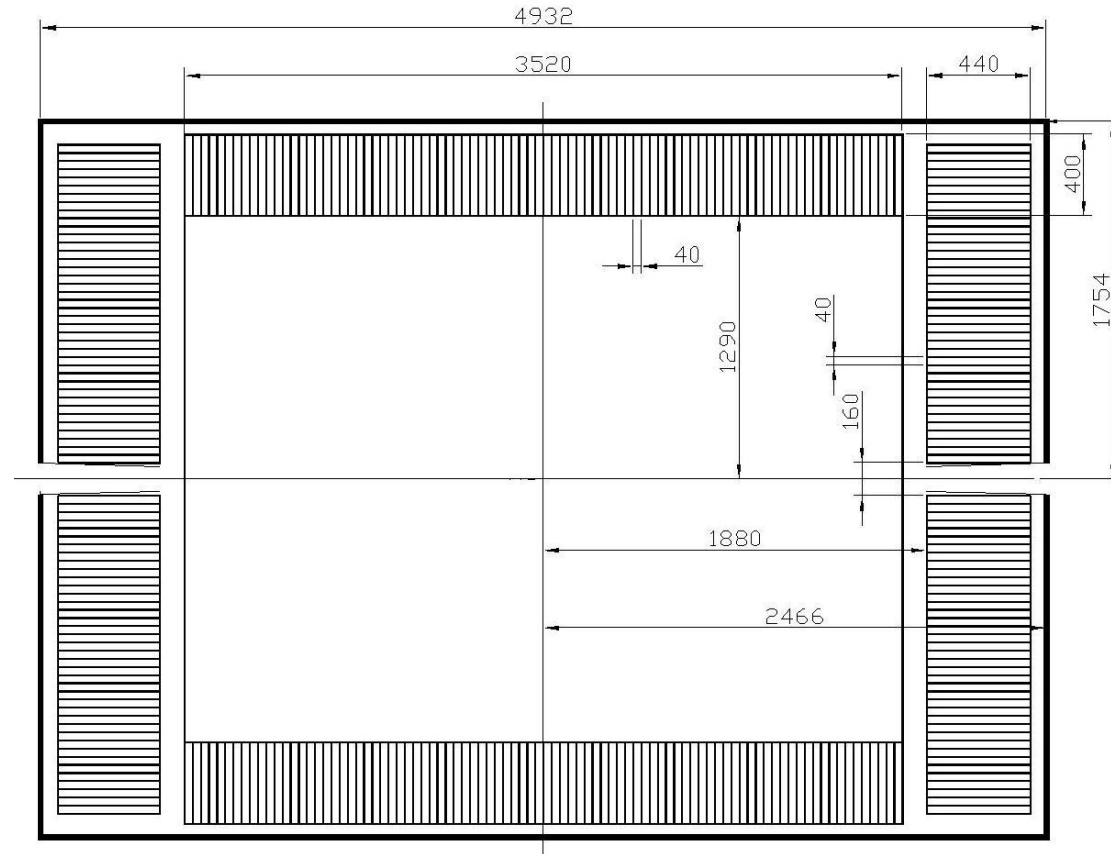
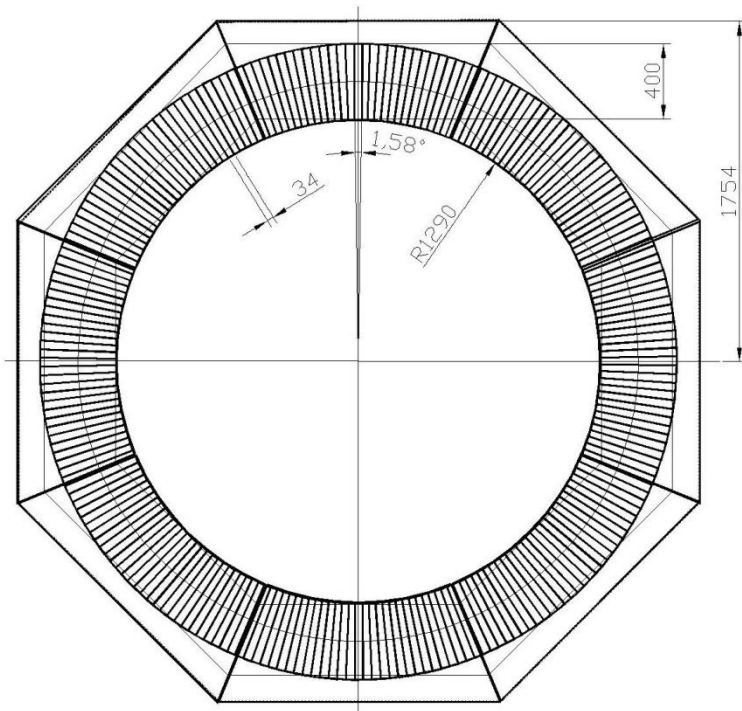
⊖ – 80 cells

½ Sector = 1120 ch – 2240 kg - 70 FE – 17.5 ADC64

ECAL Total = Sect.*16 = 17920 ch – 35840 kg

FE = 560

ADC64= 140

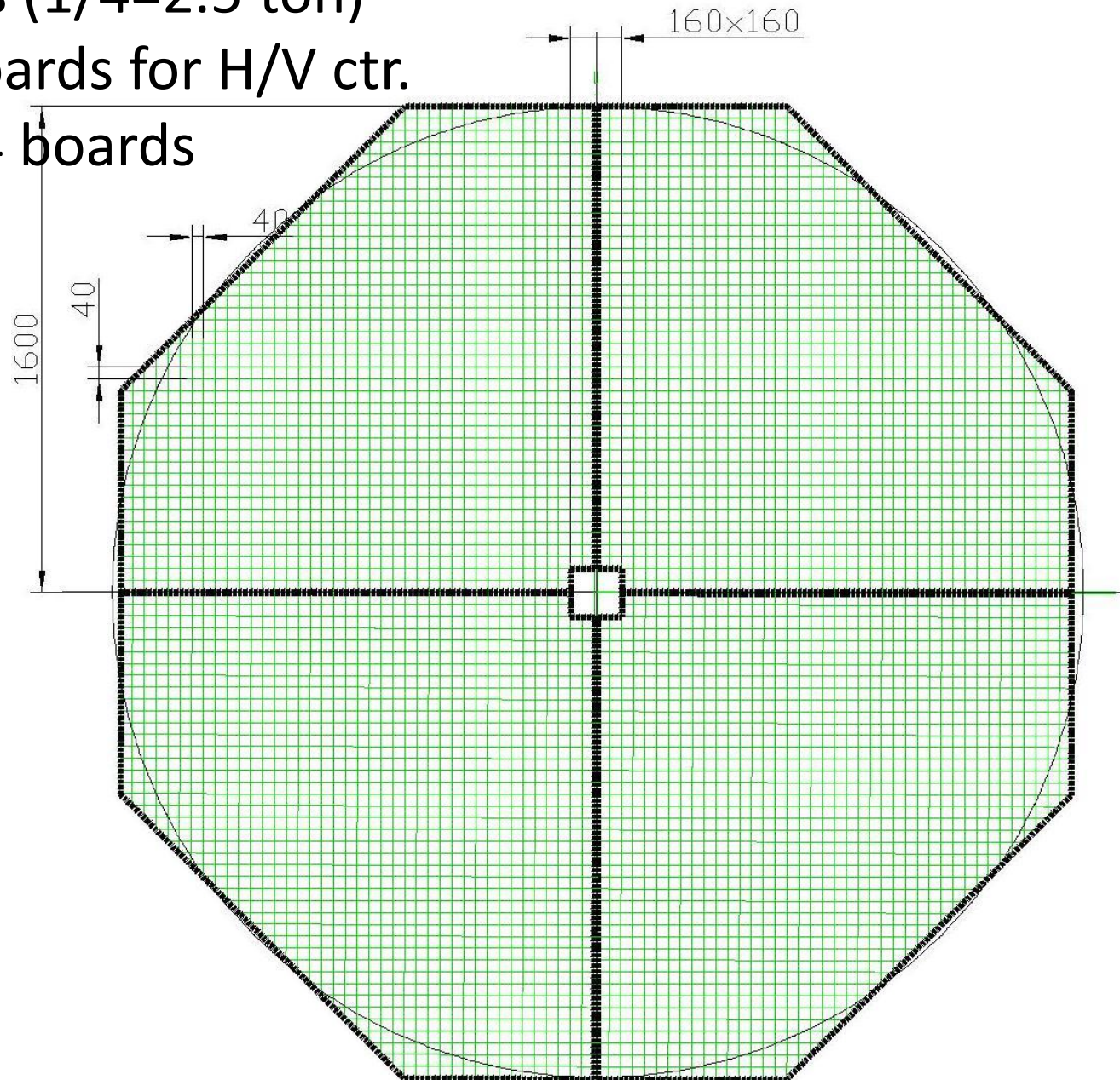


One Barrel consist of 4 sectors = 5232 ch ($1/4=1308\text{ch}$)

$m= 10$ tons ($1/4=2.5$ ton)

FE = 327 boards for H/V ctr.

ADC64 = 84 boards



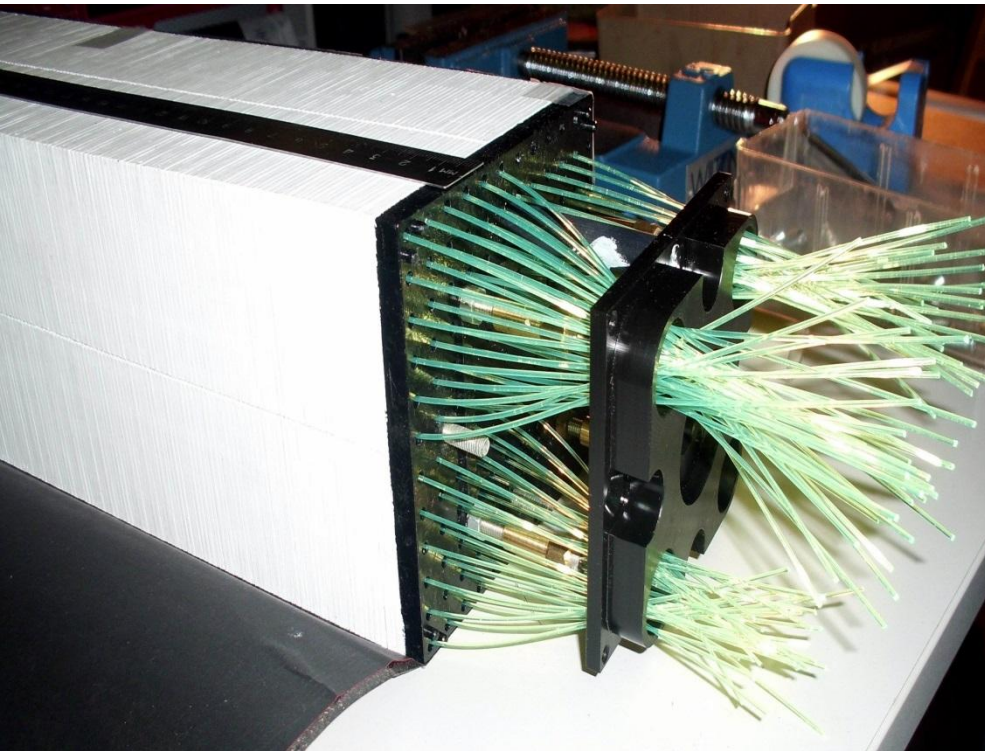
ECAL module (110x110 mm²) preliminary design



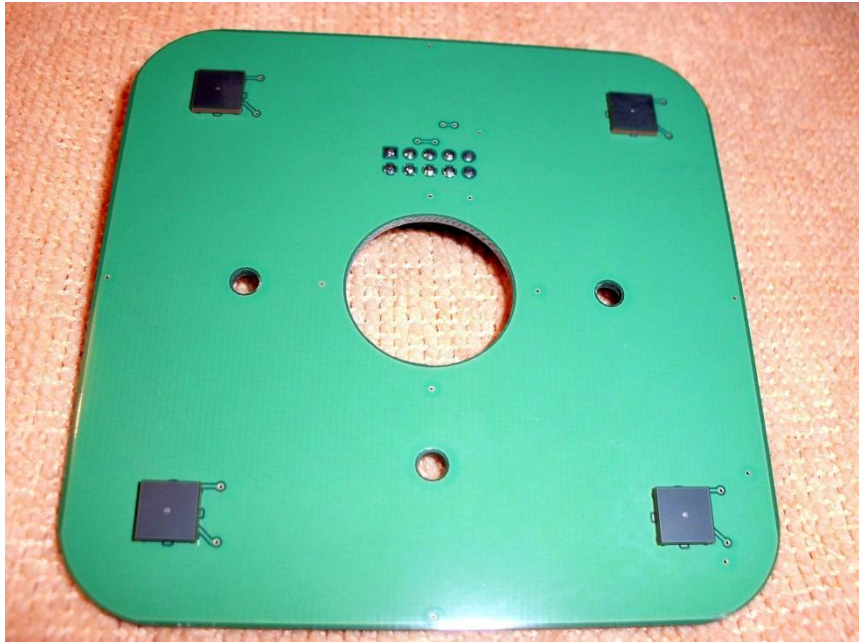
- Module consist of 4 cells 55x55x440 mm³:
 - 220 Layers Lead and Sc.
 - 1.5 mm – Scintilator
 - 0.3 mm - Lead -> 12X₀ - 220 L
 - Rm~6cm
-

Next option should be:
0.5 mm - Lead -> 18 X₀ -220 L
•40x40x440 mm³:
•Rm~3.5 cm
•Conical shape for projective
•Geometry on φ and Θ directions

36 WLS Y11(200) D=1mm
4 – bundles for SiPm 6x6 mm²;
U – shape fiber stacking



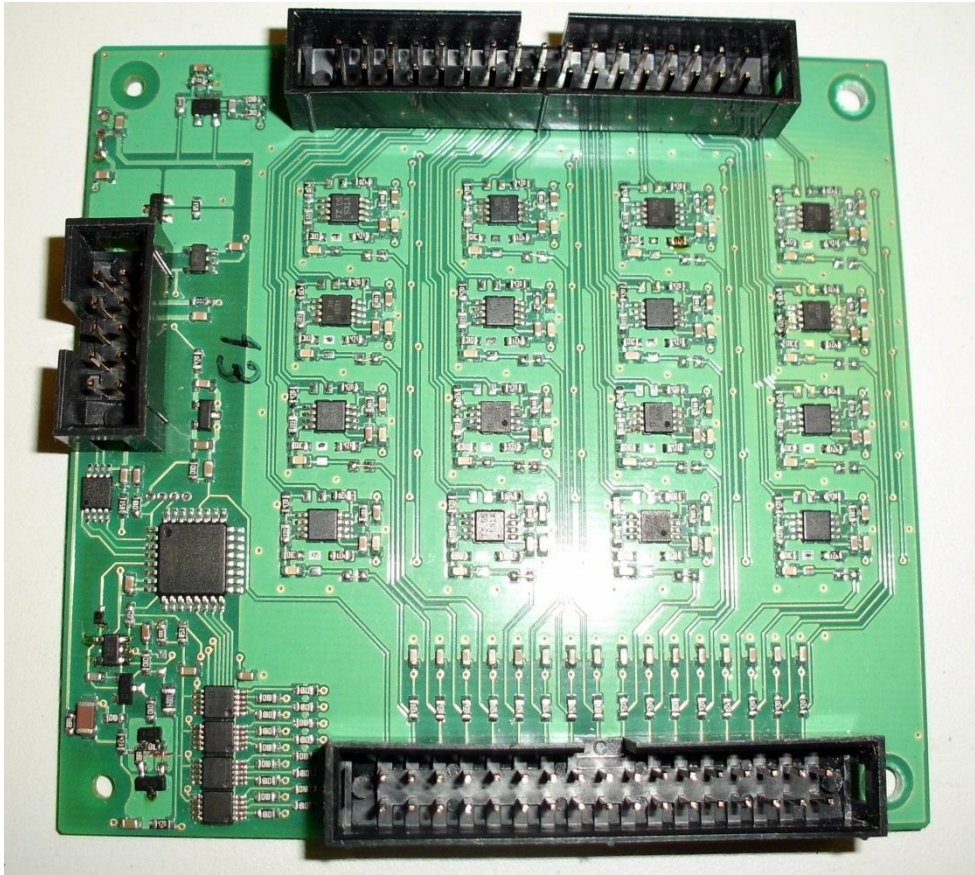
4 SiPm's head board (HB)



SiPm 6x6mm² with pixel size of 25 micron

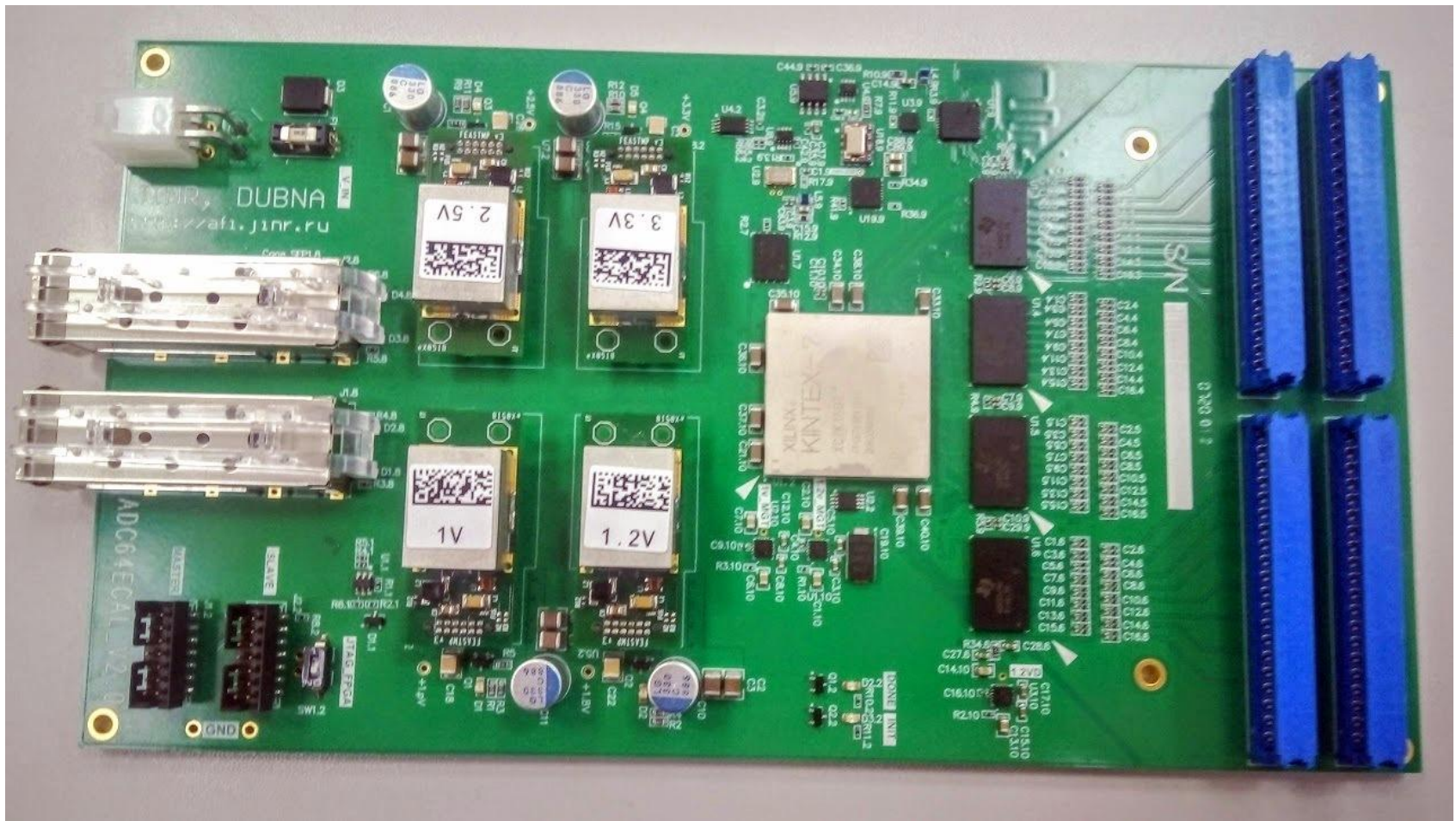


16 channels Frontend Board



- H/V control for 16 SiPm
- T-compensation (software)
- 16 amplifiers with differential output for ADC-64
- Gain $\sim 1-3$
- This FE board can be integrated in HB for 16 SiPms
- Power concept 0.020 Wt

ADC-64-ECAL modified for Air and Water cooling, can operate in Magnet. Power concept is about 60 Wt.

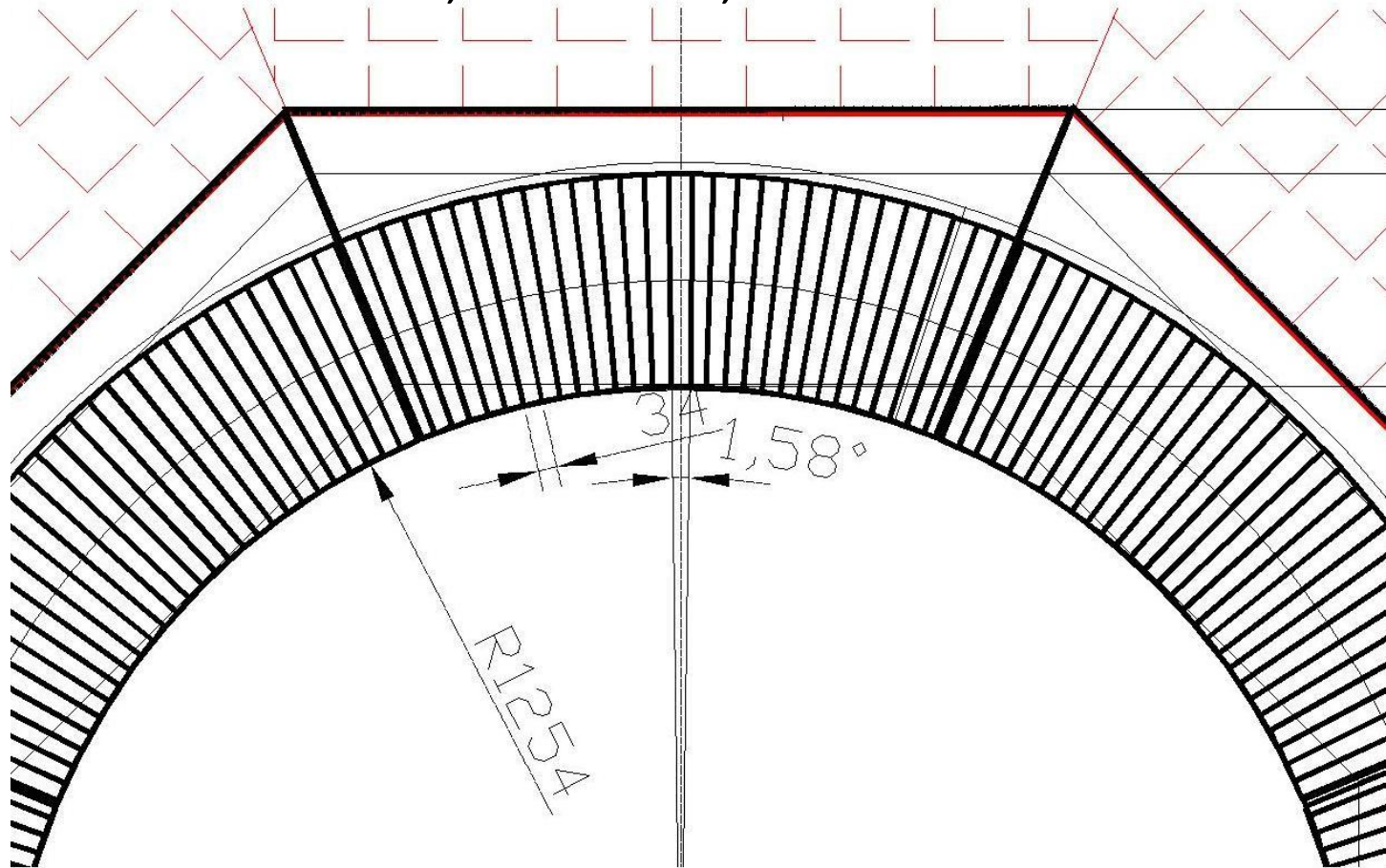


Projective geometry in φ

ECAL - 224 Sectors in 2π in φ direction

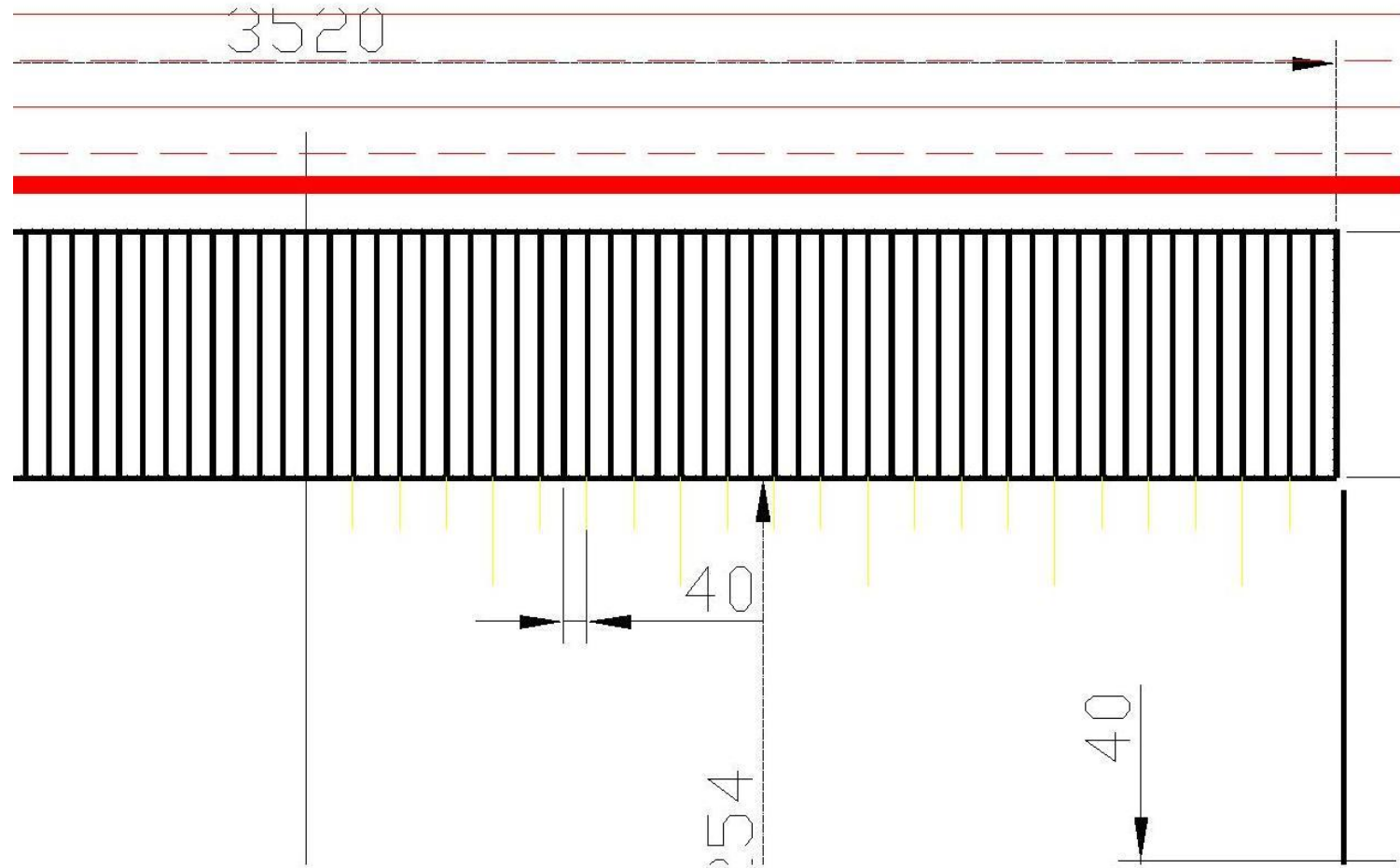
8 Gaskets (28 sectors in one Gasket, 80 Rows)

1/2 Gaskets – 40 Rows, 1120 cells, $m=2.2$ tonn



Non projective geometry in Θ direction

Barrel part – 80 cels (Θ)

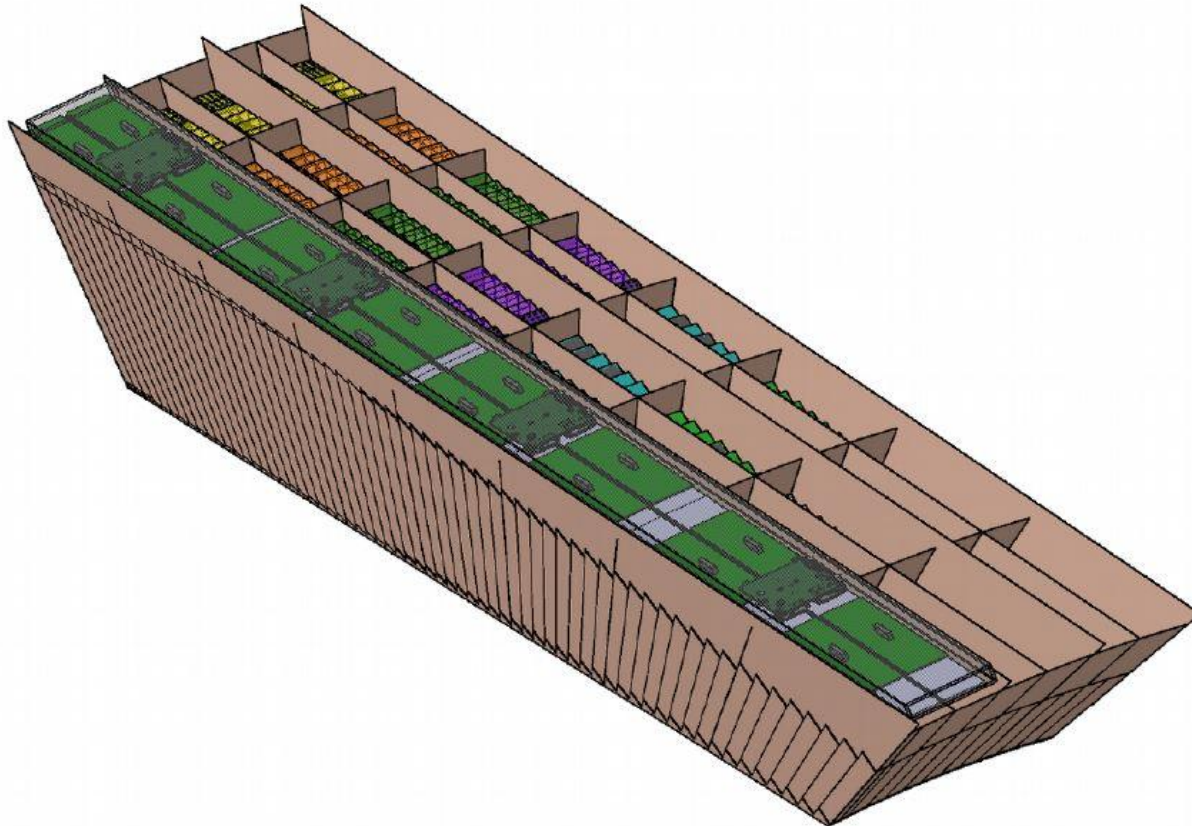


An Example of MPD:

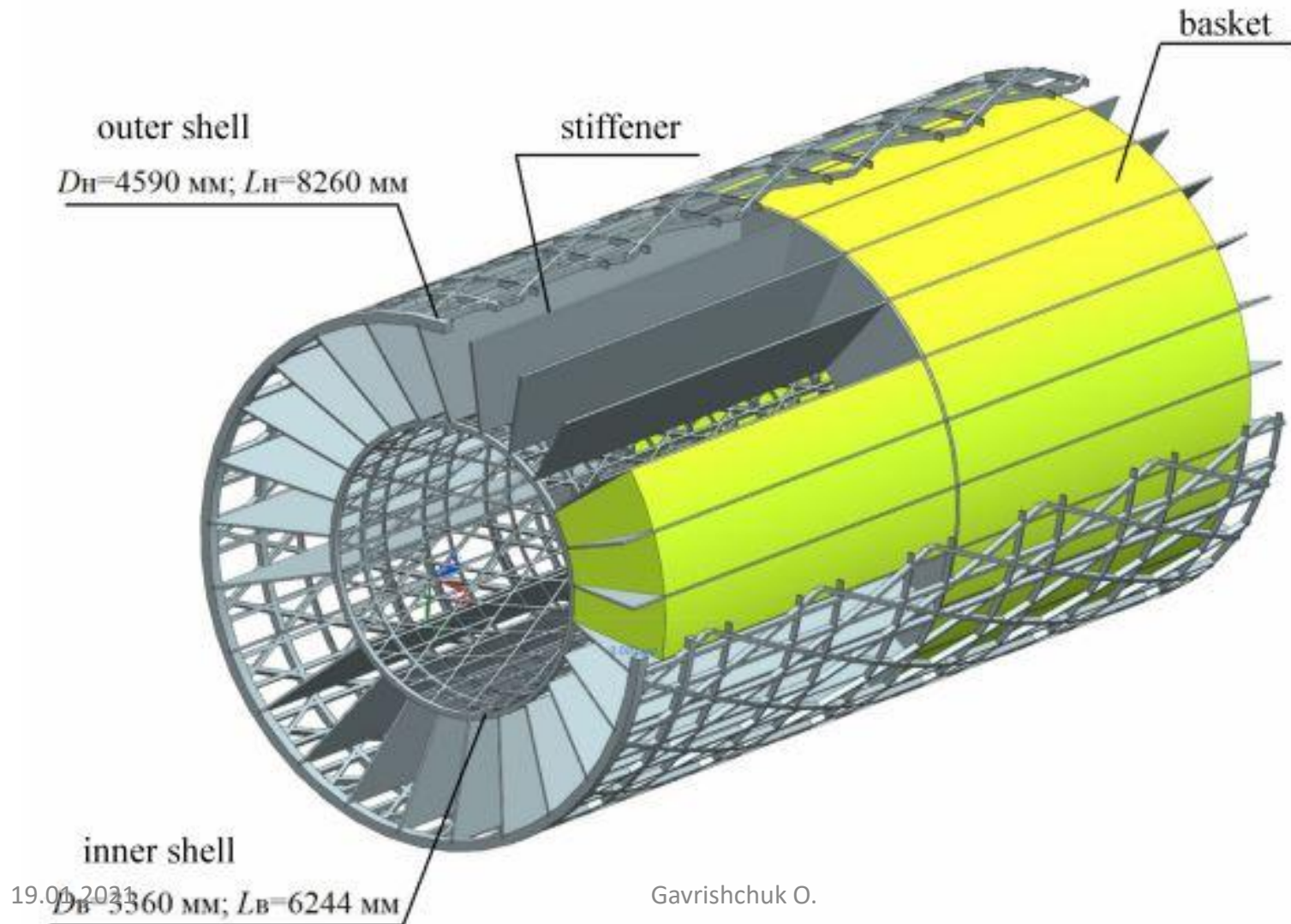
1/2 – Sector of MPD ECAL = 384 cells, $m=768$ kg

25 – Sectors in ($\varphi = 2\pi$)

N total = 1920 cells



An Example of MPD: Support frame for MPD ECAL



ECAL composition in SPD setup

Items	Barrel	End cup	Total	½ Sector	Power (kWt)
N cells	17920	5232*2=10464	28 384	1120	31
Frontend	1120	654	1774	70	1
ADC64	280	163.5	443.5	17.5	30
Weight (ton)	36	22	58	2.3	