

Beam smearing and ECAL1 description

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Beam smearing treatment

- What do we want to smear? Only beam energy? Or beam momentum? for the later case, where?
- Do we want to keep the track/hit information from the smeared beam as well?

ECAL1 z-position of modules

Module	Tech. note		detectors.dat	
	Length (cm)	PMT (cm)	Length (cm)	z-position (cm)
Olga	47.0	10.0	57.0	6.0 (1.0?)
Mainz	36.0	2.6	38.6	-3.2 (-4.5?)
GAMs	45.0	??	45.0	0.0 (OK?)
Shashlik	45.0	??	39.35	-2.825 (0.0?)

Sometimes, the size of the PMT seems to be included in the length of the active volume, sometimes not

Shashlik modules are smaller in detects.dat compared to the document I received, is the PMT length already included in the 45.0 cm?

ECAL1 transverse size and pitch: Olga

Active volume: $14 \times 14 \text{ cm}^2$

Al mylar film: $50 \mu\text{m}$ thick

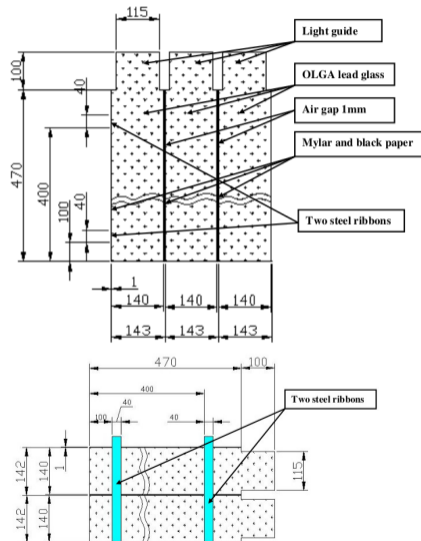
Black paper: 1 mm thick

Air gap in X: 1 mm with 0.1 mm Fe ribbons

Size = $14.21 \times 14.21 \text{ cm}^2$ ($14.3 \times 14.3 \text{ cm}^2$)

PitchX = 14.30 cm (14.3 cm)

PitchY = 14.21 cm (14.3 cm)



ECAL1 transverse size and pitch: Mainz

Active volume: $7.5 \times 7.5 \text{ cm}^2$

Al mylar film: $25 \mu\text{m}$ thick

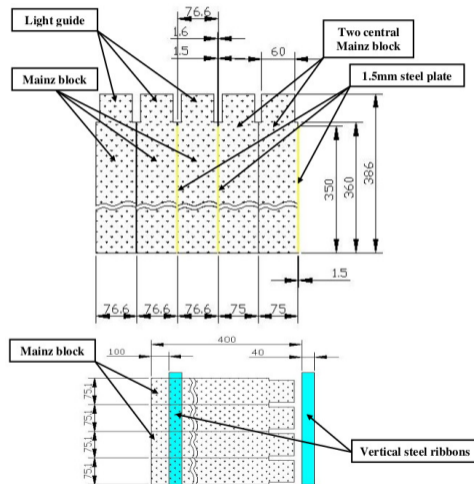
Air gap in X: 1.6 mm with 0.1 mm Fe ribbons

Size = $7.505 \times 7.505 \text{ cm}^2$ ($7.500 \times 7.500 \text{ cm}^2$)

PitchX = 7.66 cm (7.66 cm)

except for two central columns

PitchY = 7.505 cm (7.500 cm)



ECAL1 transverse size and pitch: GAMs

Active volume: $3.8 \times 3.8 \text{ cm}^2$

Al mylar film: $50 \mu\text{m}$ thick

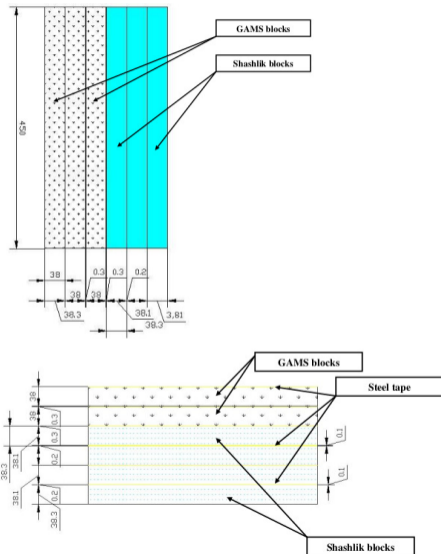
Air gap in X: 0.1 mm with 0.1 mm Fe ribbons every other gap

Fe ($3.4 \times 39 \text{ cm}^2$) tape on top: 0.1 mm

Size = $3.81 \times 3.81 \text{ cm}^2$ ($3.82 \times 3.82 \text{ cm}^2$)

PitchX = 3.83 cm from ribbons, (3.83 cm)

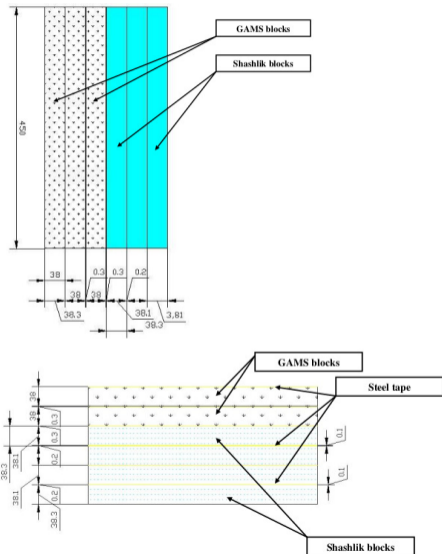
PitchY = 3.82 cm (3.83 cm)



ECAL1 transverse size and pitch: Shashlik

Active volume: $3.81 \times 3.81 \text{ cm}^2$
No Al mylar film (or already included)
Air gap in X: 0.1 mm with 0.1 mm Fe ribbons every other gap
Fe ($3.4 \times 39 \text{ cm}^2$) tape on top: 0.1 mm

Size = $3.81 \times 3.81 \text{ cm}^2$ ($3.82 \times 3.82 \text{ cm}^2$)
PitchX = 3.83 cm from ribbons, (3.83 cm)
PitchY = 3.82 cm (3.83 cm)



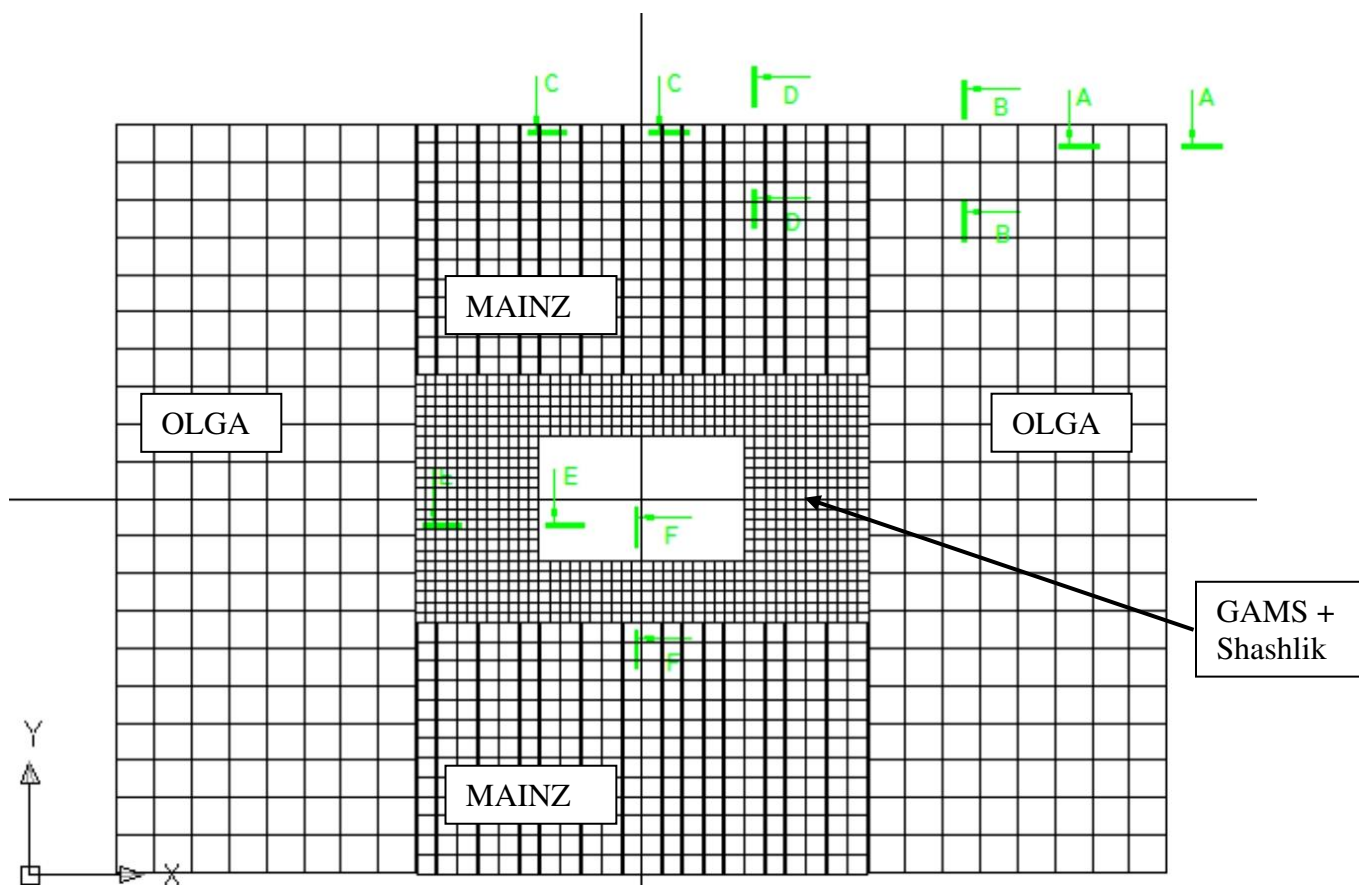
Additional questions:

- What happen in clustering if two cells are overlapping
- Noisy cells, For clustering can we have a threshold cell/cell?

BACKUP

ECAL1 in 2012

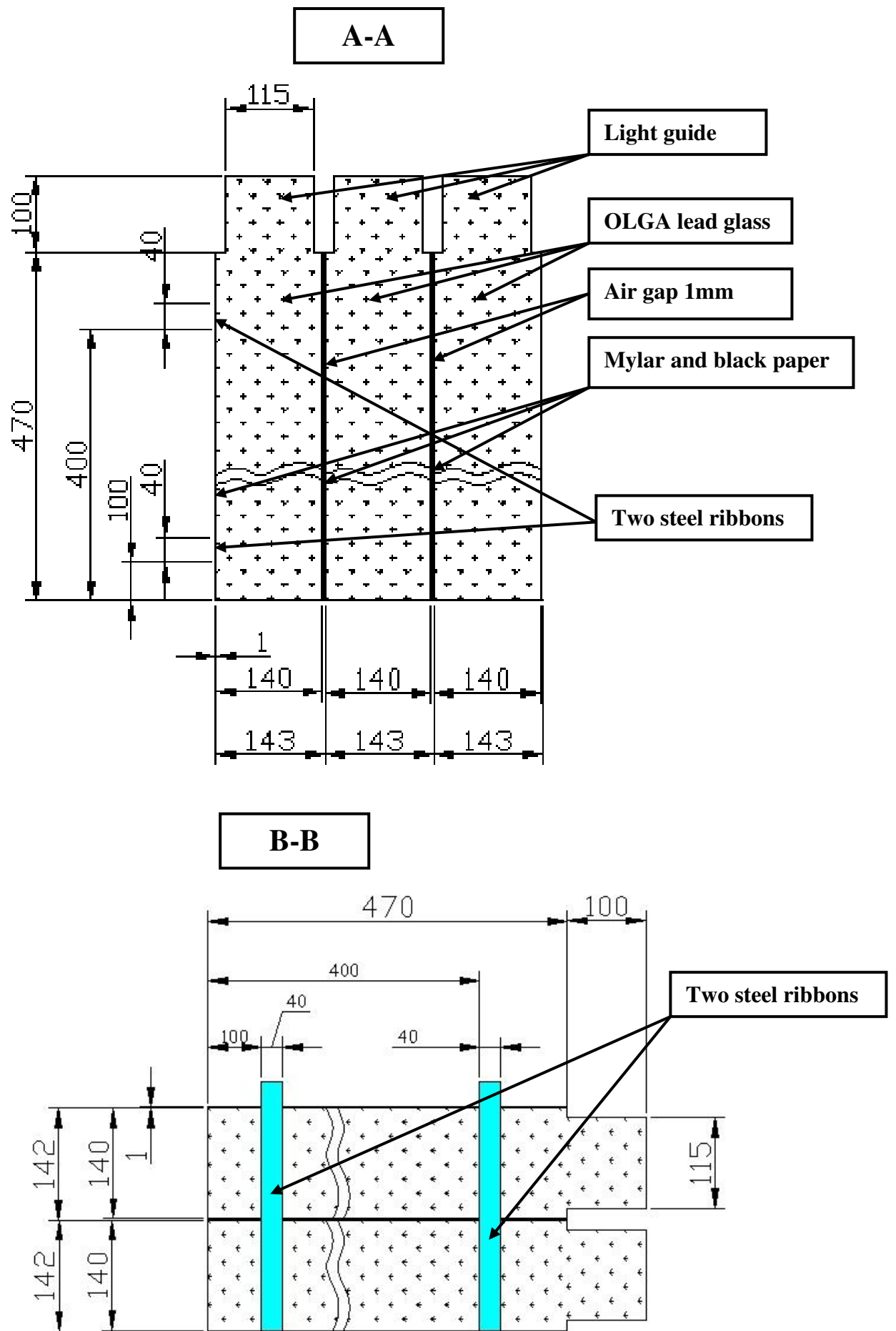
The ECAL1 consist of 4 different types of blocks: OLGA, Mainz, GAMS and Shashlik.



The center of ECAL1 cassette has coordinate X=0 and Y=0.

The OLGA blocks are placed on periphery of ECAL1 cassette. It's a two matrix 8x20 blocks, which occupy Jura and Saleve side of cassette. The position of Saleve matrix of OLGA blocks along horizontal axes is from $X = -1986.5\text{mm}$ to $X = -842.5\text{mm}$. The position of Jura matrix of OLGA blocks along horizontal axis is from $X = +842.5\text{mm}$ to $X = -1986.5\text{mm}$. The position Jura and Saleve matrixes along vertical axis is from $Y = -1420\text{mm}$ to $Y = +1420\text{mm}$. The detail dimension of OLGA blocks are shown in horizontal A-A and vertical sections B-B.

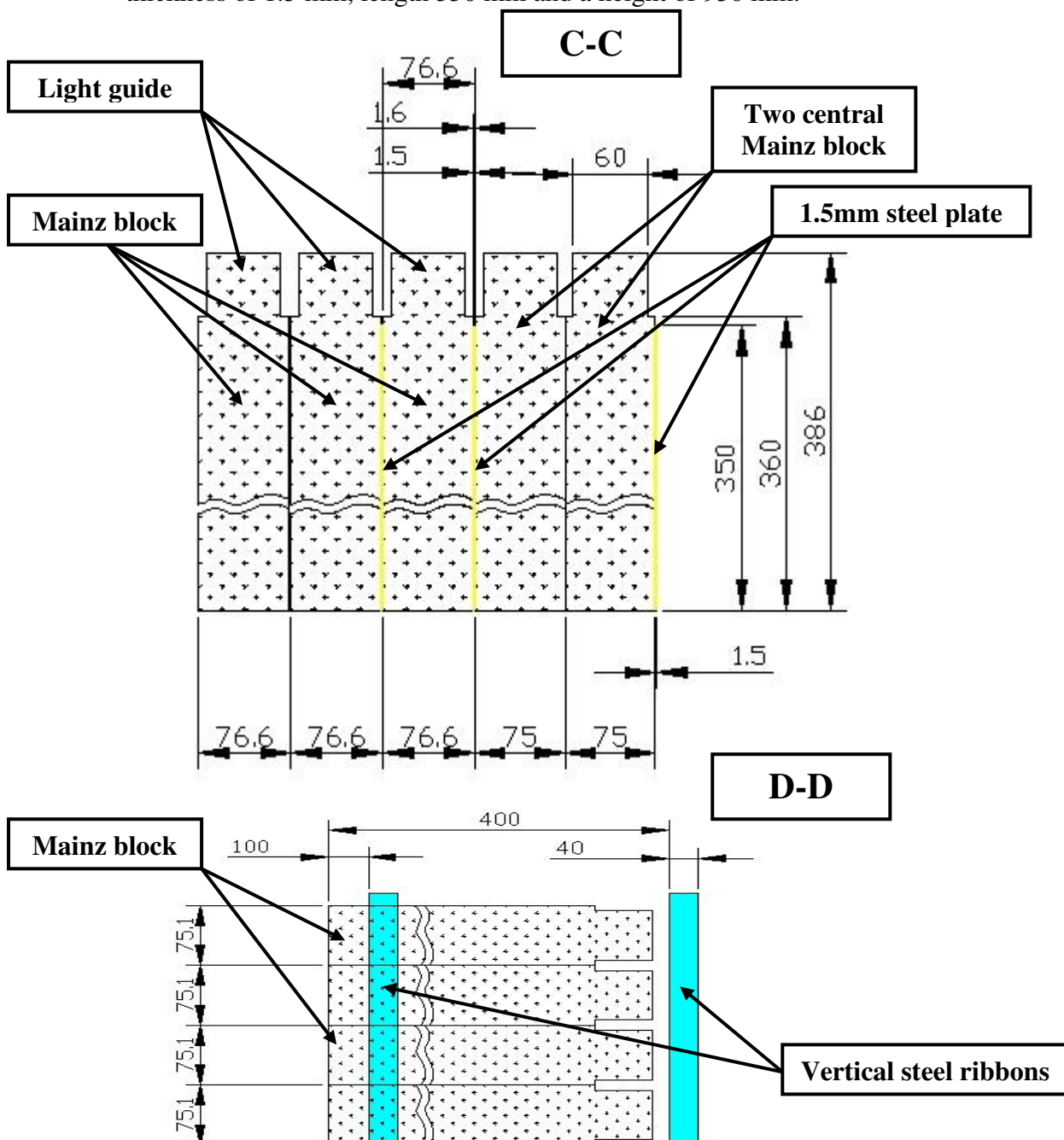
Olga lead glass block has the shape of a parallelepiped with dimensions $140 \times 140 \text{ mm}^2$ and a length of 470 mm. A light guide from lead glass, with a diameter of 115 mm and 100 mm in length, is glued to the back of OLGA lead glass. Lead glass blocks wrapped in aluminized Mylar film thickness $50 \mu\text{m}$. On top of the Mylar OLGA blocks wrapped black 1 mm thick paper. There are 1 mm air vertical gap between Olga blocks, two vertical steel ribbons thickness $100 \mu\text{m}$ are placed in this air gap. The distance between adjacent vertical steel ribbons is 143 mm.



Mainz part consist of two matrix, which are placed bottom and top with respect to central hole. The each matrix has 22x13 blocks. The position of top and bottom matrixes of Mainz

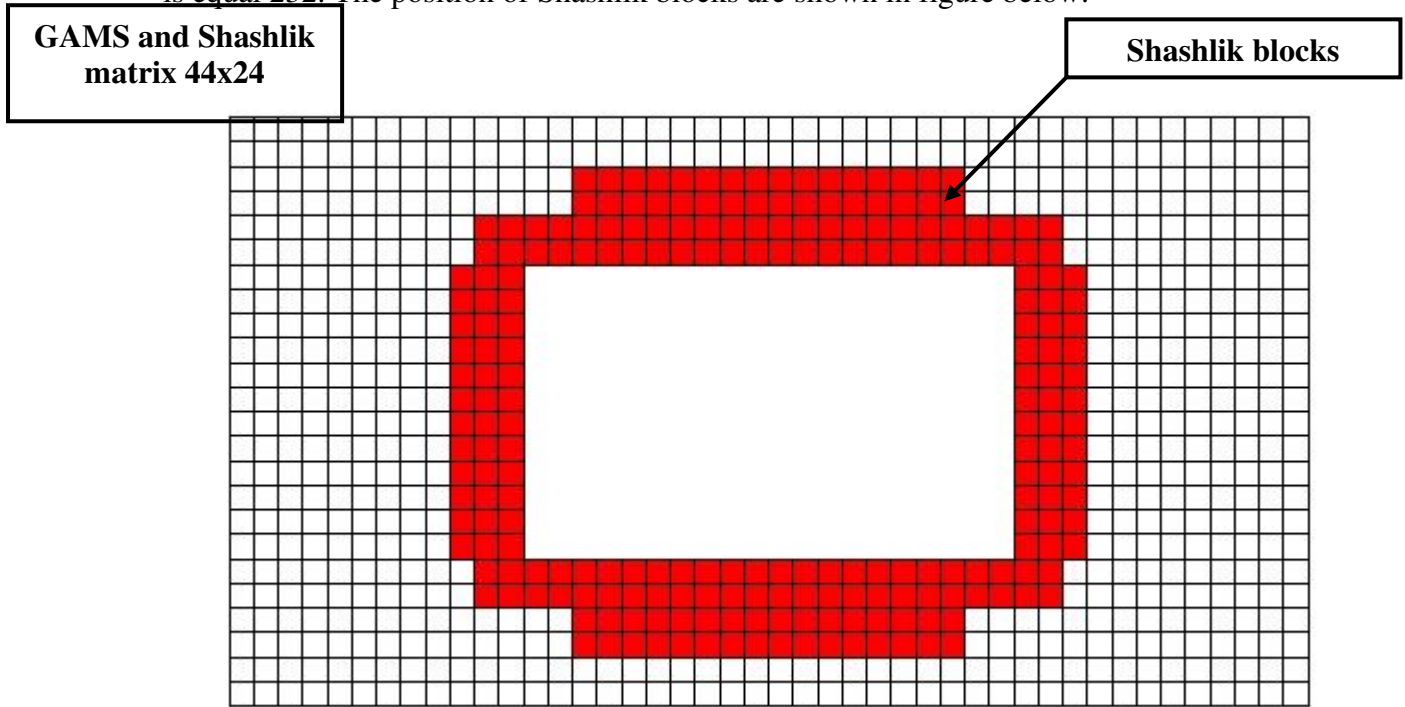
blocks along horizontal axes is from $X = -842.5$ mm to $X = +842.5$ mm. The position of bottom matrix of Mainz blocks along vertical axis is from $Y = -1436$ mm to $Y = -460$ mm. The position of top matrix of Mainz blocks along vertical axis is from $Y = +460$ mm to $Y = +1436$ mm. The detail dimension of Mainz blocks are shown in horizontal C-C and vertical sections D-D.

Mainz lead glass block has the shape of a parallelepiped with dimensions 75×75 mm² and a length of 360 mm. A light guide from lead glass, with a diameter of 60 mm and 26 mm in length, is glued to the back of Mainz lead glass. Lead glass blocks wrapped in aluminized Mylar film thickness 25 μ m. There are 1.6 mm vertical gap between Mainz blocks, excluding gap between two central columns of blocks where is gap only 100 μ m. Two vertical steel ribbons with thickness 100 μ m are placed in this gap. The distance between adjacent vertical steel ribbons is 76.6 mm. The position of steel ribbon inside this gap along block axes absolutely the same as in OLGA part. Vertical gaps between columns Mainz blocks are empty and filled the air, with the exception of four gap close to the centre, where installed vertical steel plate thickness of 1.5 mm, length 350 mm and a height of 950 mm.



ECAL1 central hole was modified in December 2011; present size of central hole is 20x12 Shashlik blocks or $766 \times 459.6 \text{ mm}^2$. The inner frame was produced from stainless steel 8mm thickness. The internal size of the frame is equal $750 \times 443.6 \text{ mm}^{**2}$, external size - $766 \times 459.6 \text{ mm}^2$.

Two types of blocks are placed around central hole, it is a GAMS and Shashlik blocks. Shashlik and GAMS blocks have roughly the same size and therefore are united into a single matrix size 44x24 blocks. Shashlik blocks are placed around central hole, total amount of blocks is equal 232. The position of Shashlik blocks are shown in figure below.

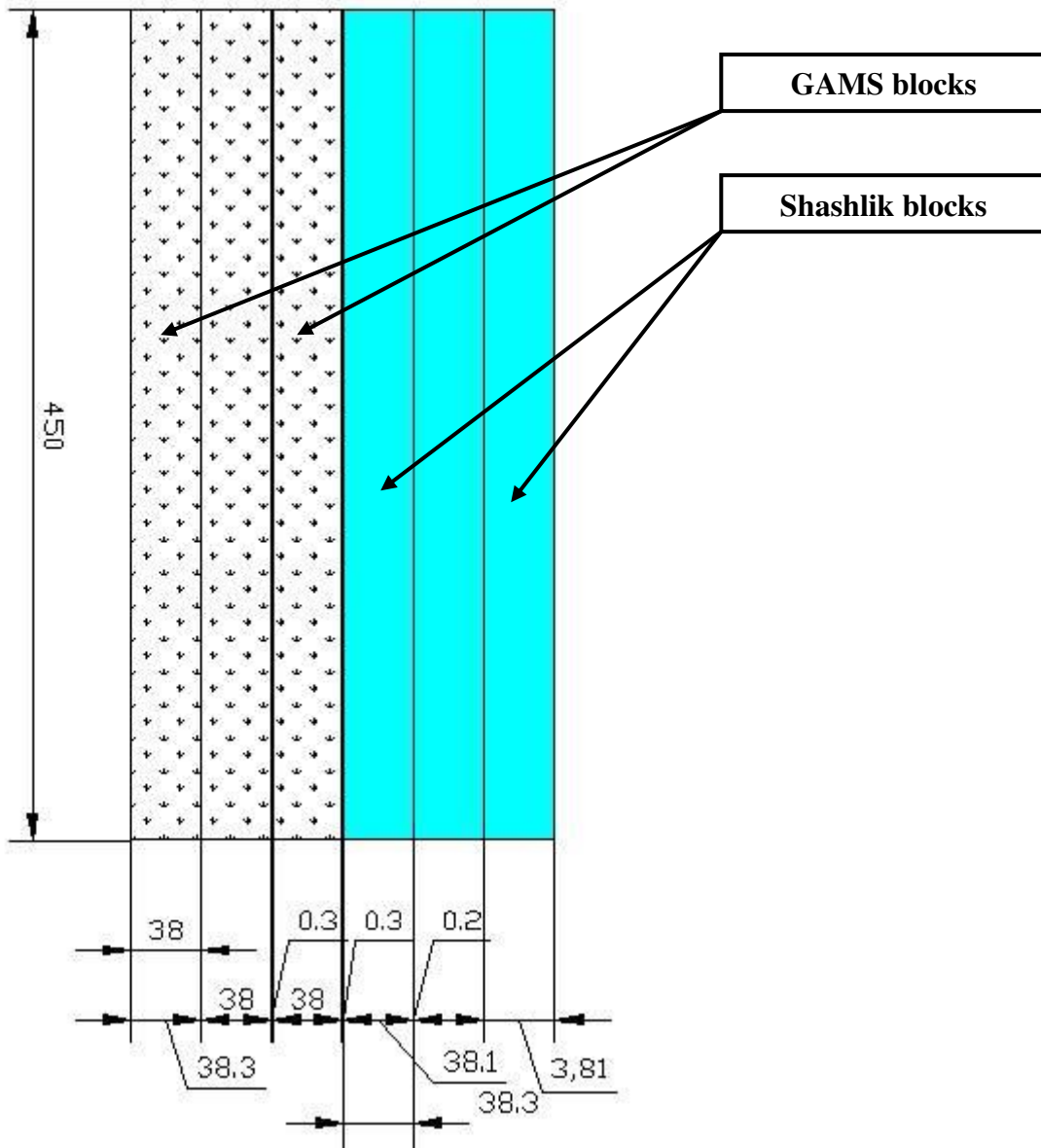


The position of GAMS and Shashlik matrix along horizontal axes is from $X = -842.5 \text{ mm}$ to $X = +842.5 \text{ mm}$. The position of GAMS and Shashlik matrix along vertical axis is from $Y = -460 \text{ mm}$ to $Y = +460 \text{ mm}$. The detail dimension of GAMS and Shashlik blocks are shown in horizontal E-E and vertical sections F-F.

GAMS lead glass block has the shape of a parallelepiped with dimensions $38 \times 38 \text{ mm}^2$ and a length of 450 mm. GAMS blocks wrapped in aluminized Mylar film thickness $50 \mu\text{m}$. There are $100 \mu\text{m}$ vertical gaps between GAMS blocks. Two vertical steel ribbons with thickness $100 \mu\text{m}$ are placed in each even gap. The distance between adjacent vertical steel ribbons is 76.6 mm. The position of steel ribbon inside this gap along block axes absolutely the same as in Mainz parts.

Shashlik block is sandwich type calorimeter. This block has the shape of a parallelepiped with dimensions $38.1 \times 38.1 \text{ mm}^2$ and a length of 450 mm. Steel tape placed on top of each blocks GAMS and Shashlik. Tape size is $34 \times 390 \text{ mm}^2$ and the thickness of $100 \mu\text{m}$.

E - E



F - F

