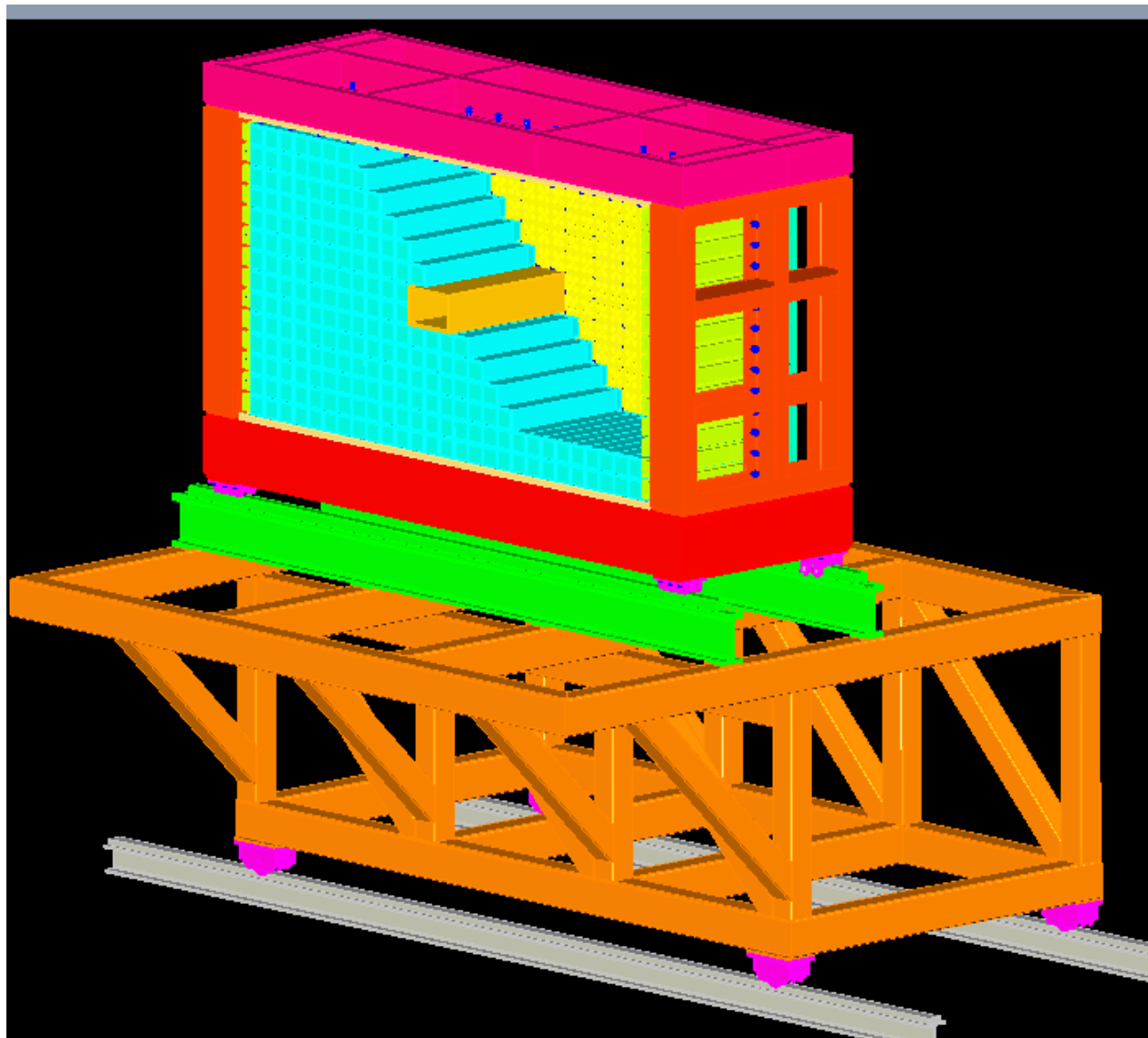


# IHEP group *Shashlyk* activity towards TDR

Pavel Semenov IHEP, Protvino  
on behalf of the IHEP PANDA group

PANDA collaboration meeting, GSI  
2-6 March 2009

- Mechanical design of the calorimeter
- **Assembling and maintenance**
- MC simulations
- Last run results



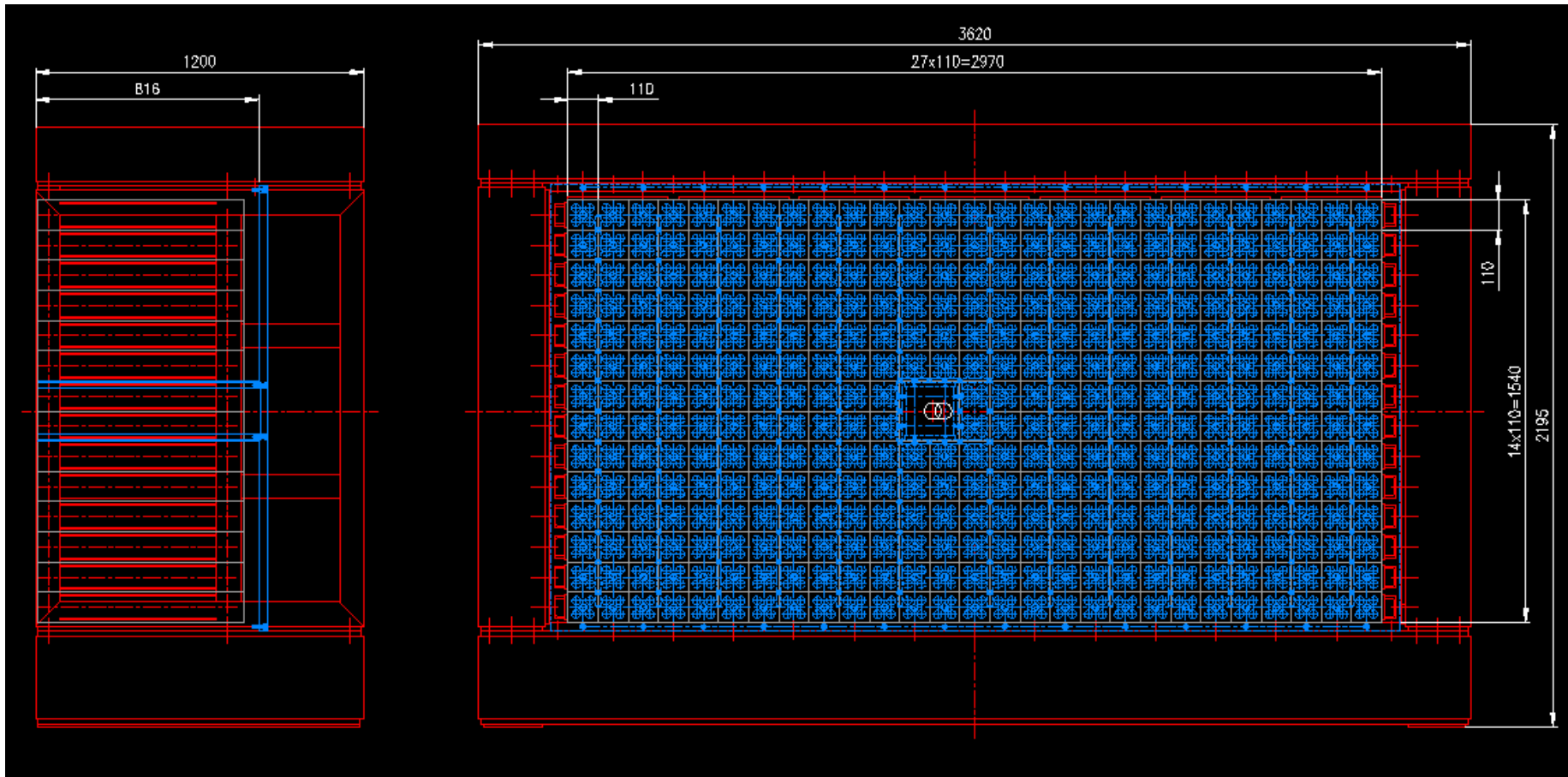
27x14 modules  
(4cells each)

Massive closed frame

Back plate to fix modules  
in Z direction  
(modules position from  
one side and  
photodetectors from the  
other side of the plate )

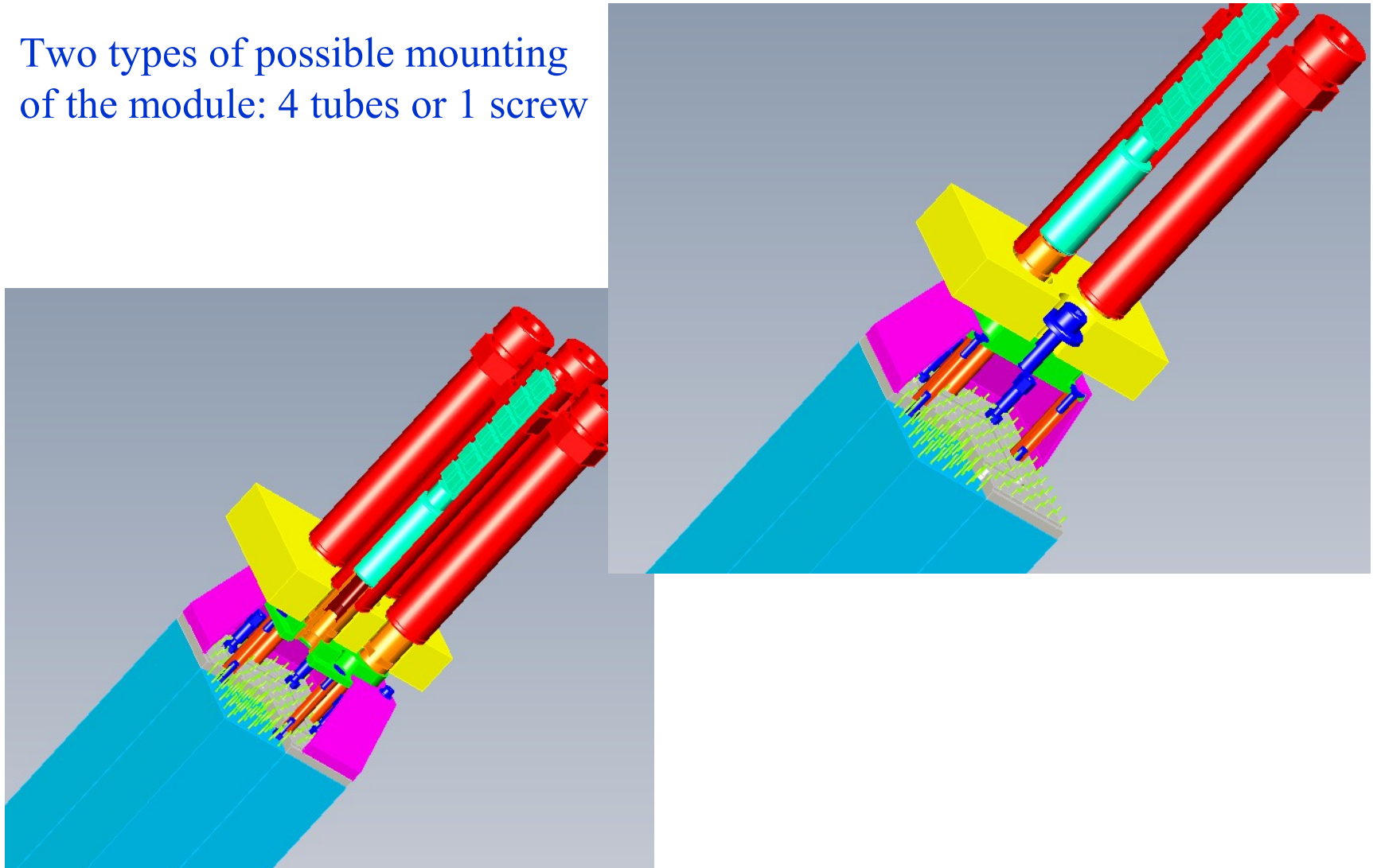
Accelerator pipe hole  
(2x2 modules) shifted  
from the center

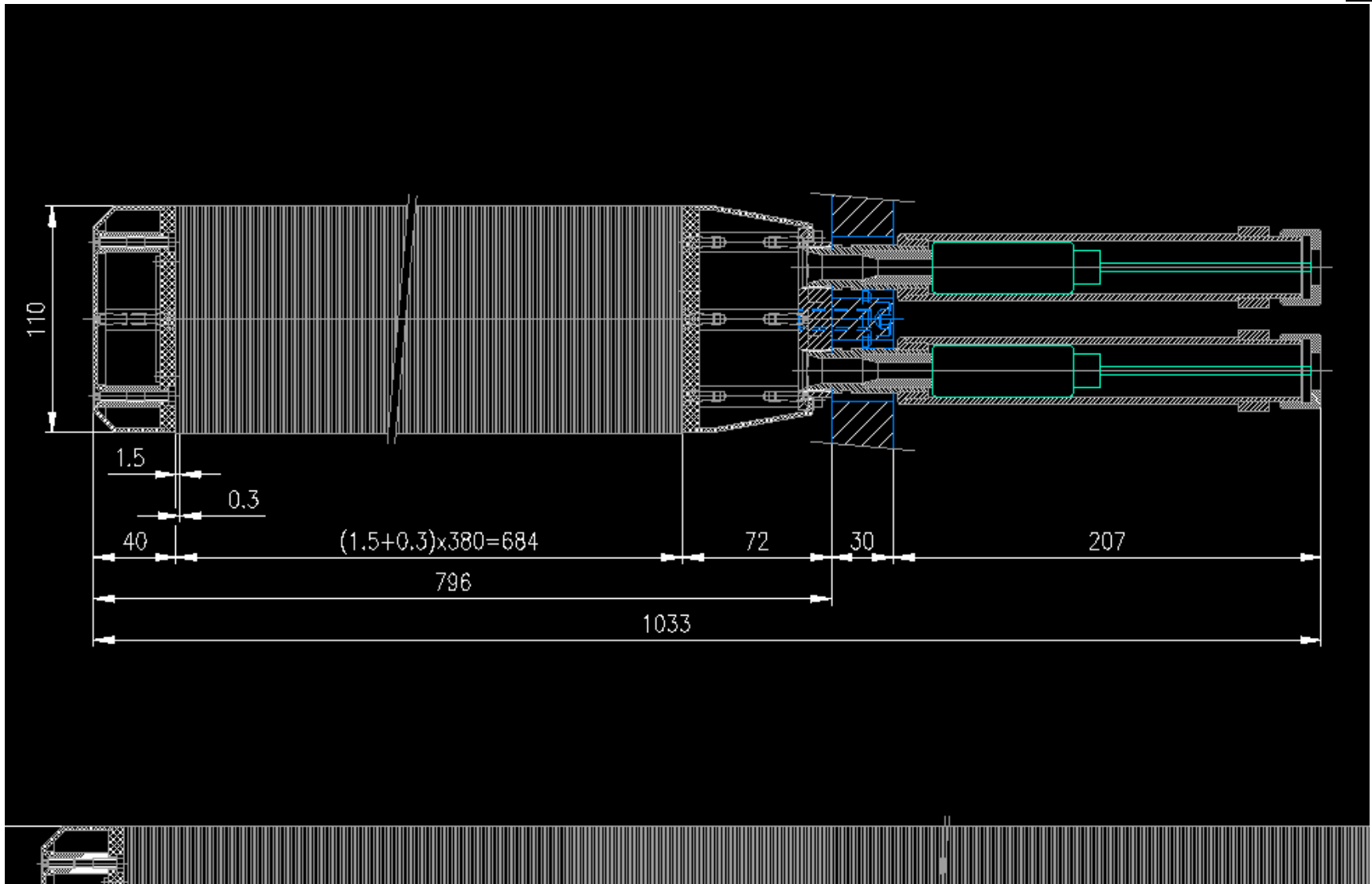
Dedicated rail system  
for maintenance procedure

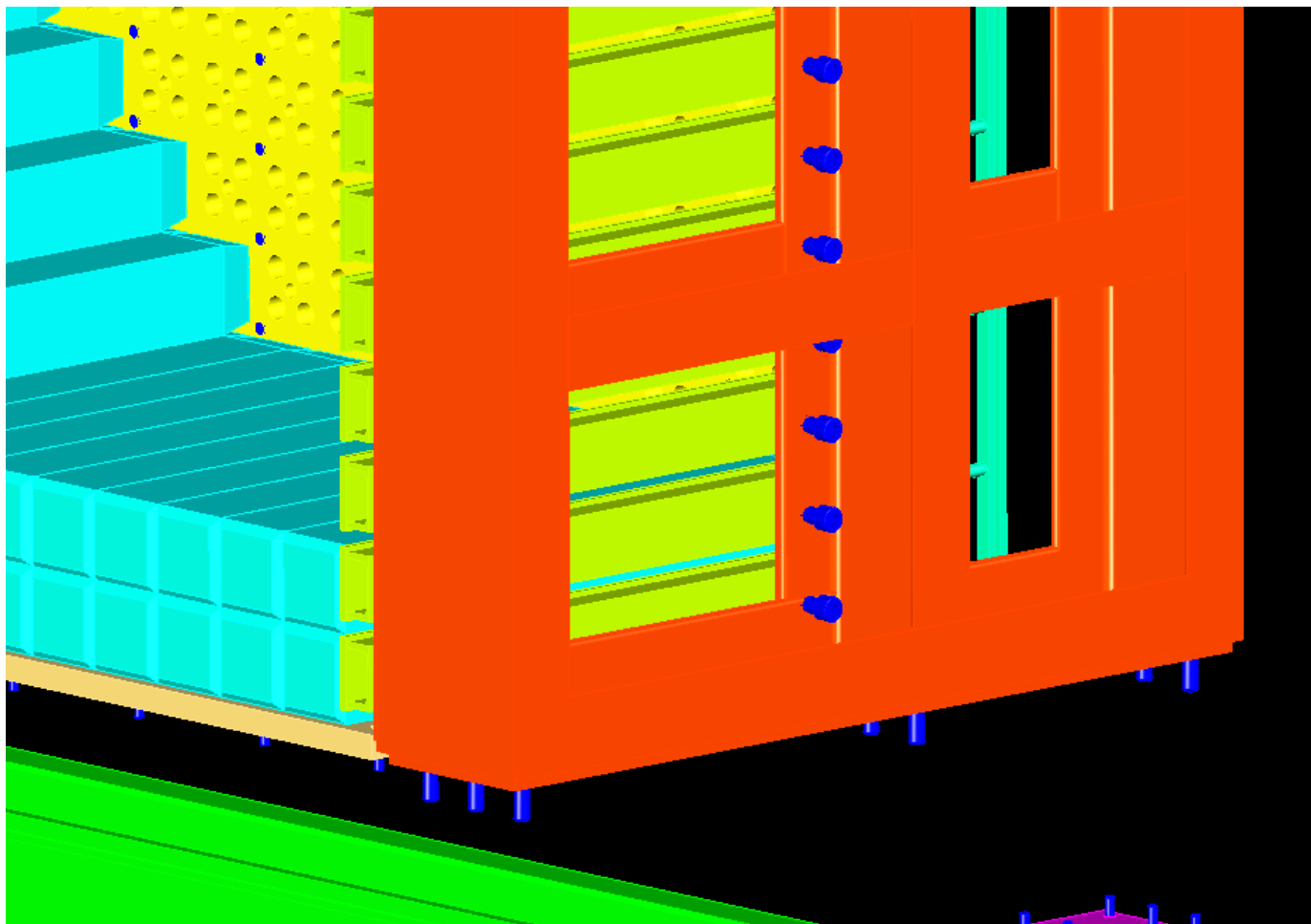


Active zone 2970x1540 mm<sup>2</sup>

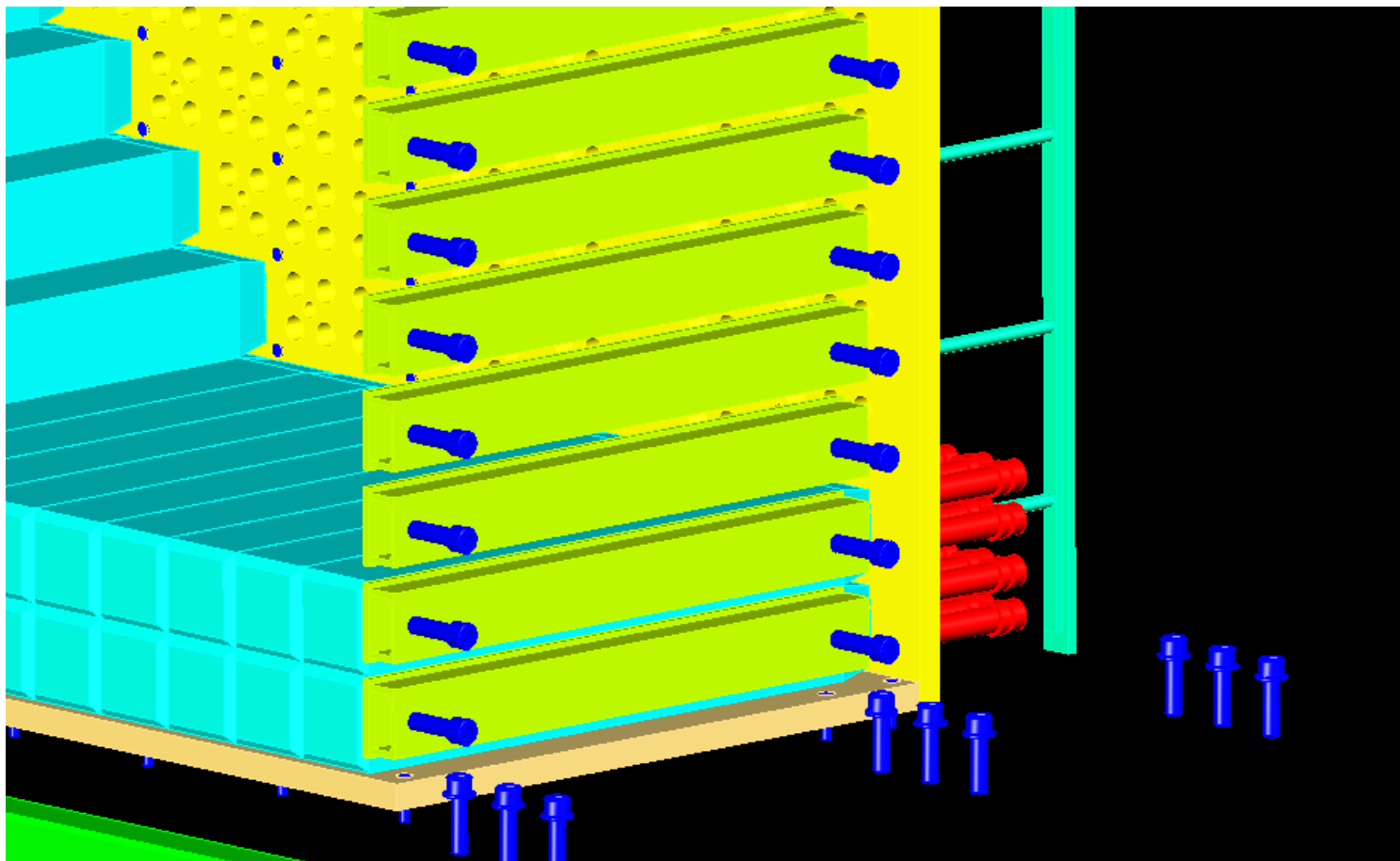
Two types of possible mounting of the module: 4 tubes or 1 screw





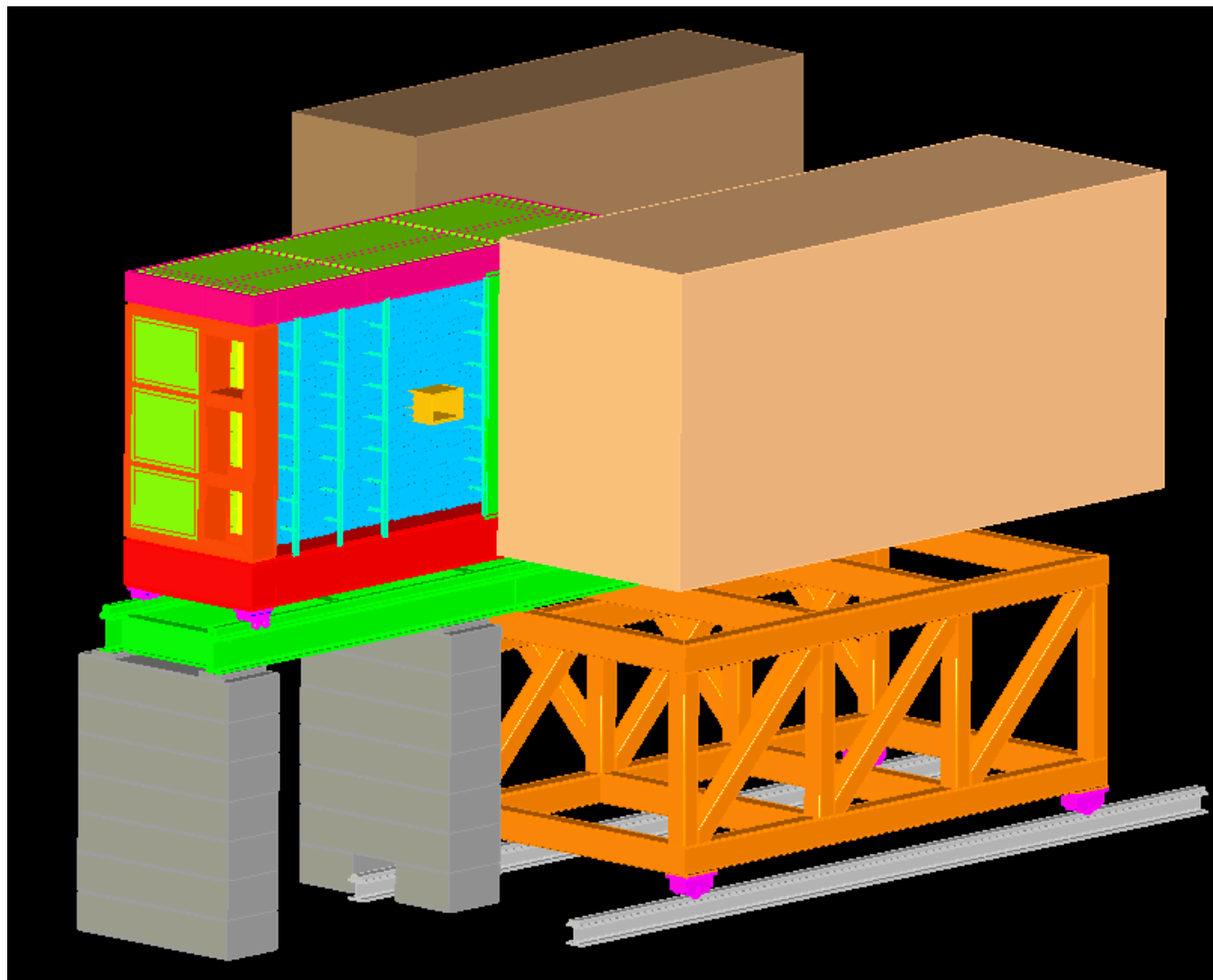


Modules installation:  
layer by layer,  
positioning each  
module according to  
the back plate holes



Press bars to minimize the gap between modules and fix positions

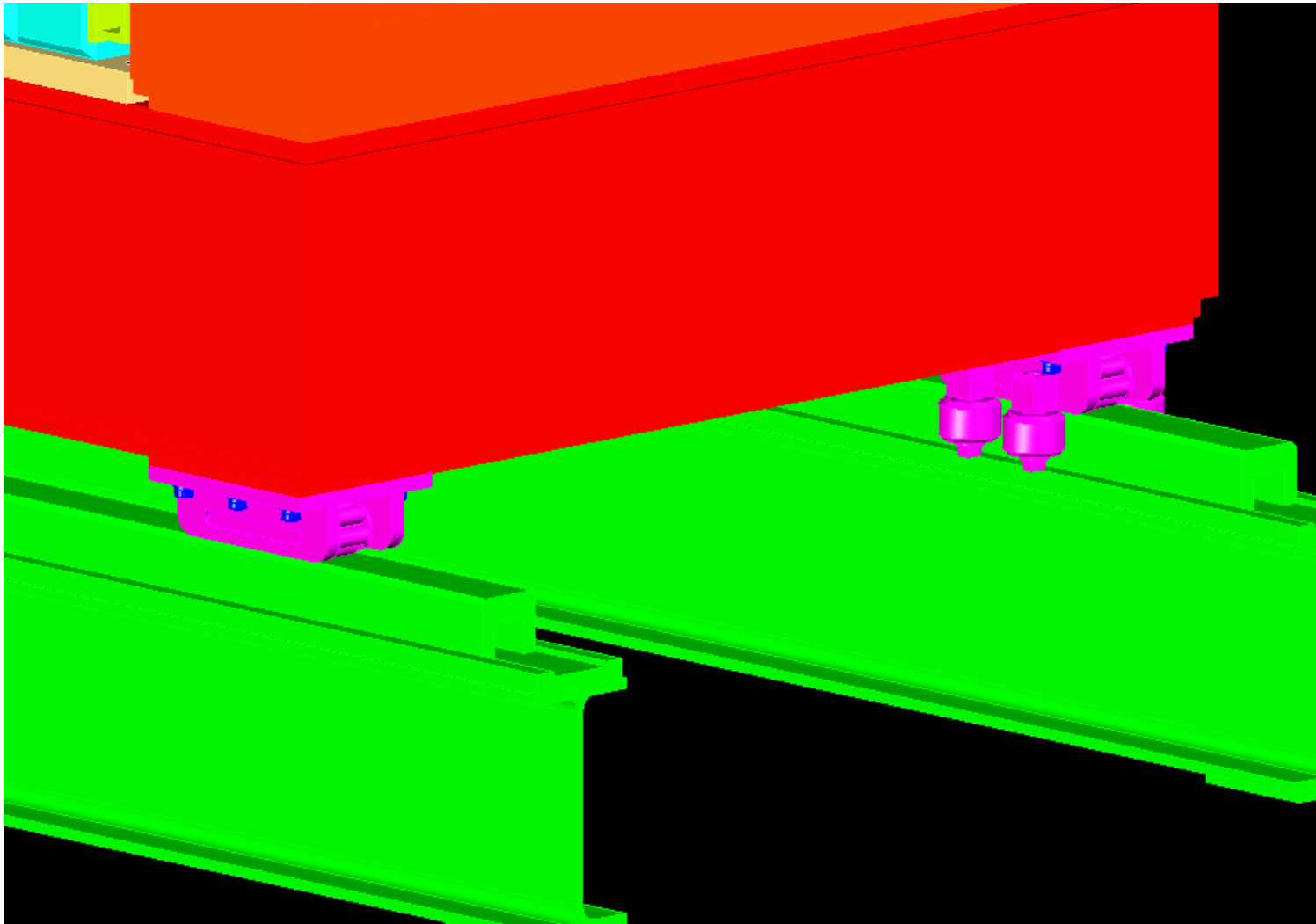


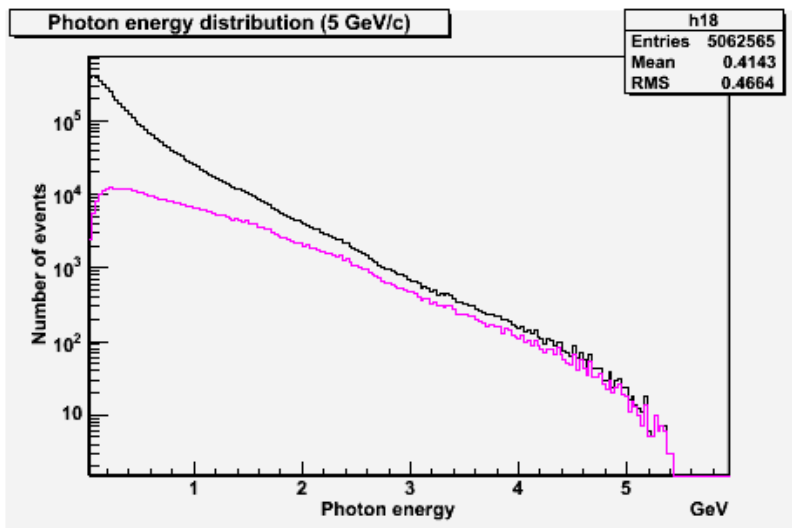


To provide a possibility of Shashlyk maintenance  
A dedicated extensible rail system is proposed.

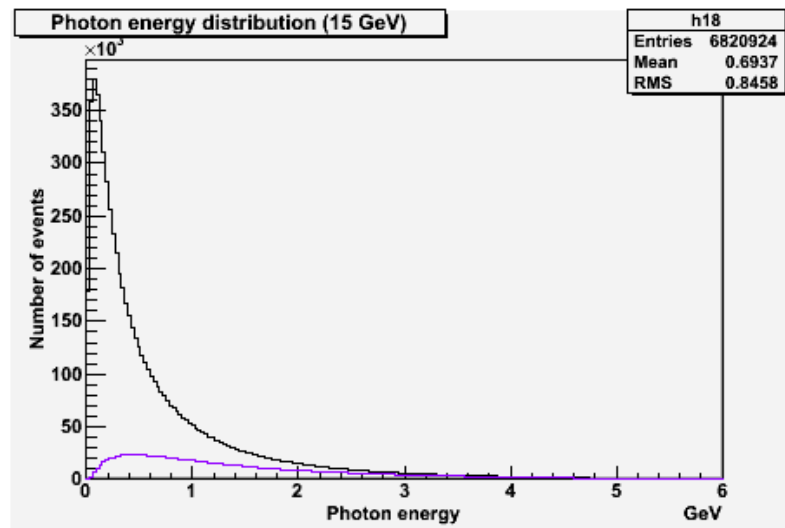
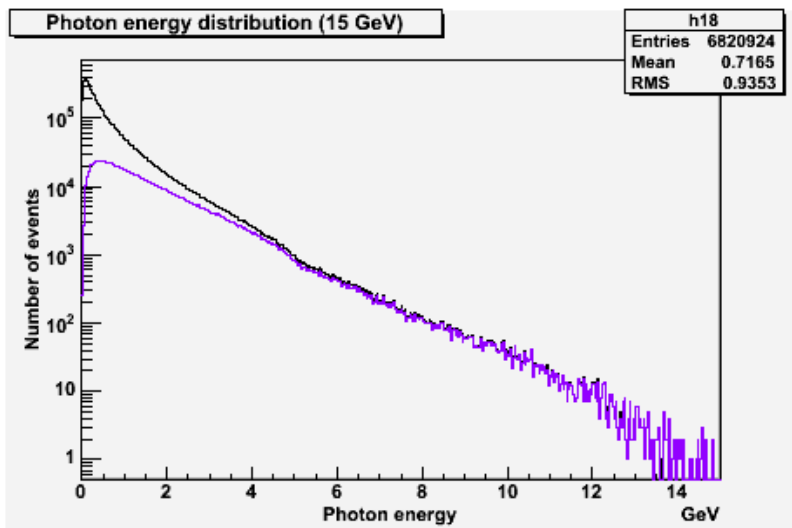
Calorimeter can be shifted out to the left or the right side of the Forward Spectrometer.

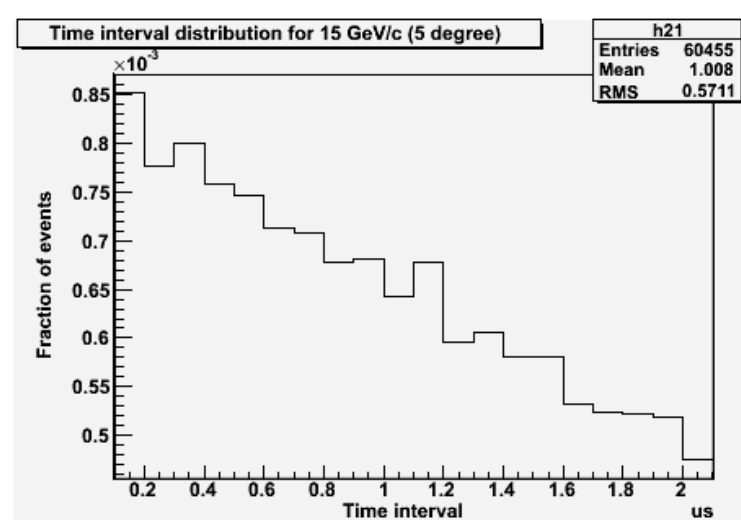
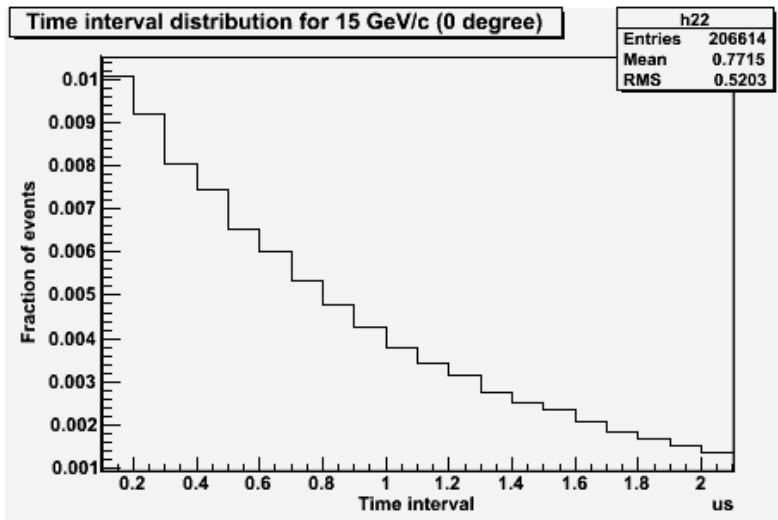
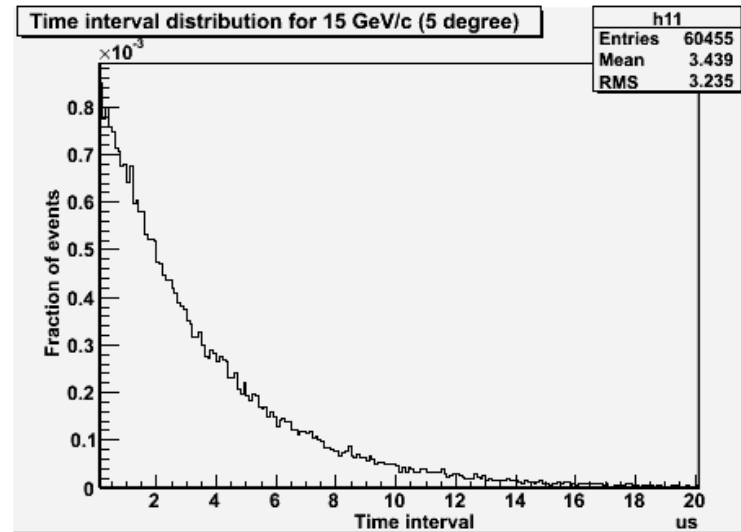
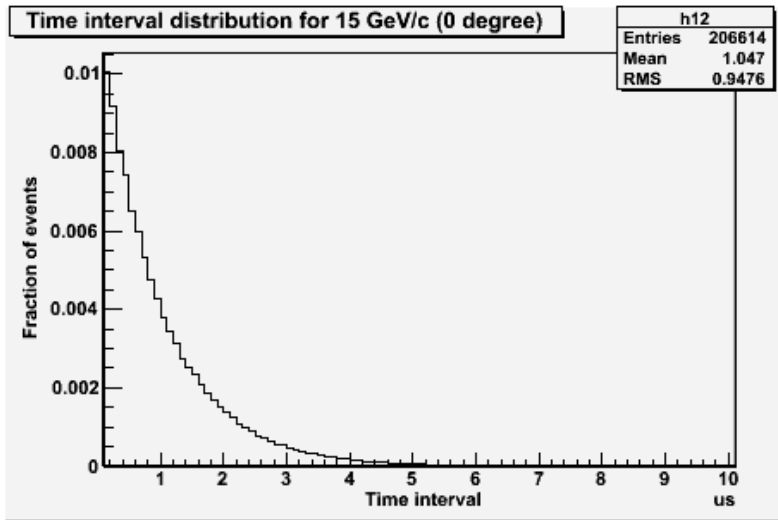
At the working position it fixed by lock pins with high precision





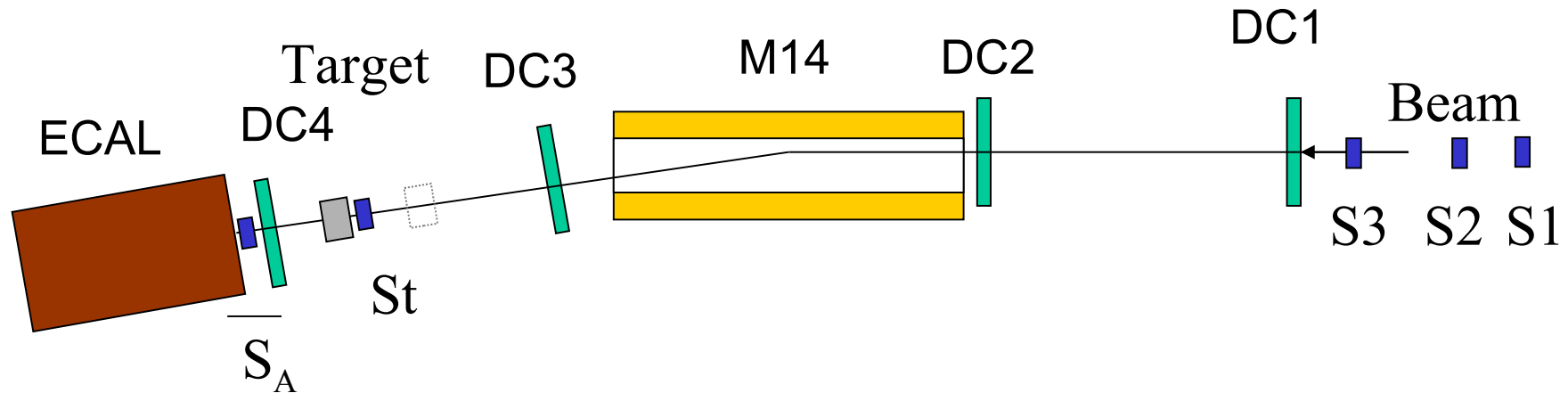
All photons energy (upper curve) over photons at the Shashlyk aperture (color curves)



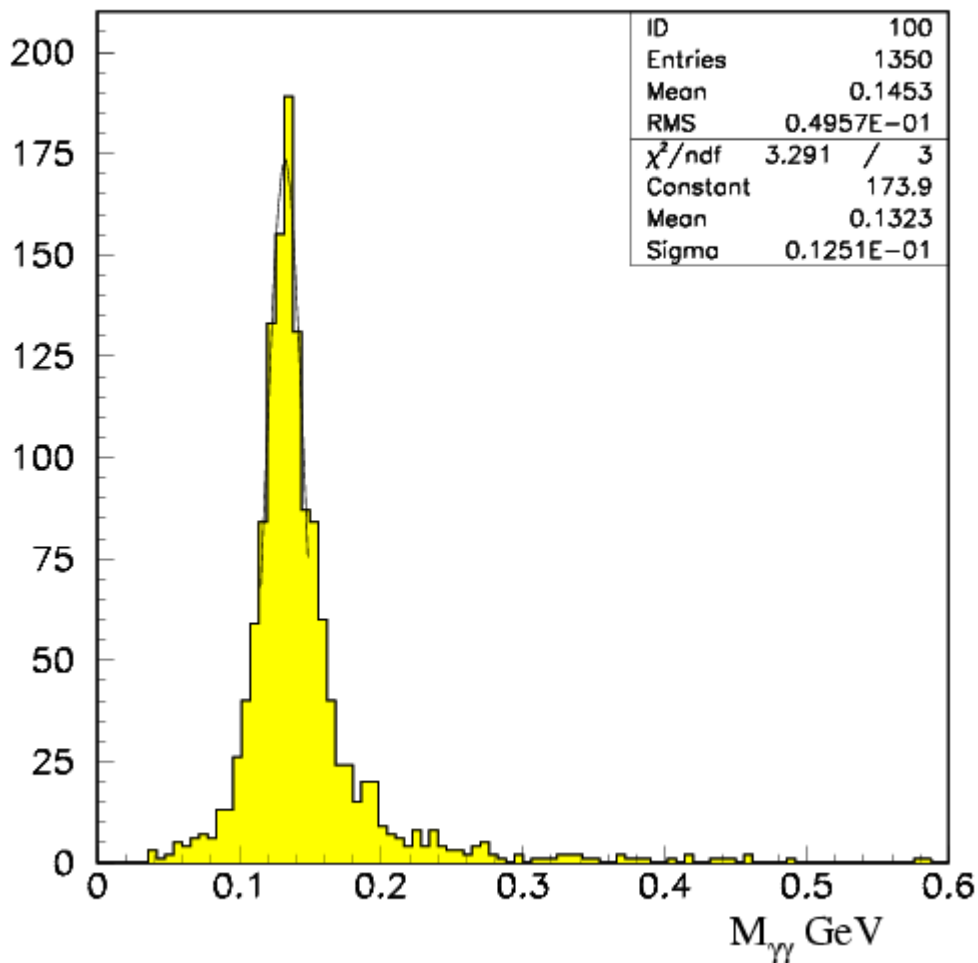


**Near pipe**

**Detector vertical edge**



- Spectrometer consisted of 4 drift chamber stations and a magnet to measure beam particle momentum precisely
- Calorimeter prototype
- Al target at 1.5m and 3 m before the prototype



Shower profile fit,  
 Charged hadrons removed (drift chamber),  
 Rough calorimeter calibration

$\pi^0$  1-2 GeV,  $\sigma_m$  12.5 MeV

Next steps:  
 Precise calibration,  
 All data analysis,  
 Big and small cell  
 performance comparison

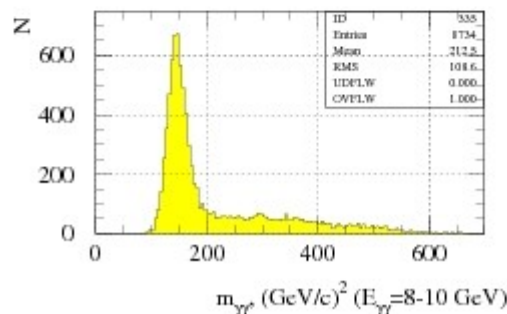
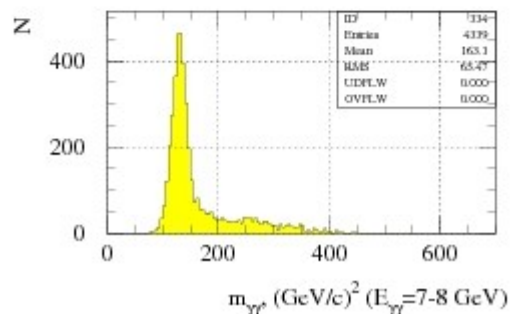
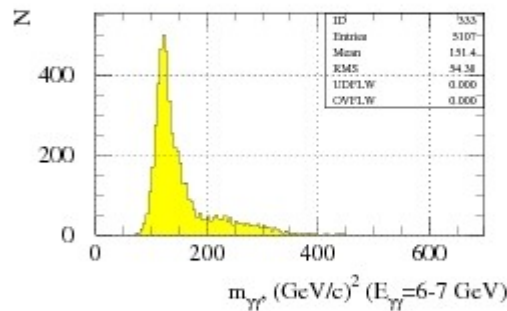
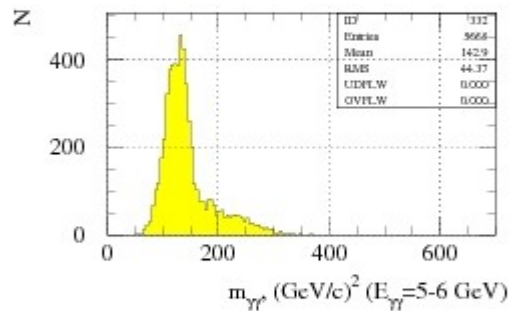
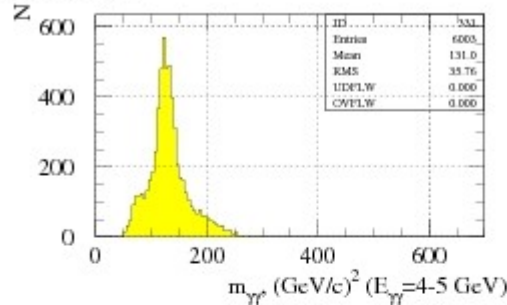
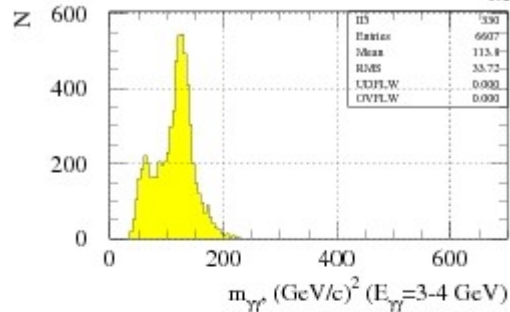
- Shashlyk module length
- Size of the cell (55 mm vs 110 mm)
- Readout electronics
- Full MC

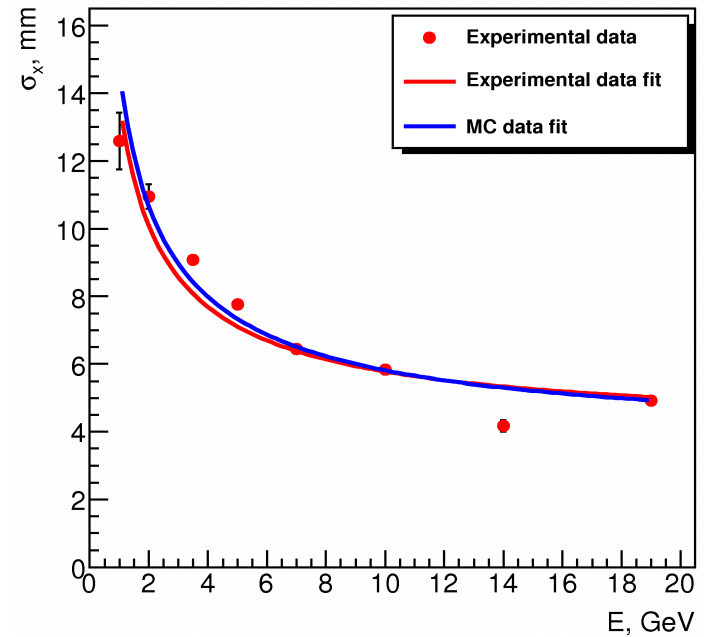
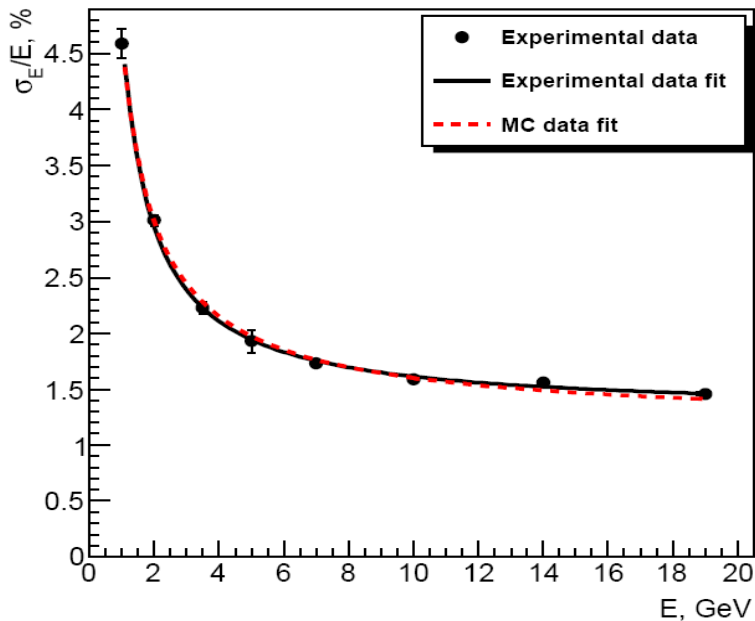
# Backup slides



2008/12/07 19.56

Masses for 3 m





$$\sigma_E / E = 3.5/E \oplus 2.8/\sqrt{E} \oplus 1.3 \text{ [%]}, E \text{ in GeV}$$

$$\sigma_x = 13.1/\sqrt{E} \oplus 4.0 \text{ [mm]}, E \text{ in GeV}$$

### 64 cells (16 supermodules) assembled in matrix

- 380 layers of 0.3-mm lead and 1.5-mm scintillator, total length 680 mm
- Transverse size 55x55 mm<sup>2</sup>
- Effective Moliere radius:  $R_M=59$  mm
- Effective radiation length:  $X_0=34$  mm
- Total radiation length:  $20X_0$
- Light collection: 36 fibers BCF-91A ( $\varnothing 1.0$  mm)

