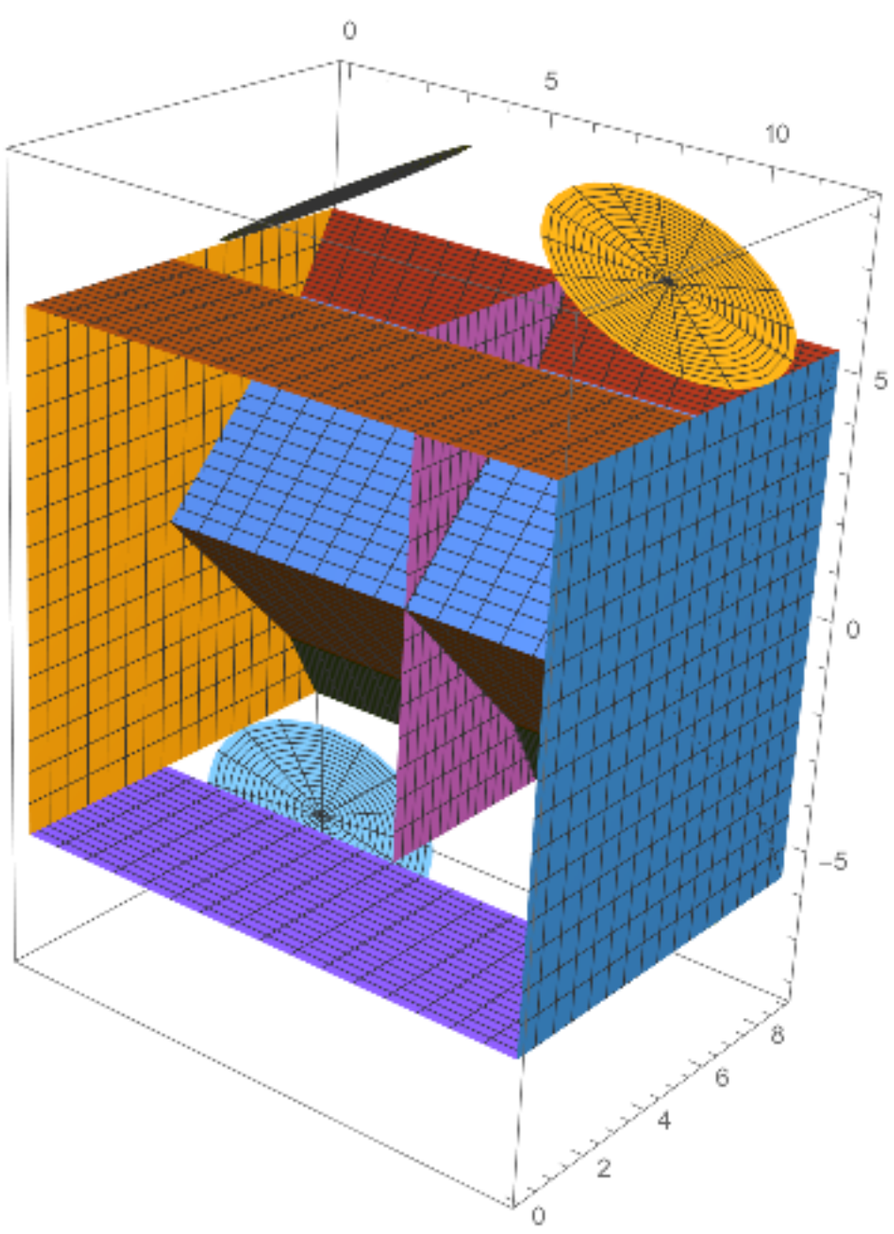
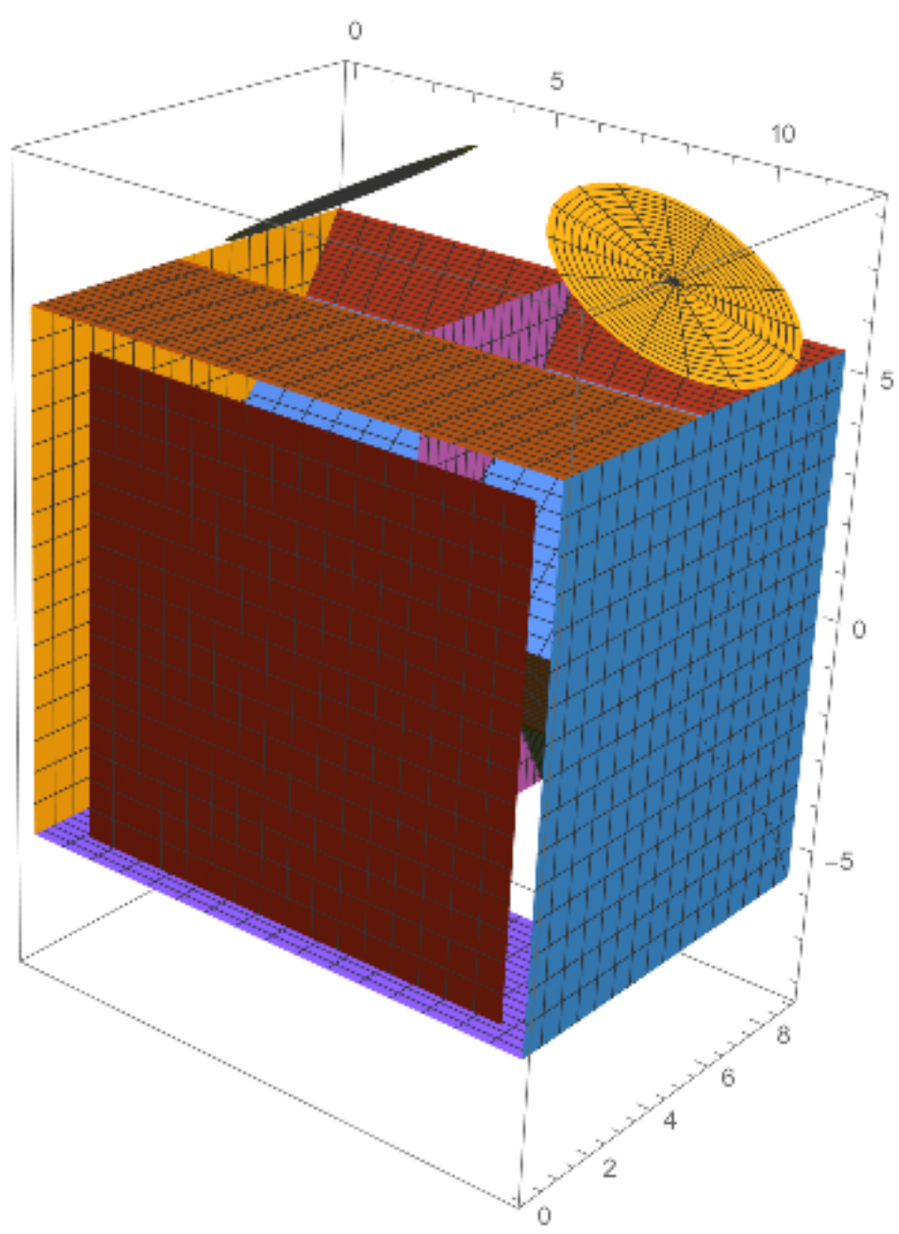
Progress on GEANT4 AC simulation

강병민

Detector Geometry

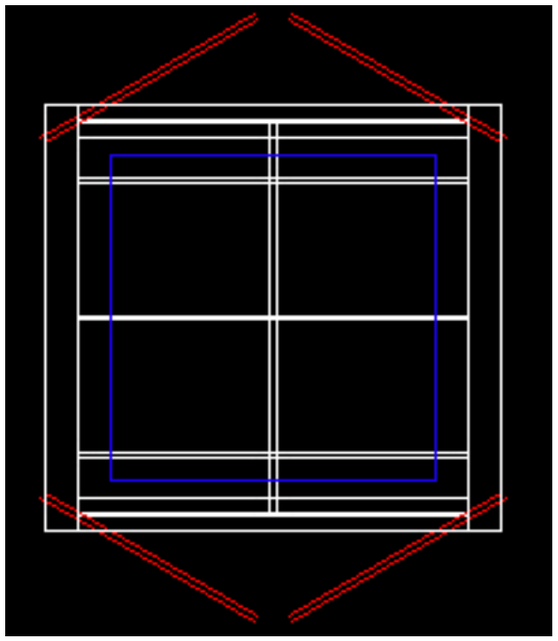
- This model was plotted by *Wolfram Mathematica,* because it provides better visual.



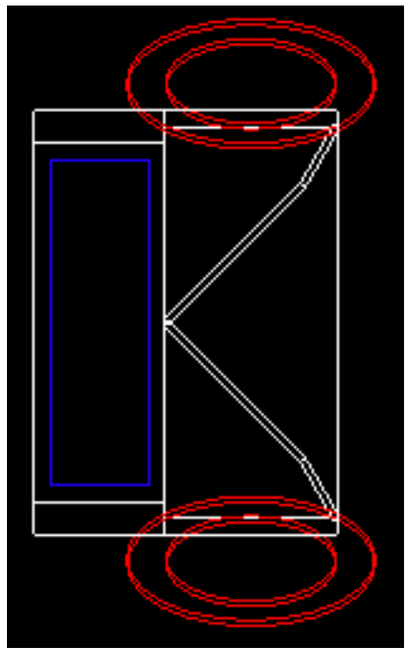


- Mockup looks like this, compared with aerogel(10cm x 10 cm)
- Tilted circles are detection area of FM-PMT.
- All other things are mirrors. Vertical wall is added to get better efficiency.

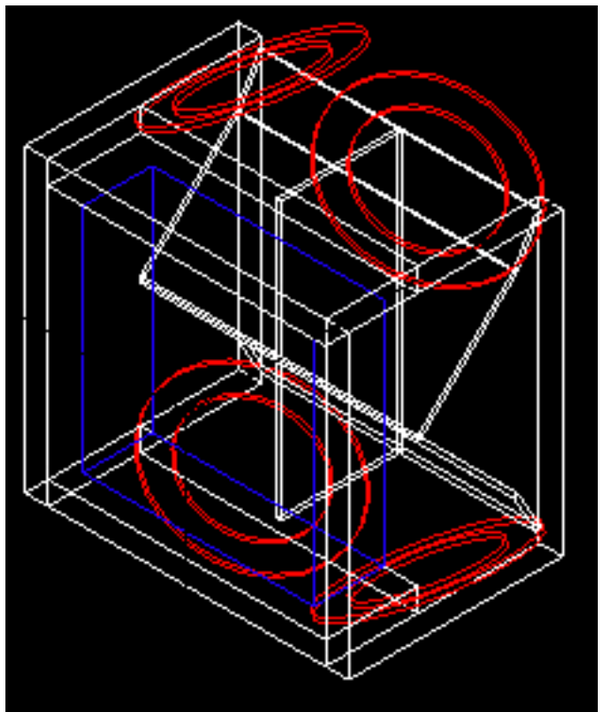
In GEANT4



Front view



Side view



Diagonal view

```
theta_1     = (pi/4)*radian;
theta_2     = (pi/6)*radian;

d           = 0.7;


Det_ang = (pi/6)*rad;
Det_rad =   2.6*cm;
Det_posx=   3.8*cm;
Det_posy=   wall_y+Det_rad*sin(Det_ang);
Det_posz=   -wall_z-hor_bar_z;
```

Adjustable Params.

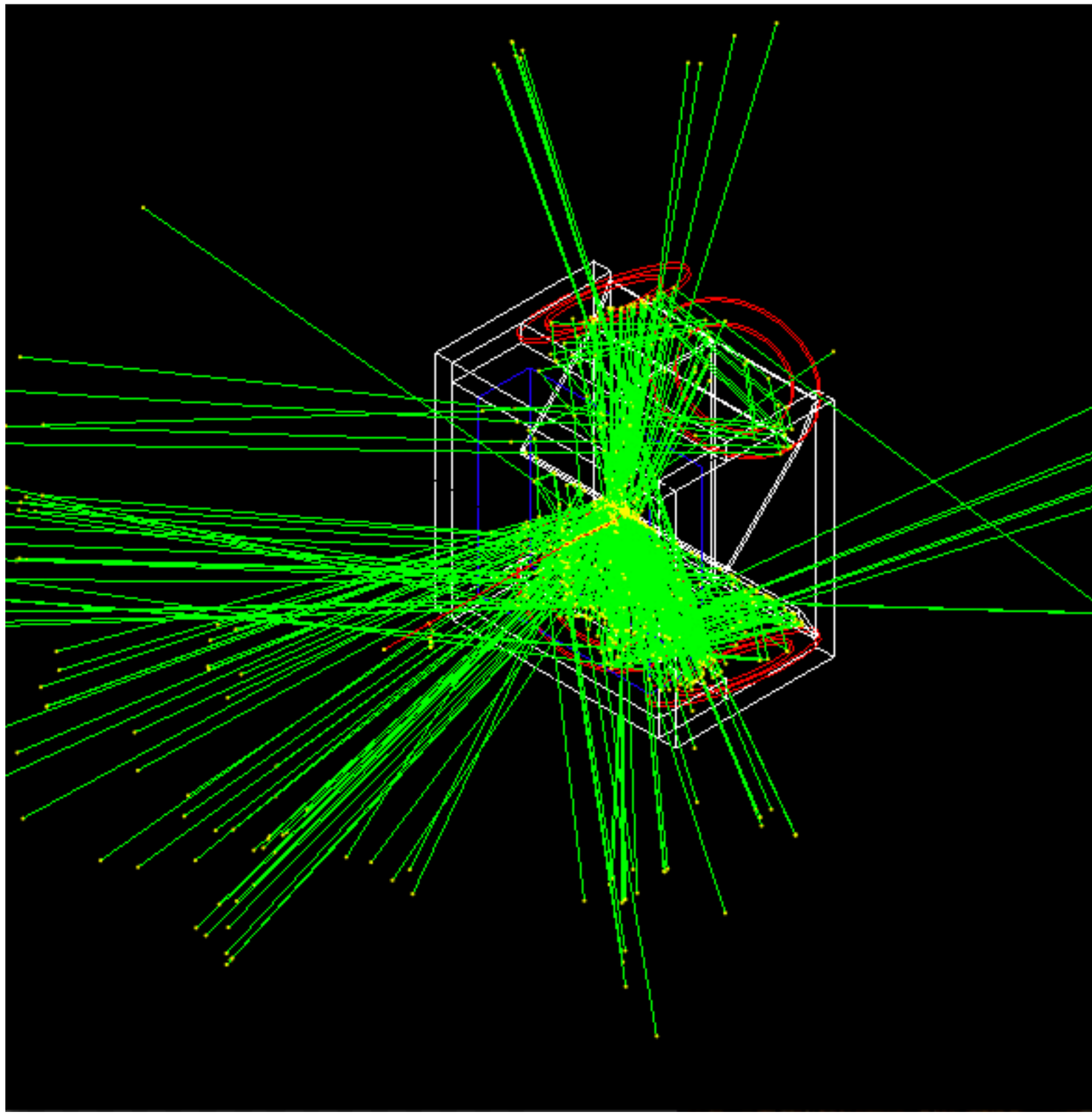
- Blue box is 3 layers of aerogel.(In G4, 3 layers are merged for simplicity.)
- Red disks are FM-PMT outer dimension(set as mirror), and inner disks are detection region.
- Mockup and detector dimension will be set automatically, whenever parameters are changed(in reasonable range).

Adjustable Parameters

- Refraction index of Aerogel(currently 1.04 for all wavelength)
- Width and height of the mockup.
- Angle of two mirrors(theta_1&2 in the previous slide)
- (height)Ratio of two mirrors(d in the previous slide)n
- Tilting angle of the detector(Det_ang in the previous slide)
- Aerogel size, detector dimensions are not adjustable.(hope aerogel could be…)

Typical example of beam run

Two electron beam with E=5 MeV (v=0.9957)



Further works to do

- Set realistic parameters for aerogel.(refractive index variance, transmittance, etc.
- Find out how to set detectors.
- Find out how to save data.
- Scan parameters to maximize Cherenkov photons.