SoLID Collaboration Meeting

Heavy gas Cerenkov Update

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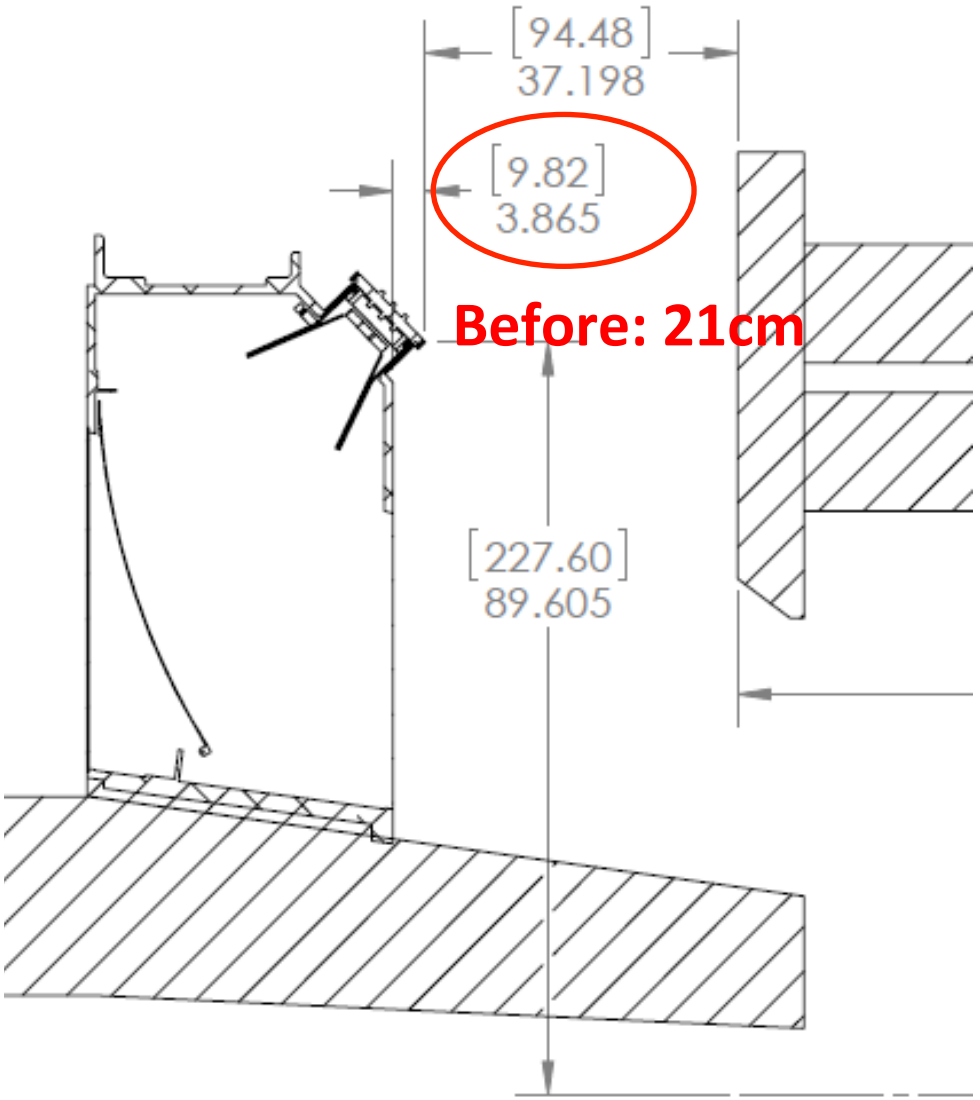
“New” Tank

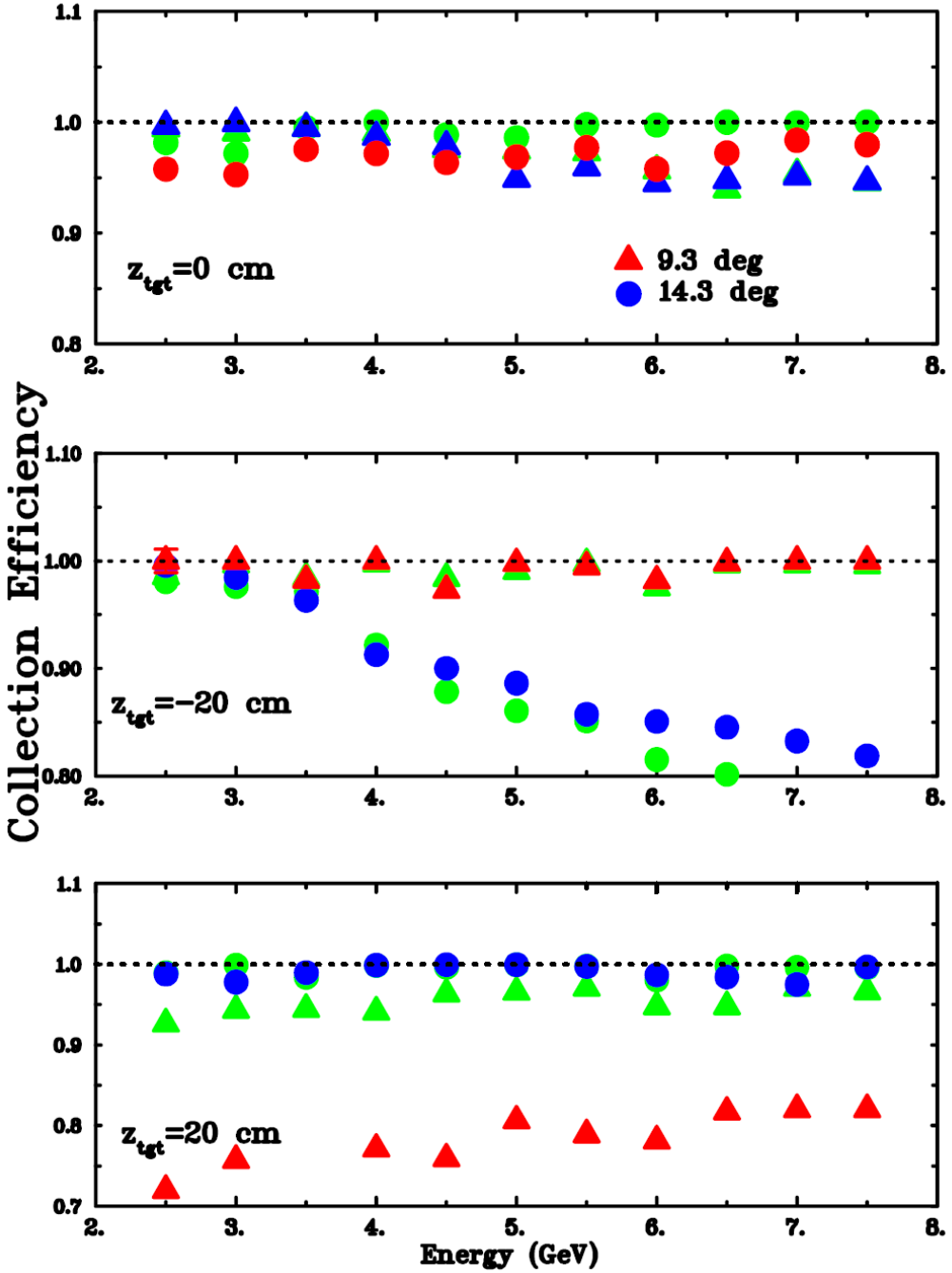
Last meeting: 10cm shift.

- Downstream shift of PMTs, cones and mirrors

- Use the 10cm between the two Cherenkov to extend the tank (modification not shown on the drawing)

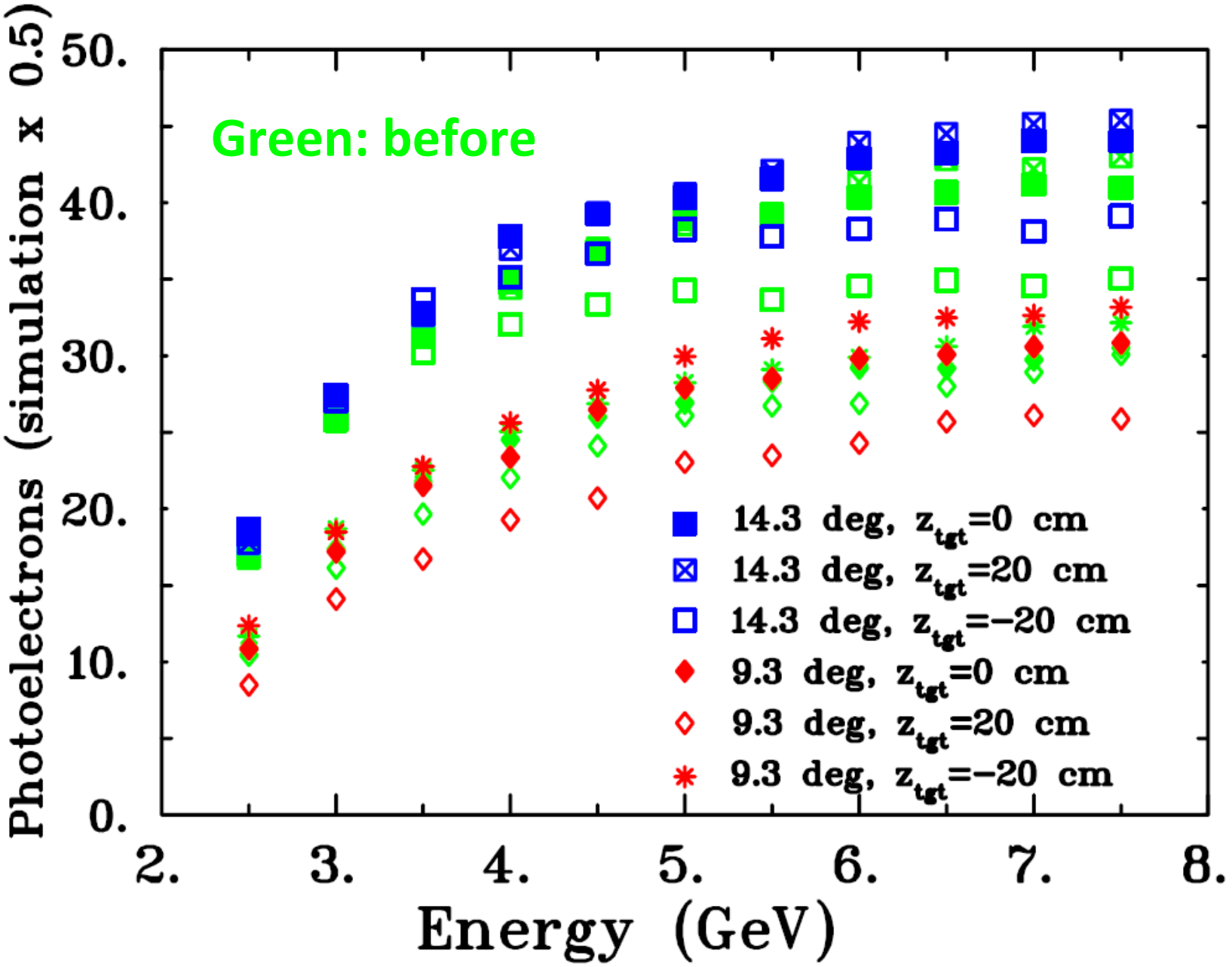


Collection Efficiencv

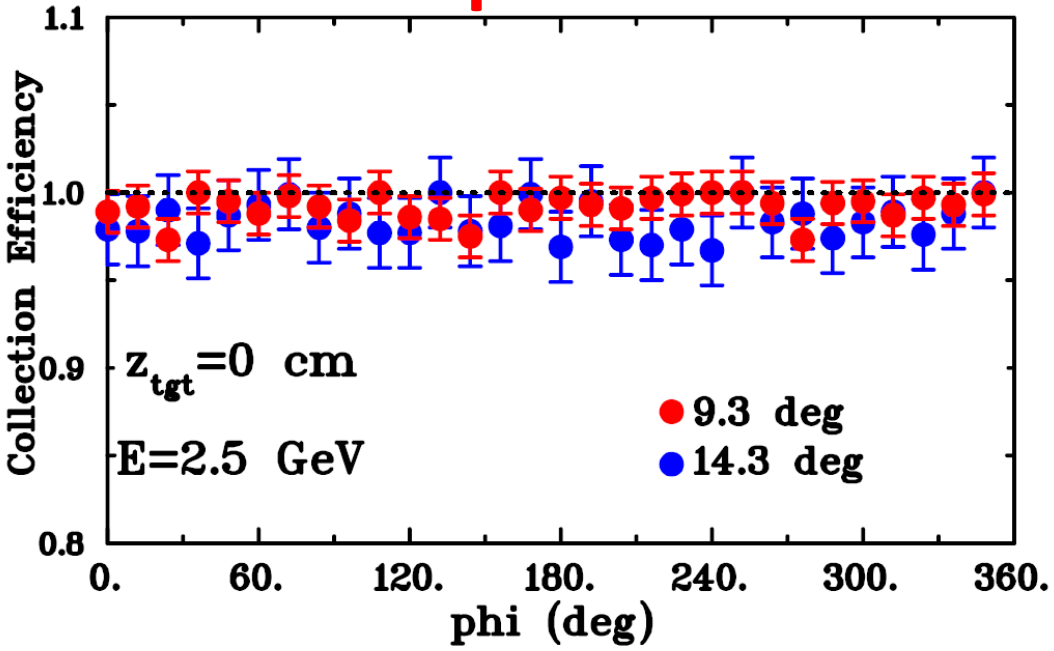


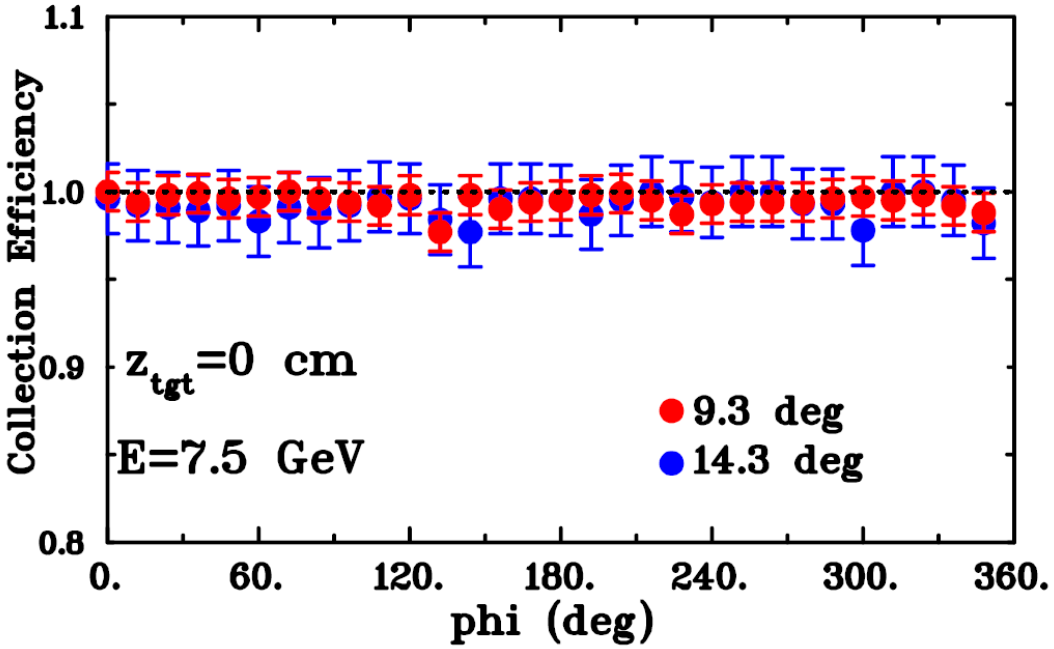
Green: before

Photoelectrons



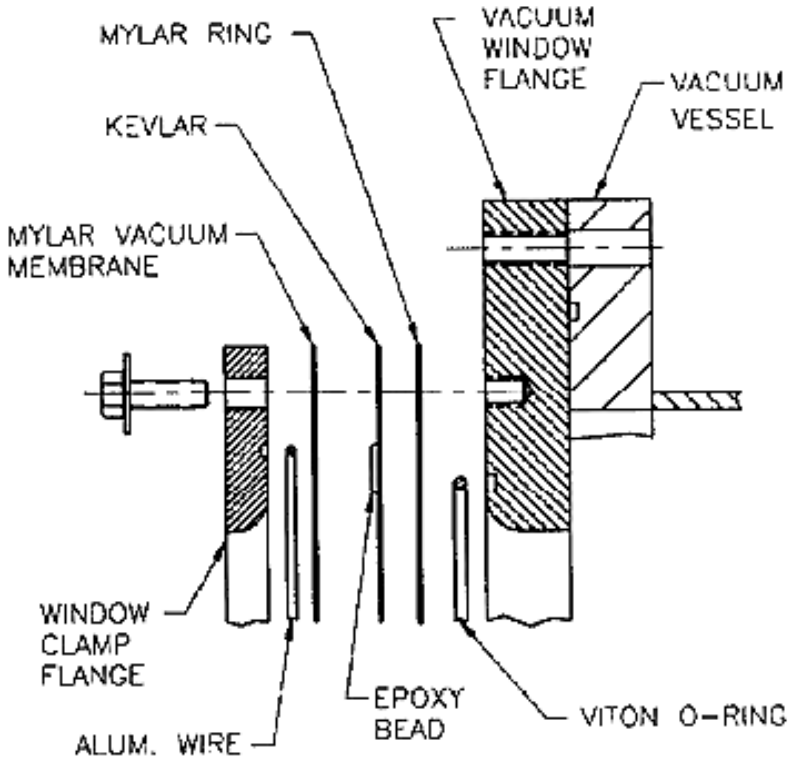
Phi dependence





Tank Windows

W. J. Leonhardt and M. Mapes, DESIGN OF LARGE APERTURE, LOW MASS VACUUM WINDOWS, 1993, BNL



Test No	Window Size	Thickness, Kevlar/Mylar	Pressure at Failure
1	91.4 circular	0.58/0.13mm	4.1 atm
2	"	0.43/0.13	4.1
3	"	0.30/0.13	2.0
4	122x61 rect.	0.38/0.13	3.2
5	"	0.30/0.13	2.5
6	"	0.30/0.05	2.3
7	"	0.25/0.13*	1.5
8	"	0.30/0.05	**
9	193x86 rect.	0.43/0.13	2.7
10	"	0.43/0.05	2.5
11	"	0.30/0.05	1.4

Window Assembly:
-Mylar/Kevlar layers
-Epoxy for sealing

About the same area than 1-2 sectors

Heavy Gas Cherenkov Status

- Optimization performed for the larger 9.3-14.3° range

- Write-up is done, need to update the design part

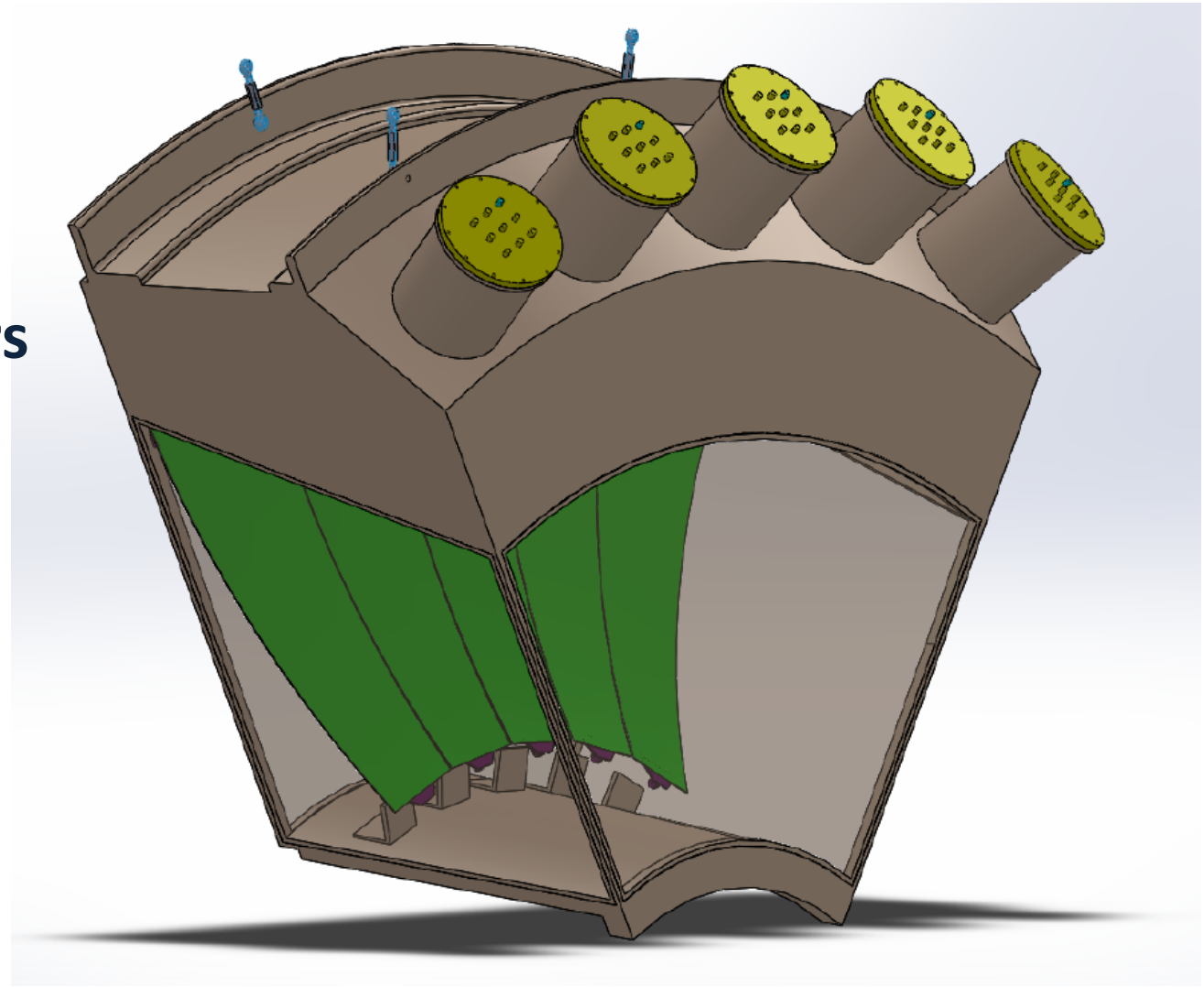
- Check the influence of the windows on the light collection system performances

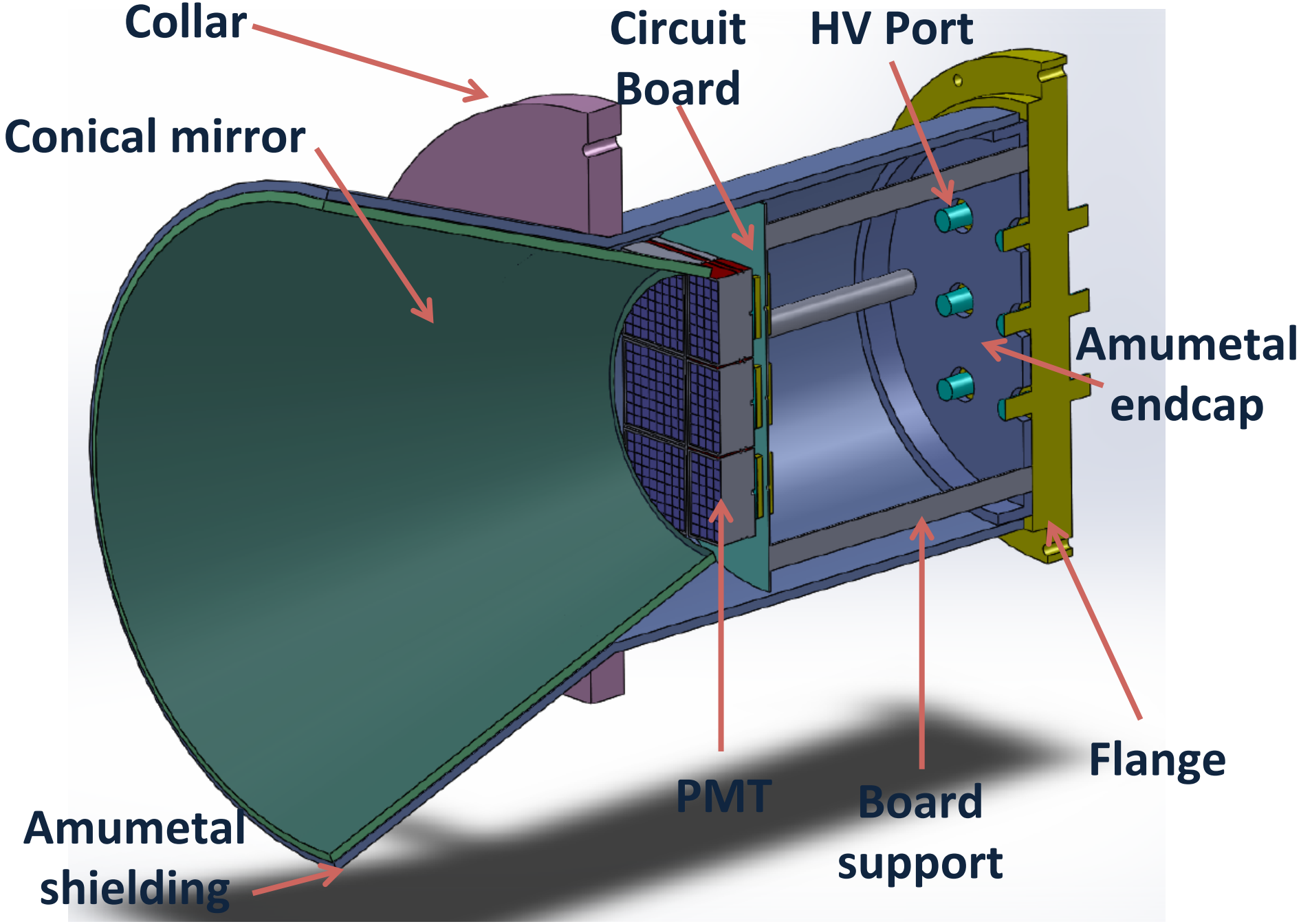
- Improve the design based on the 10cm shift (need more info on the magnet to move forward)

- Finalize the implementation of the Cherenkov into GEMC for PID and rate study.

6 segments of 60°

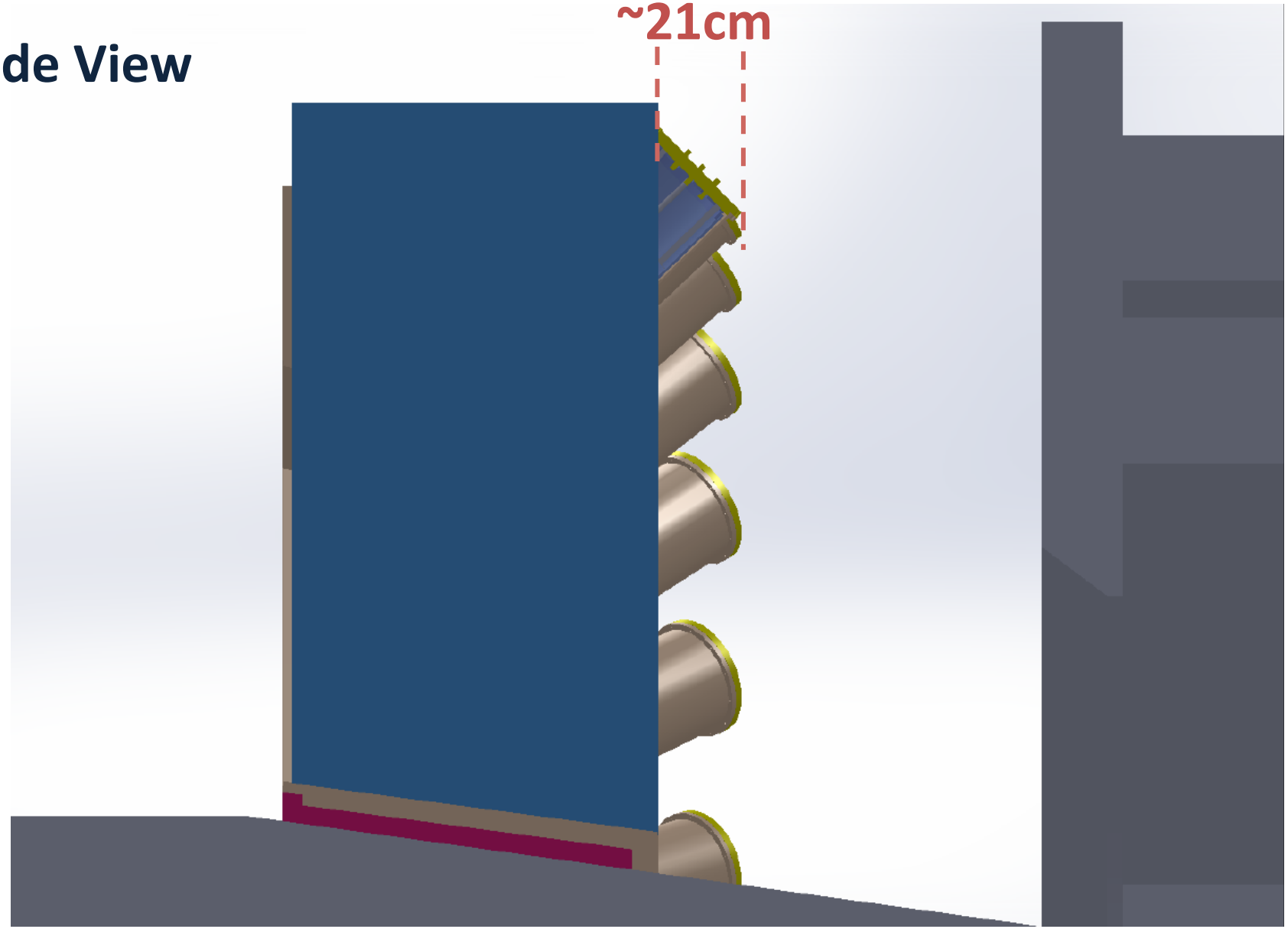
With 5 sets of
- PMTS
- Conical mirrors
- Spherical mirrors




Collar
Circuit Board
HV Port
Conical mirror
Amumetal endcap
Flange
PMT
Board support
Amumetal shielding

Last Meeting Space Issue

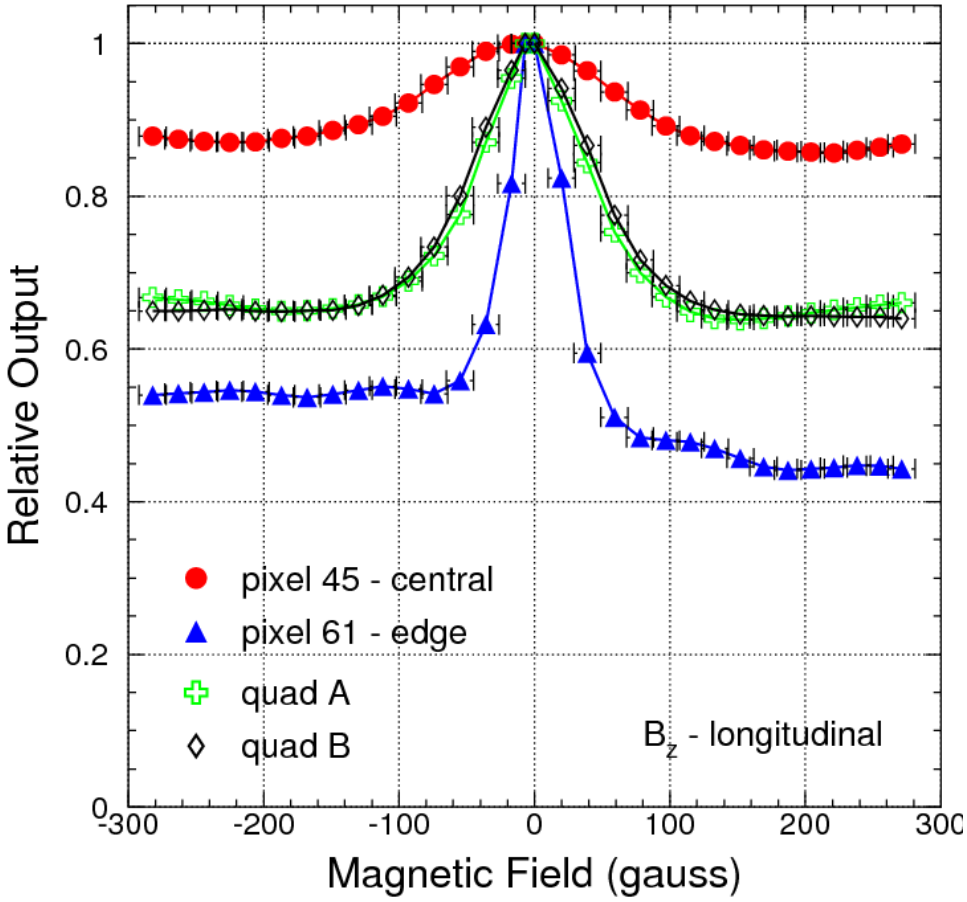
Side View



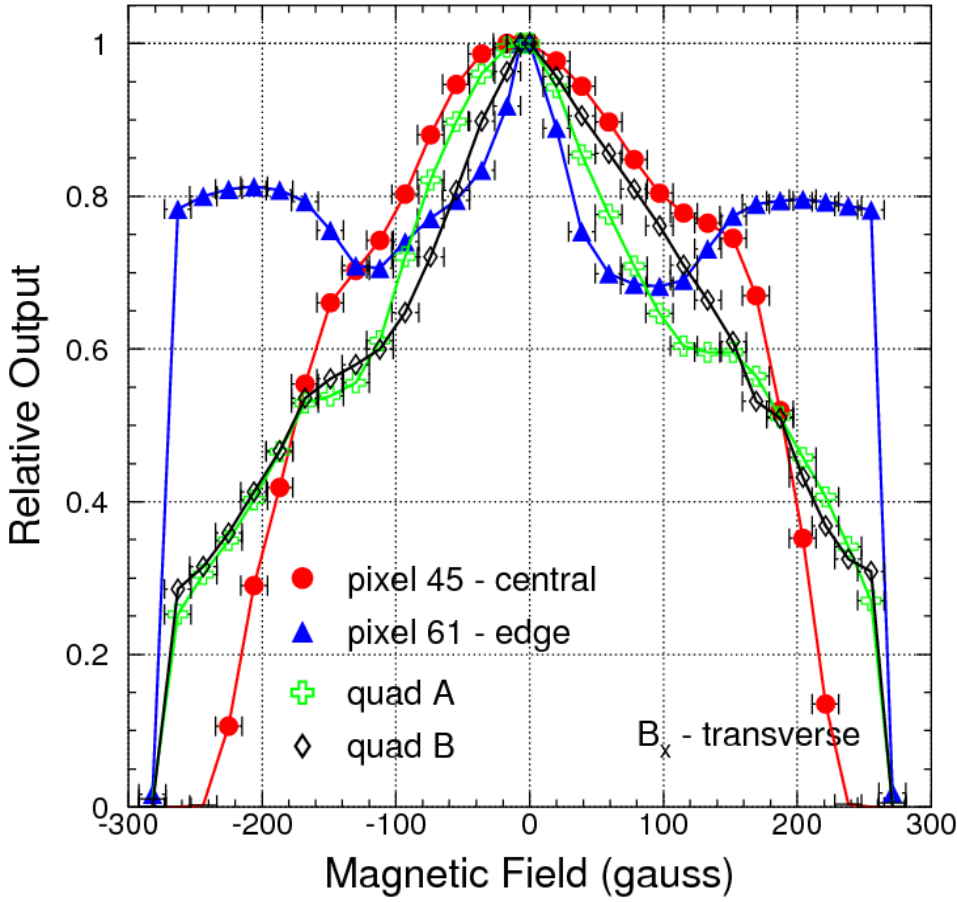
Cost Estimate

	COST	
Mirrors		$277k
PMTs		$837k
Tank	Material	$50k
	Assembly hardware	$15k
	Shop work	$100k
Gas System	System Sensor, Piping	$50k
	Recovering System	$35k
Gas		$154k
Total		$1.58M +3/4 technician year

PMT response to magnetic field



Longitudinal



Transverse

Pictures from Simona's study

Space Issue

Amuneal results:

Previous length is already enough for an excellent shielding:

- **longitudinal direction: from 200 G to 10-20 G**
- **transverse: from 100 G to 5-7 G**

Reduce the length of the box by 50%:

- **longitudinal direction: from 200 G to 15-30 G**
- **transverse: from 100 G to 3-5 G**

-> Gain of 10cm max in the z-direction

-> Need to move the calorimeter and MRPC

-> Optimization performed for a 10cm downstream shift