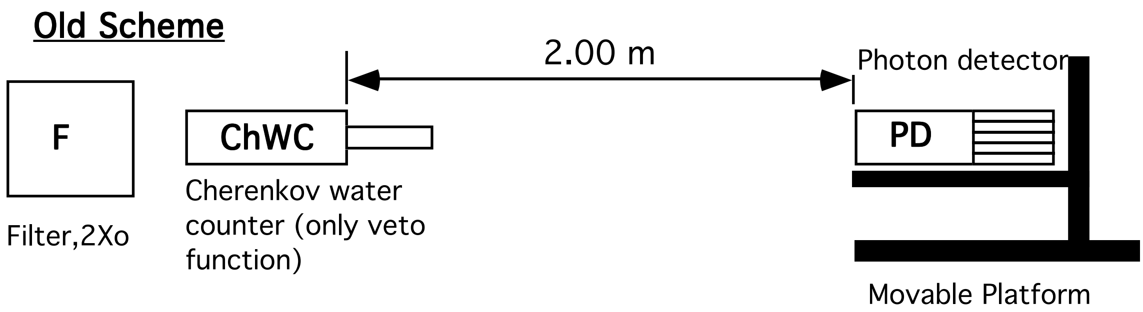
Lumi system γ-arm upgrade

28.02.95 A.Us.

Abstract: Geometry of the γ-arm was changed to satisfy an idea of a combined detector. Better calibration and energy resolution is expected. Cherenkov water counter is now protected during beam injection/dump.

1. Motivation

Initially a photon arm of the lumi system was designed and used to work with photons which do not convert in the filter and Cherenkov water counter (~10% of statistics). Cherenkov water counter was used only as veto counter to select such eventa.



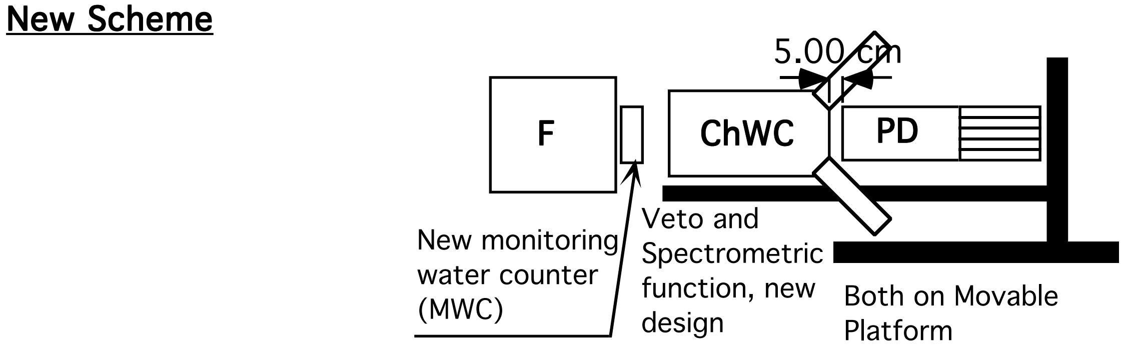
After deteailed MC simulation of WC and PD responces it became clear that water counter responce is proportional to the energy , absorbed in the filter and water counter itself. Therefore, it was decided to use a photon arm as a *combined detecor* for energy measurement of any photons with E > 2 GeV.

From the viewpoint of the combined detector quality the existing design however was not optimal. Main disadvantages:
- big distance between ChWC and PD (energy leakage dependance on the primary photon energy)
- small vertical size of water counter (energy leakage dependance on the primary photon position)
- no protection of the water counter during beam injection and dump.

2. Photon Arm Modification

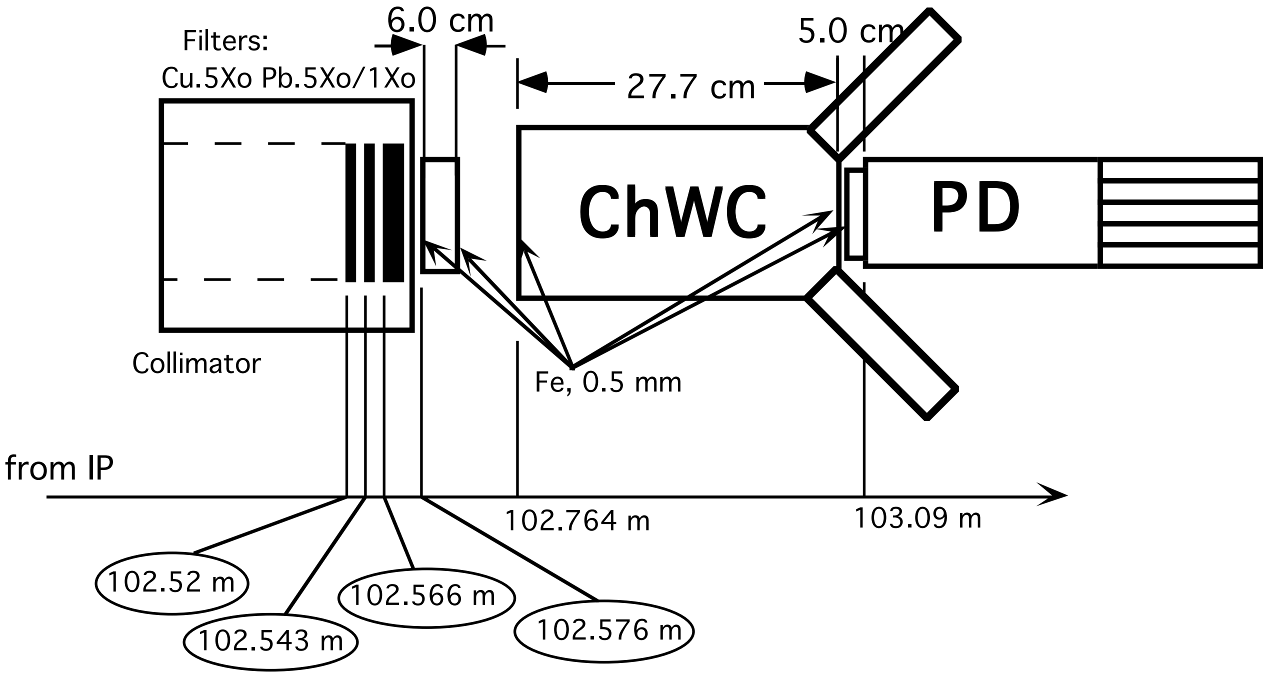
The disadvantages are removed in a new scheme:
- minimal possible distance between ChWC and PD (5 cm instead of ~2m)
- new water counter with bigger lateral sizes and improved light collection
- protection of the ChWC (installed on Movable Platform).

To keep the present possibility of permanent beam status monitoring (to keep finger on the beam :-) - new monitoring water counter is added.

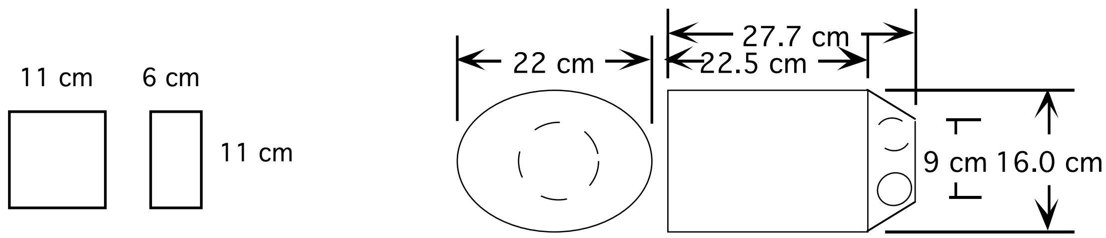


3. Specifications

3.1 γ–arm geometry



3.2 Detectors



3.3 Photomultipliers

		Type	No	Ph.sens., μA/Lm	U,* V
Cherenkov Water Counter:					
	Right **	FEU-85	24614	121	1020
	Left	FEU-85	29299	110	884
Monitoring Counter :					
	Right	FEU-85	24629	99	1000
	Left	FEU-85	24377	99	950

*/ Umax - not more 1.05U
**/ Direction from Interection Point

Acknowledgments

First of all thanks to Lev Gorbov for the main contribution in the detector production. Thanks to P.Smirnov for the organizational help. And special thanks to E.Malinovski for his attention and support.