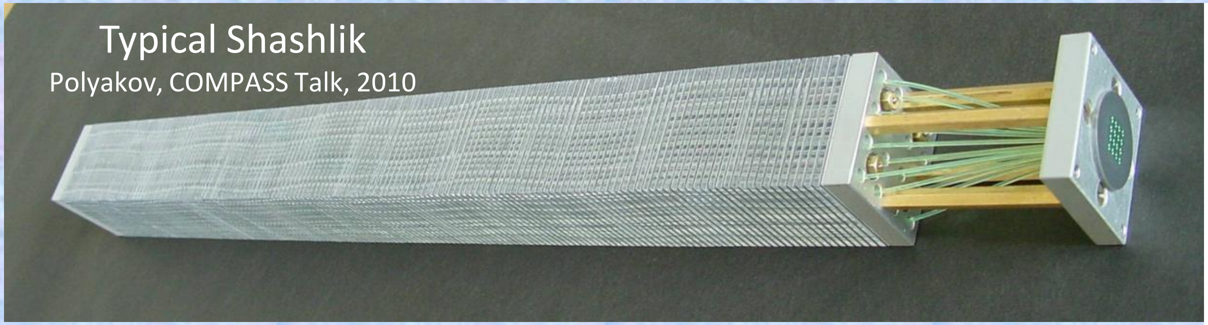
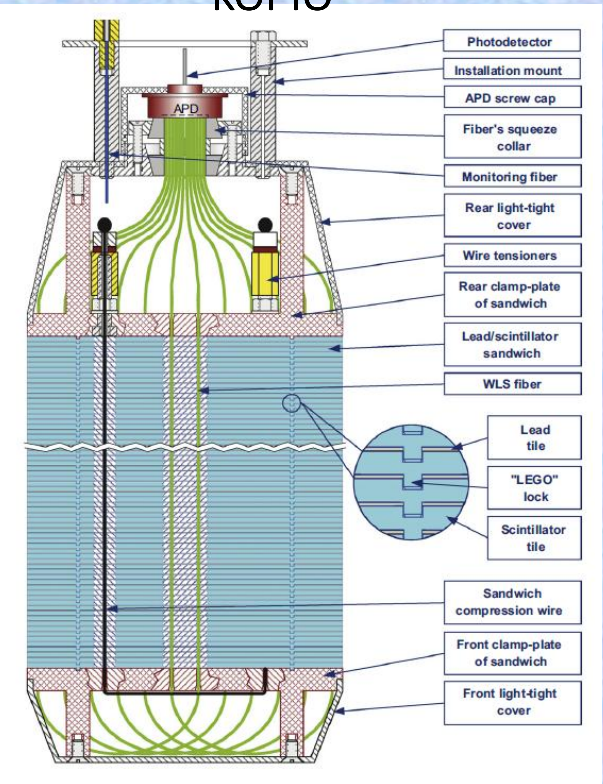
# EC segmentation

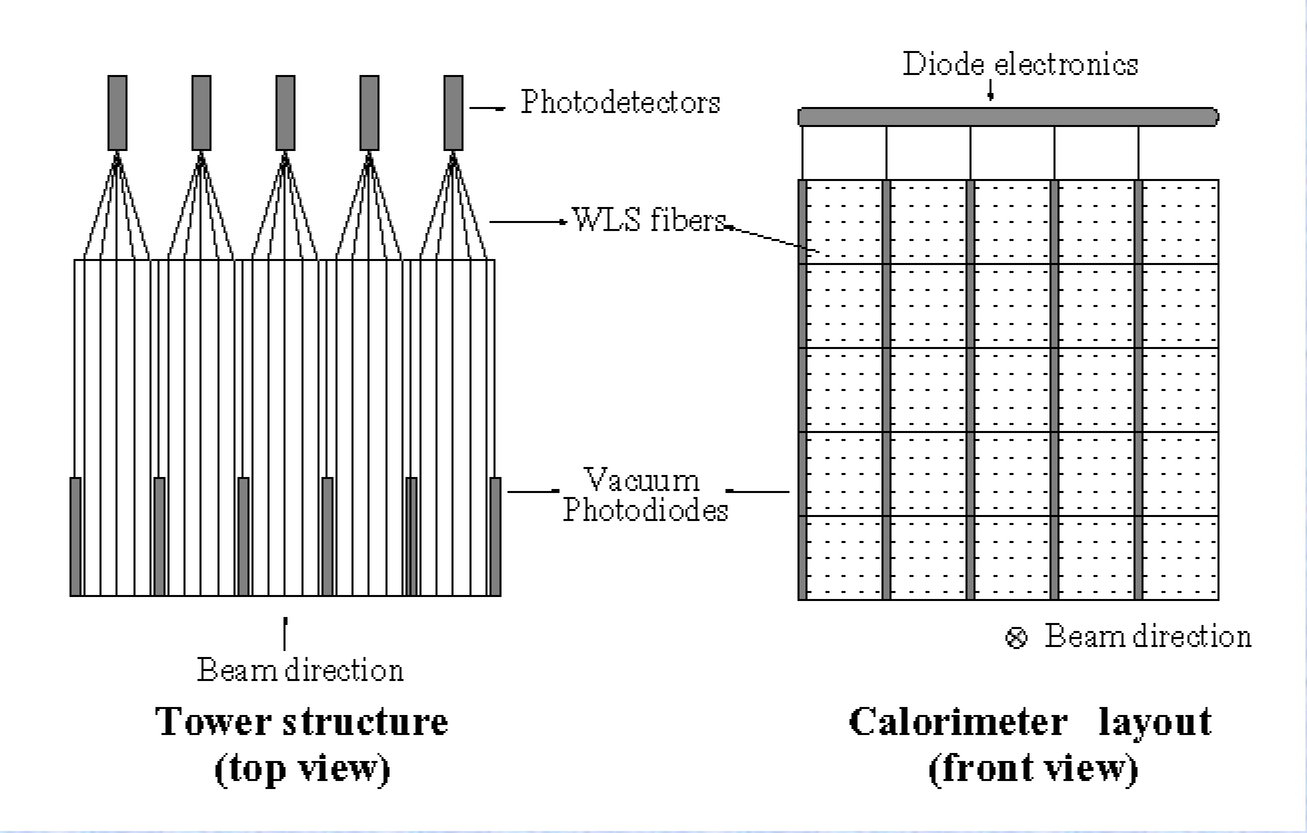



KOPIO



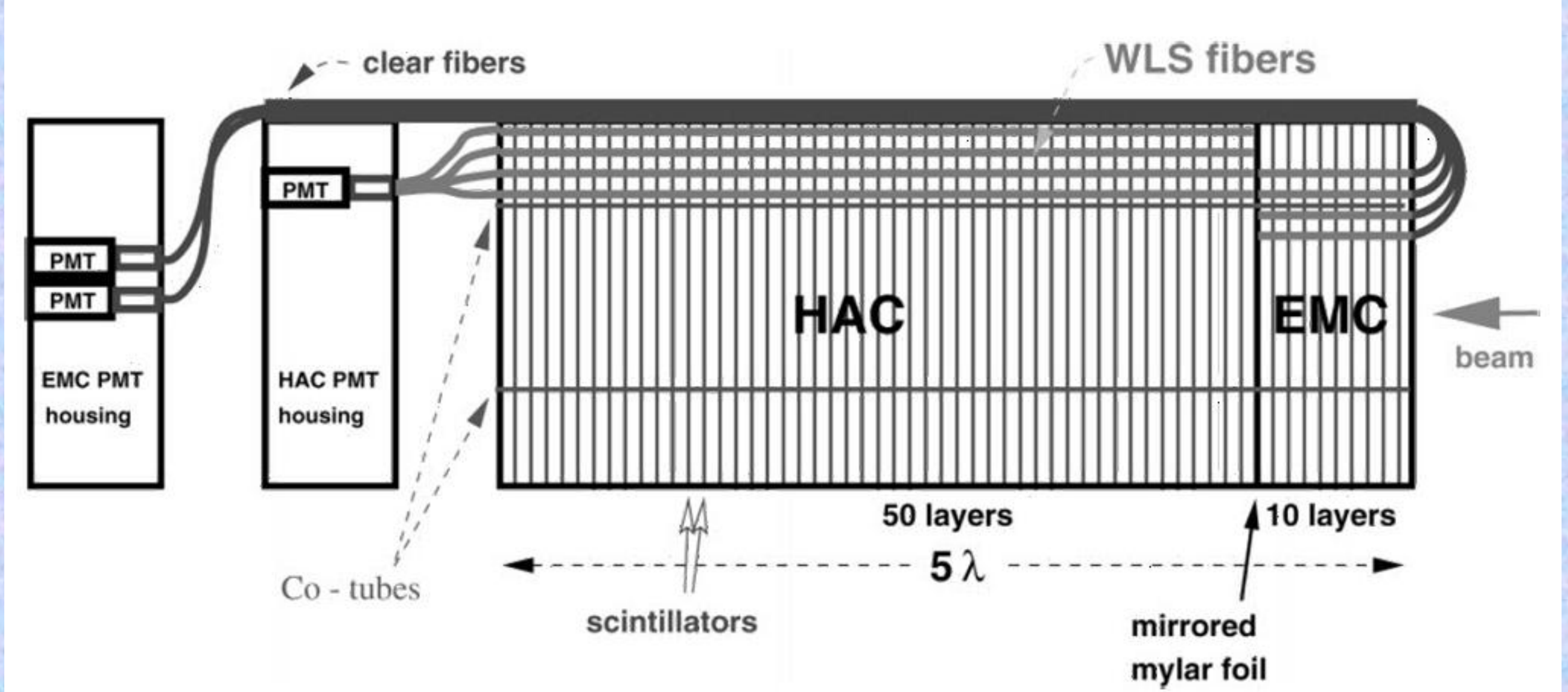

- Shashlyk calorimeter
  - Lead-scintillator sampling calorimeter
  - Fiber collects and reads out light
- Satisfy the SoLID requirement
  - Good energy resolution (tunable)
  - Radiation hardness ~ 500kRad
- Easier to collect and read out the light
- Well developed technology, many experiments

# Option 1, readout preshower directly



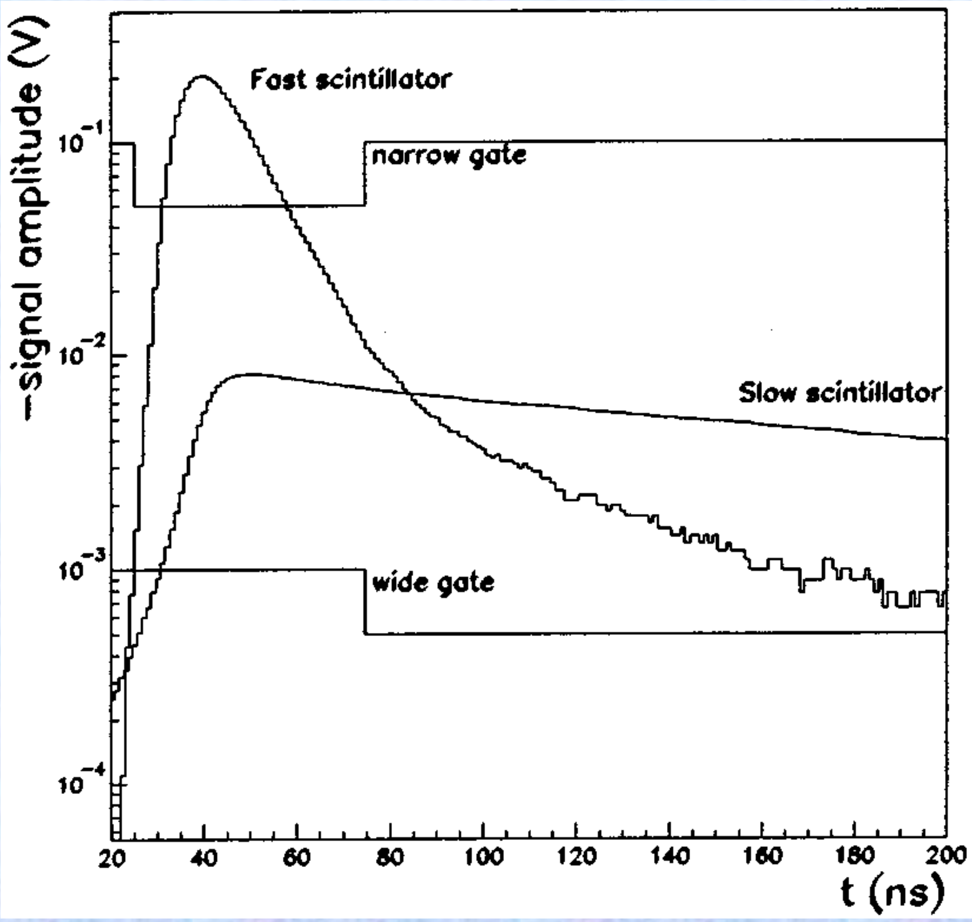

- Vacuum Photodiode or APD can't survive high rate environment?
- dead area?

# Option 2, let fibers go back

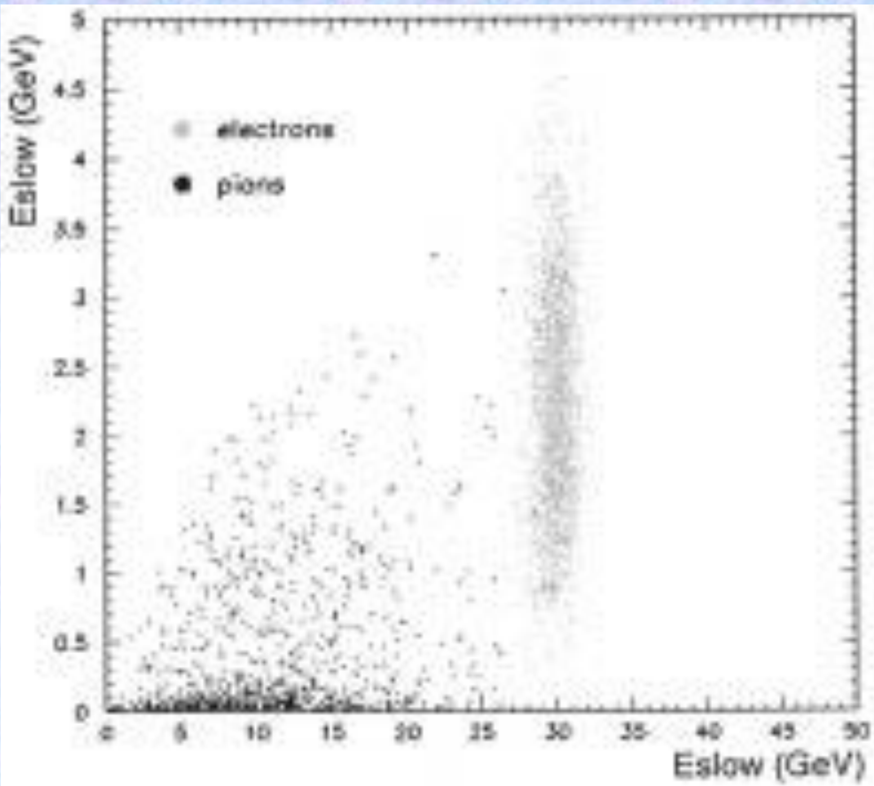


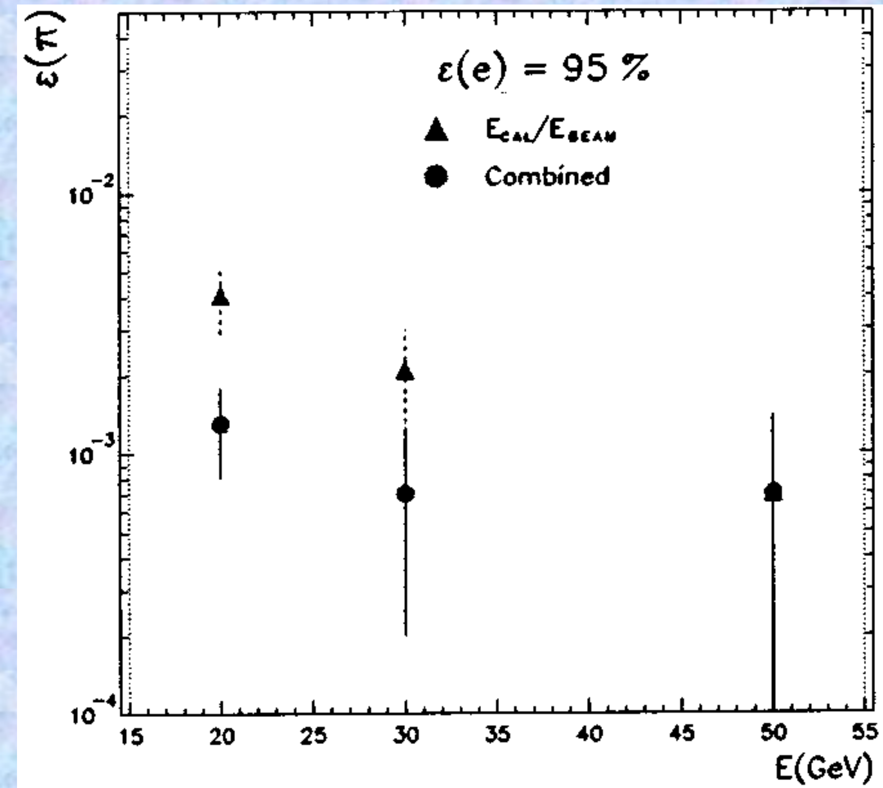

- Fiber bending, how flexible it is? Dead area? High rate?
- hiding in rod

# Option 3, slow/fast scintillator



# Option 3, fast/slow scintalator



# PVDIS rate

| Process | Geometry | |
| --- | --- | --- |
| | Open | baffles |
| DIS total | 2500 kHz | 110 kHz |
| DIS $W > 2$ GeV, $X > 0.20$ | 1500 kHz | 110 kHz |
| DIS $W > 2$ GeV, $X > 0.55$ | 35 kHz | 12 kHz |
| DIS $W > 2$ GeV, $X > 0.65$ | 8 kHz | 3 kHz |
| $\pi^-$ $p > 0.3$ GeV | 2300 MHz | 140 MHz |
| $\pi^-$ $p > 1.0$ GeV | 460 MHz | 70 MHz |
| $\pi^-$ $p > 2.0$ GeV | 26 MHz | 8 MHz |
| DIS $X > 0.20$ $E_{CALOR} > E_{thr}(R)$ | 680 kHz | 102 kHz |
| $\pi^-$ $E_{CALOR} > E_{thr}(R)$ | 540 kHz | 120 kHz |
| $\pi^-$ $E_{CALOR} > E_{thr}(R)$ pileup | $\sim$10 kHz | $<$2 kHz |

Table 3.3: Calculated DIS and pion rates in the spectrometer.

# SIDIS rate

| Process | Rate Forward angle 11 GeV | Rate Large angle 11 GeV | Rate Forward angle 8.8 GeV | Rate Large angle 8.8 GeV |
|---|---|---|---|---|
| $(e,e\pi^+)$ | 1467 Hz | 192 Hz | 810 Hz | 117 Hz |
| $(e,e\pi^-)$ | 1010 Hz | 120 Hz | 554 Hz | 73 Hz |
| single $e^-$ | 88.5 kHz | 11.0 kHz | 151 kHz | 16.5 kHz |
| high energy photon | 623 kHz | 51.5 kHz | 596 kHz | 37 kHz |
| single $\pi^+$ | 2.90 MHz | 20.2 kHz | 2.5 MHz | 13.4 kHz |
| single $\pi^-$ | 1.77 MHz | 14.5 kHz | 1.47 MHz | 9.2 kHz |
| single $K^+$ | 226 kHz | 5.9 kHz | 185 kHz | 4.1 kHz |
| single $K^-$ | 54.6 kHz | 1.2 kHz | 39.9 kHz | 0.6 kHz |
| single proton | 1.15 MHz | 13.8 kHz | 0.99 MHz | 9.4 kHz |
| low energy photon | 200 MHz | - | 200 MHz | - |

# prototype

- 1. option 2, test manufacturing and performance.
- 2. option 3, test with flashADC and try to reach better energy resolution and e/pi speration

https://hedberg.web.cern.ch/hedberg/home/caleido/caleido.html