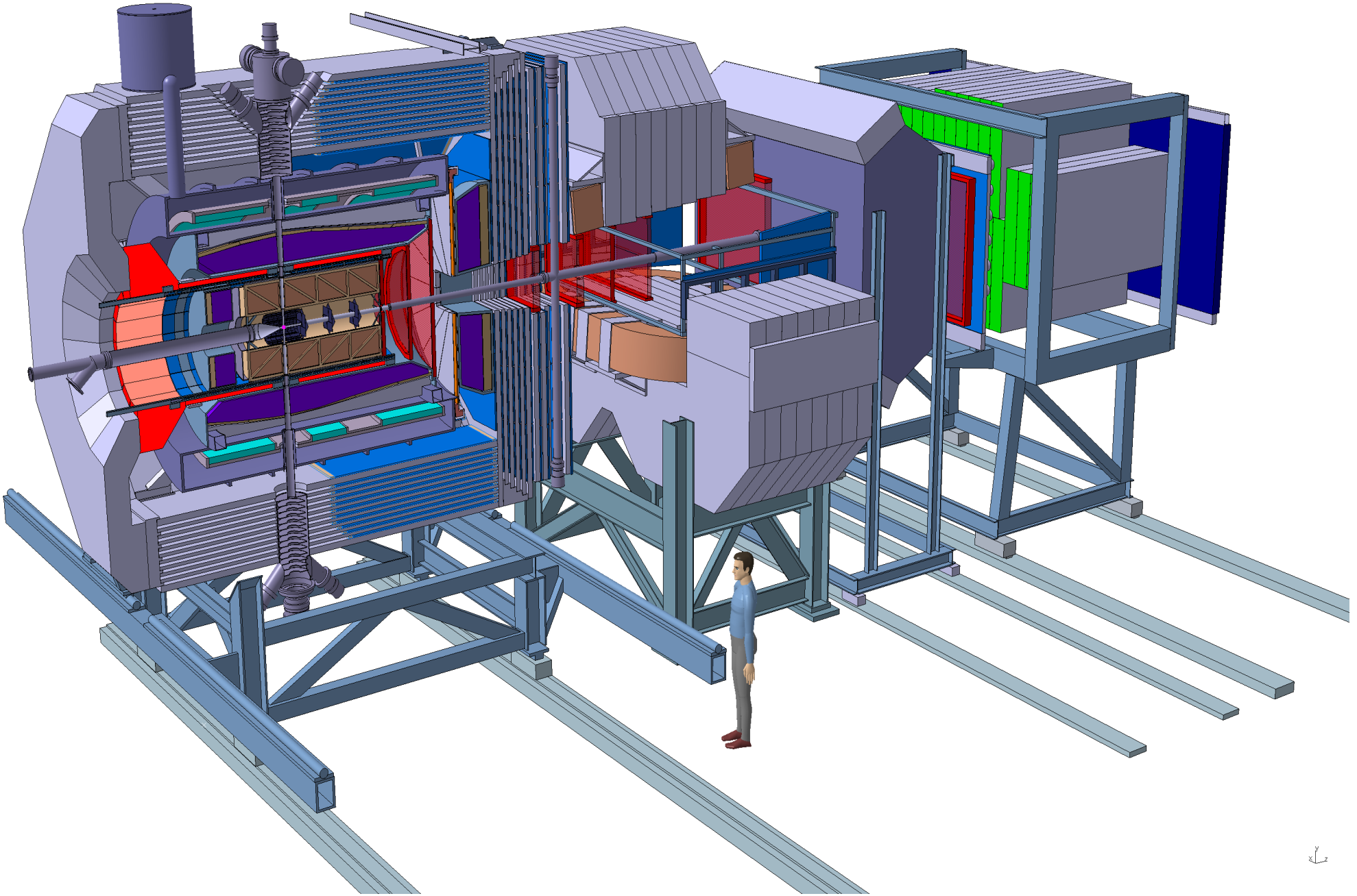
Barrel DIRC

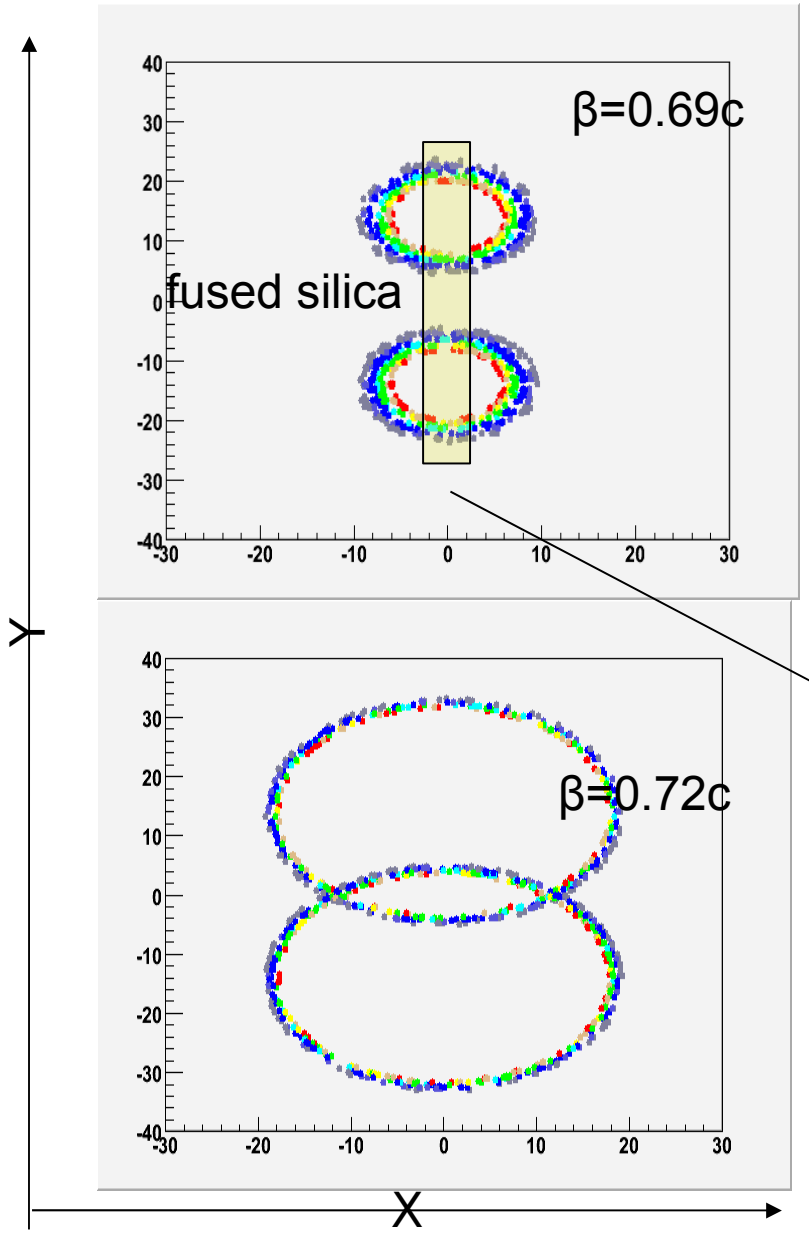
Carsten Schwarz, GSI

- Introduction
- Photon detector
- Electronics
- Analysis

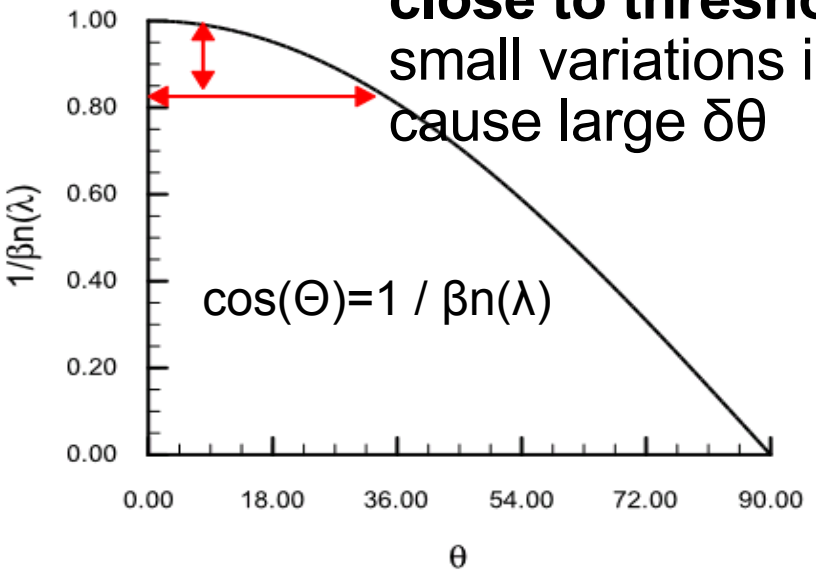
Introduction

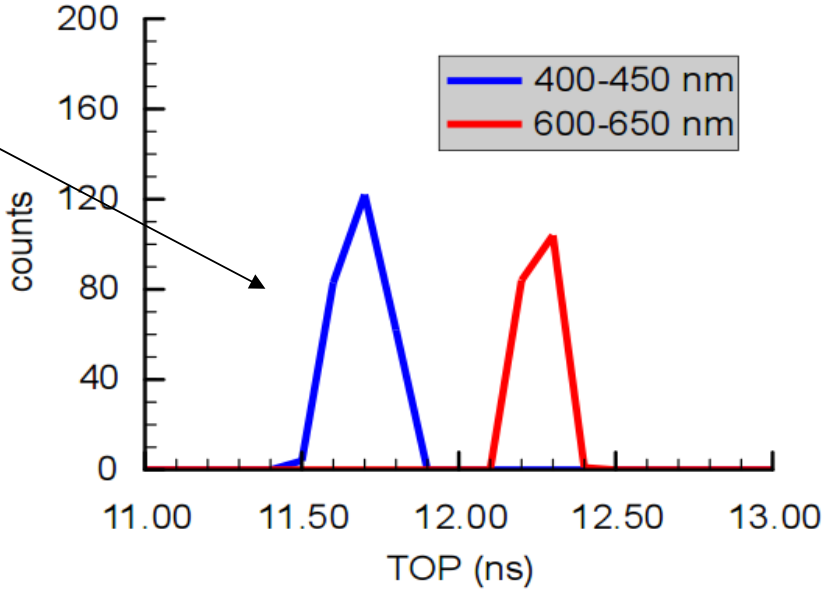


3D-DIRC



close to threshold:
small variations in n(λ)
cause large δθ

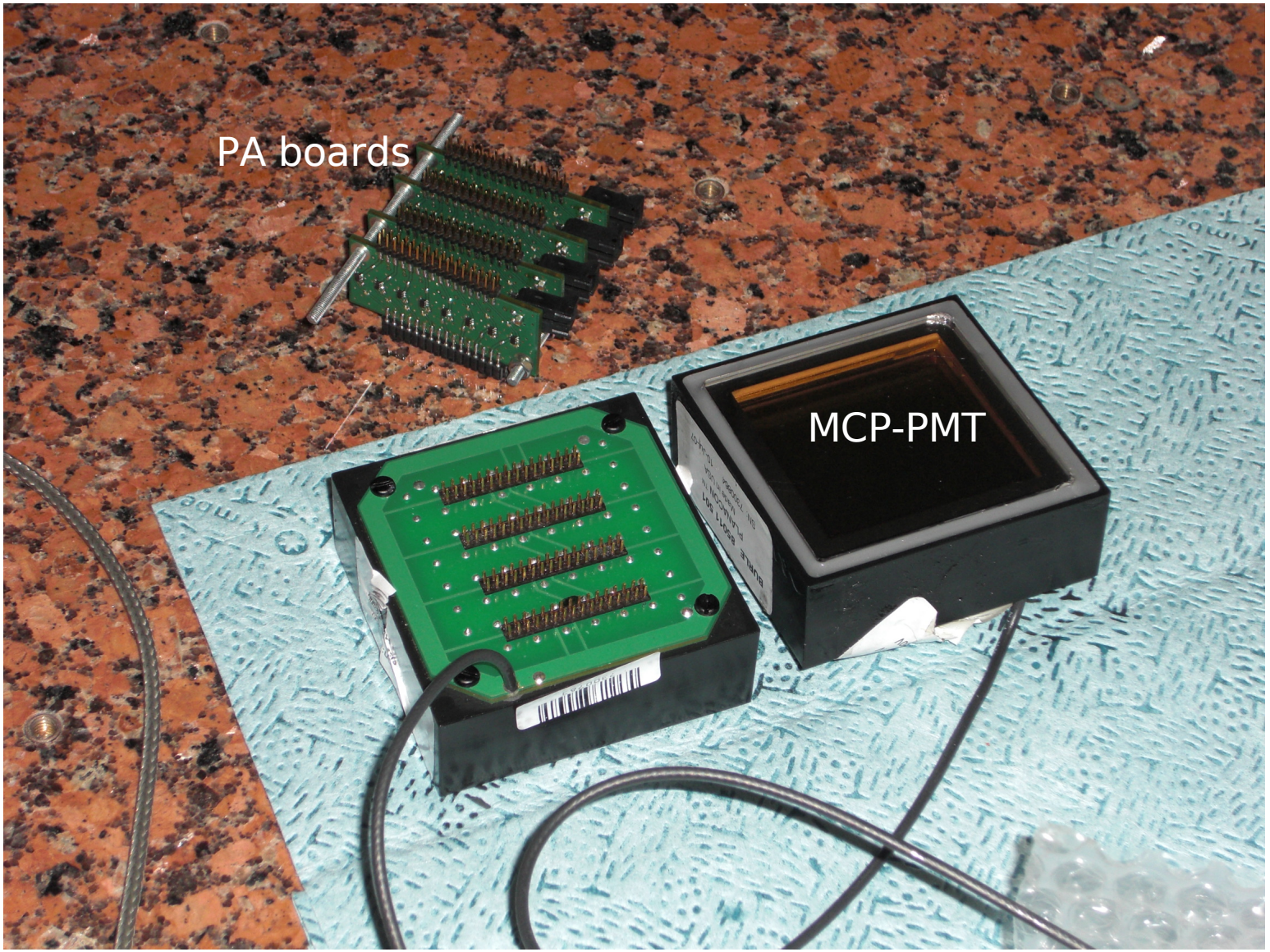


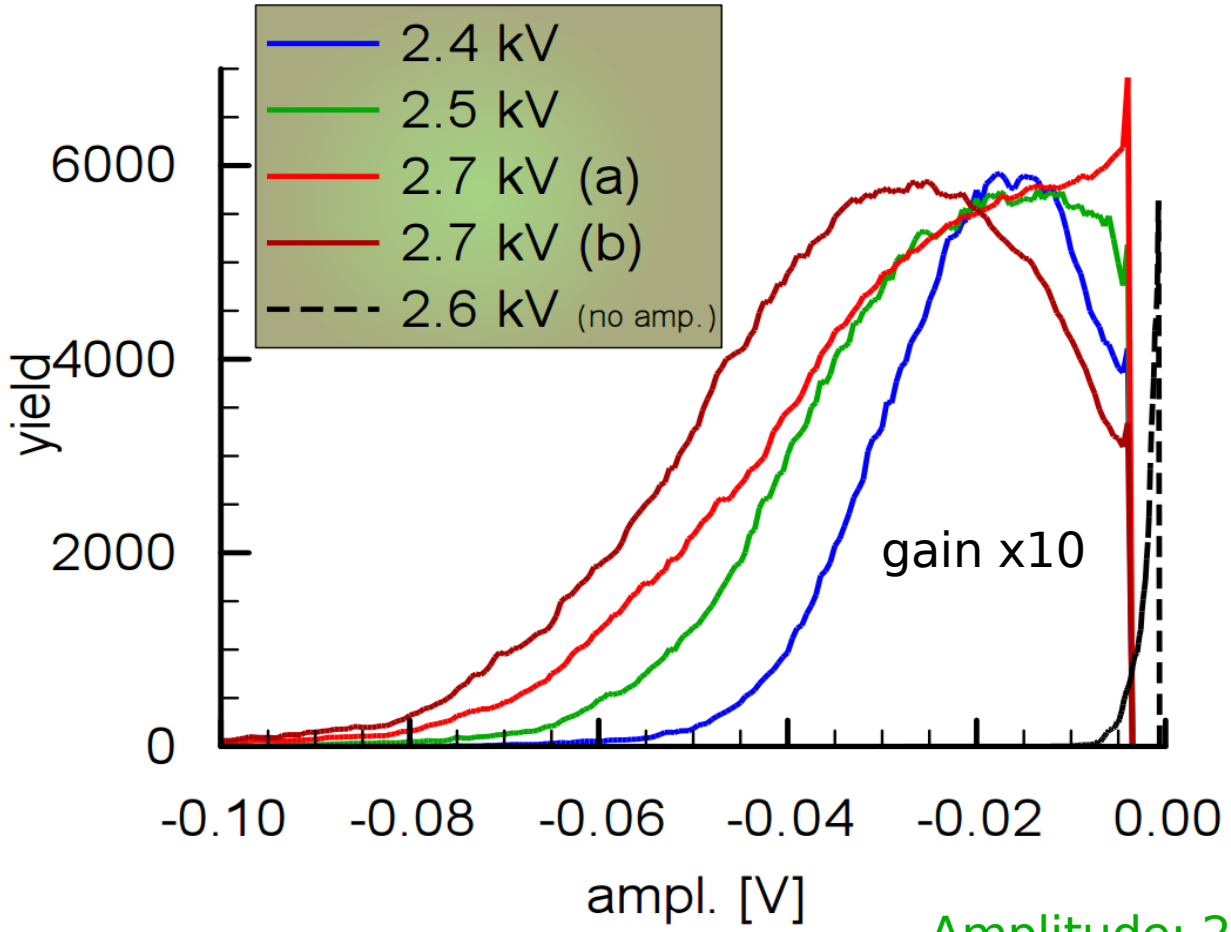


Time of Propagation measurement better 0.5ns allows to correct dispersion for high and low momenta→x,y,t→3D-DIRC

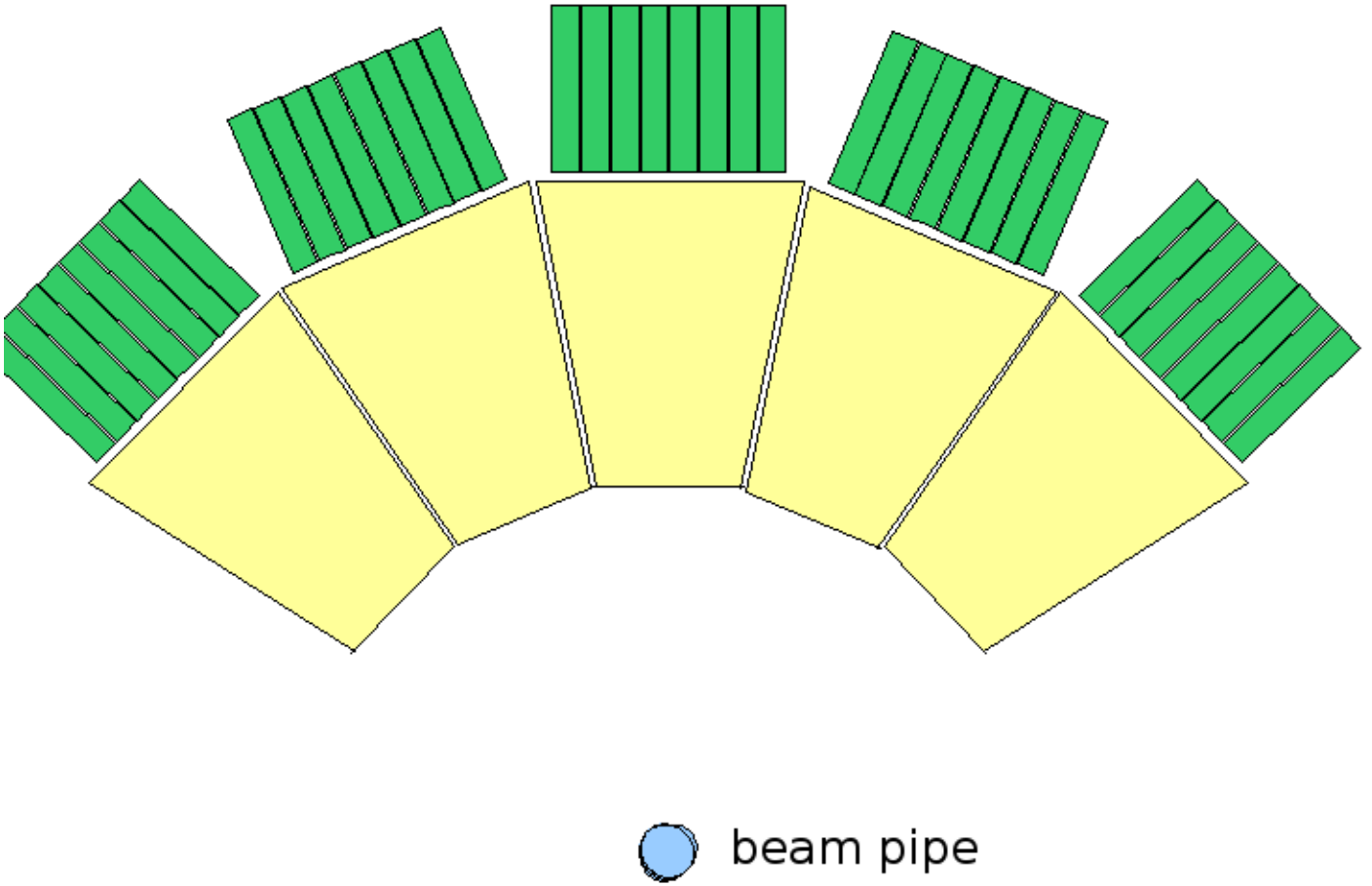
Photon detector

Burle-MCP-PMT
64 anodes
25um channels
work in high
magnetic field



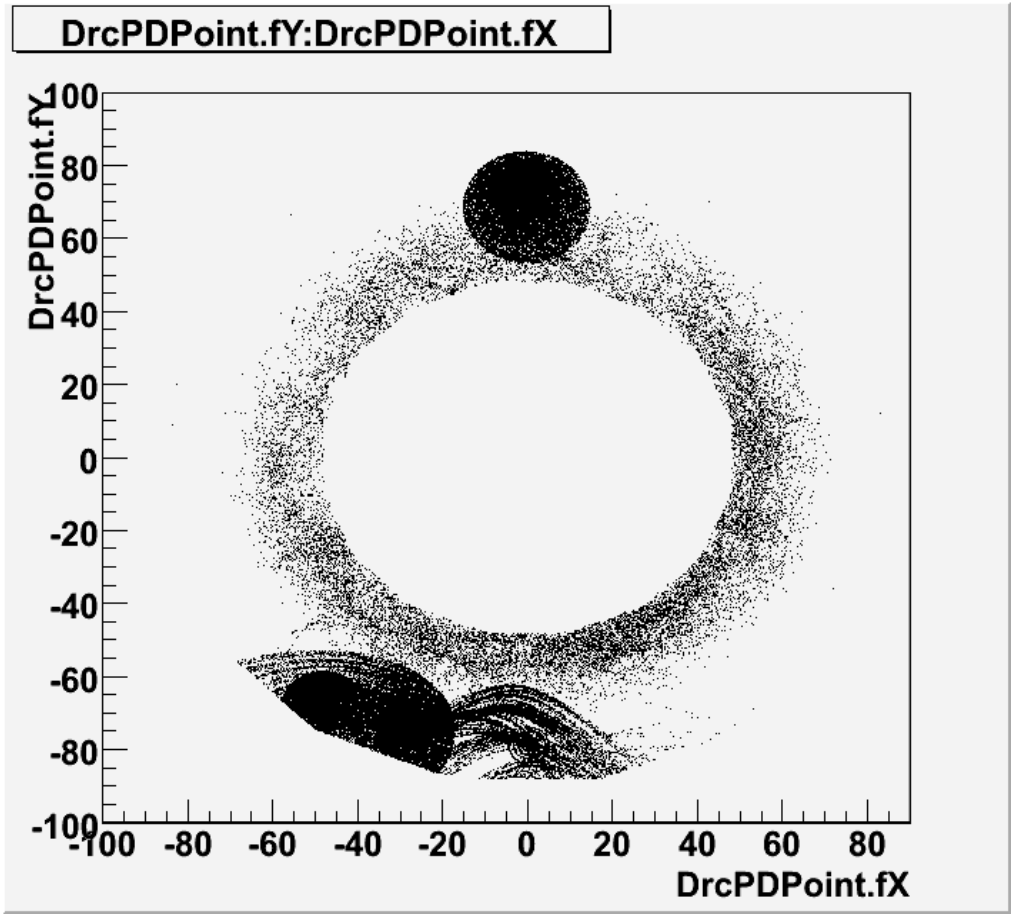


Amplitude: 2-3 mV for single photons
Time resolution 60-80ps (no amp.)

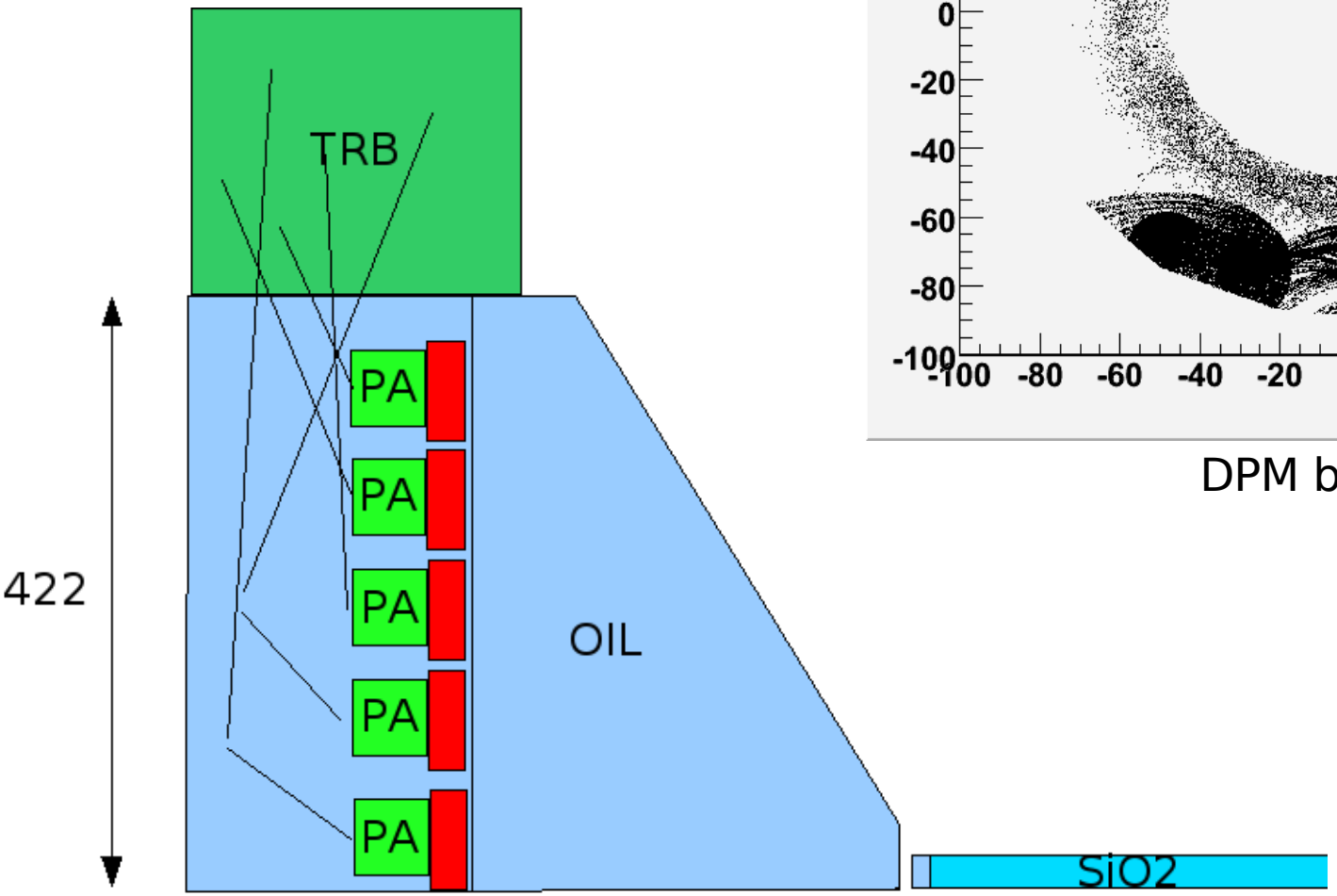

beam pipe

20 MHz interaction rate
barrel multiplicity 2
20 photons per ring
~ 5000 channels (inside region)

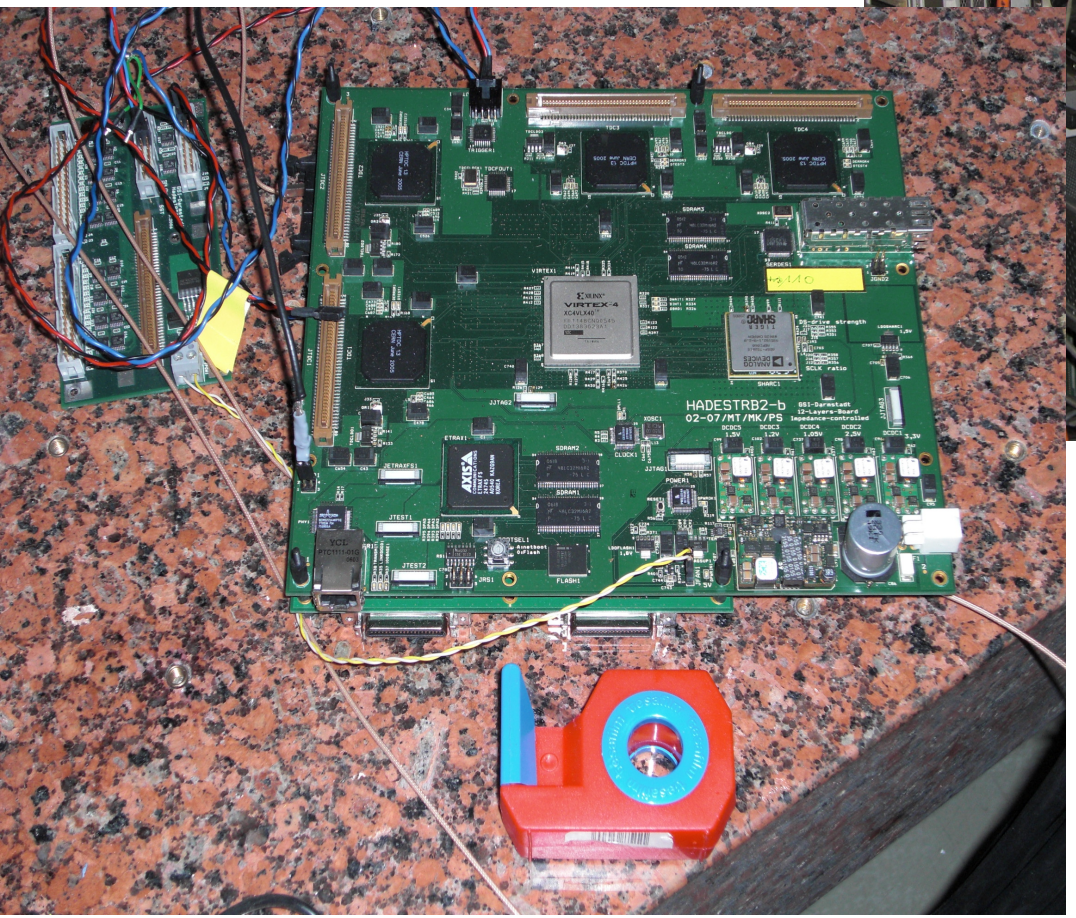
Rate: 160kHz (inside region)



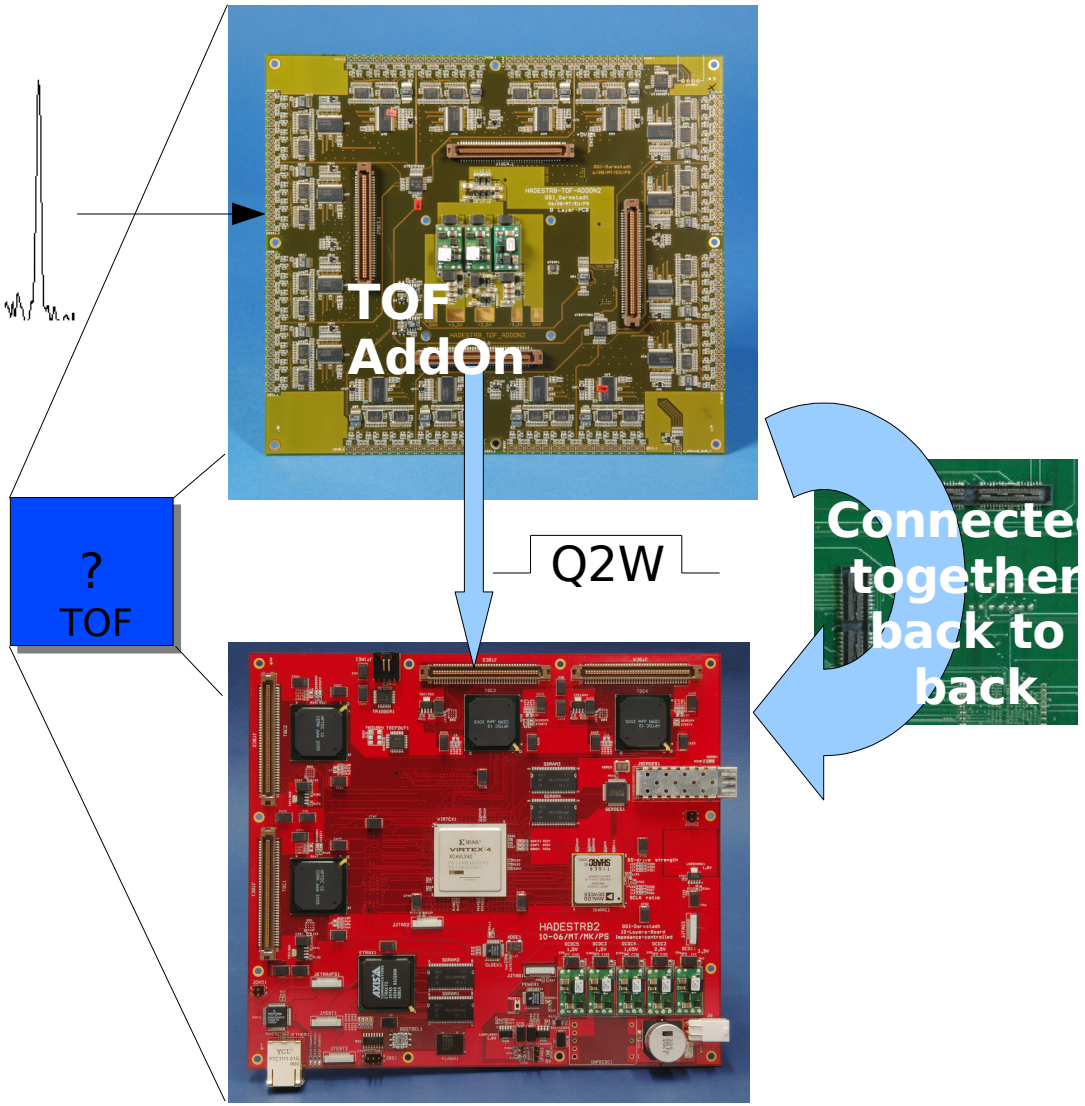
DPM background generator



Electronics



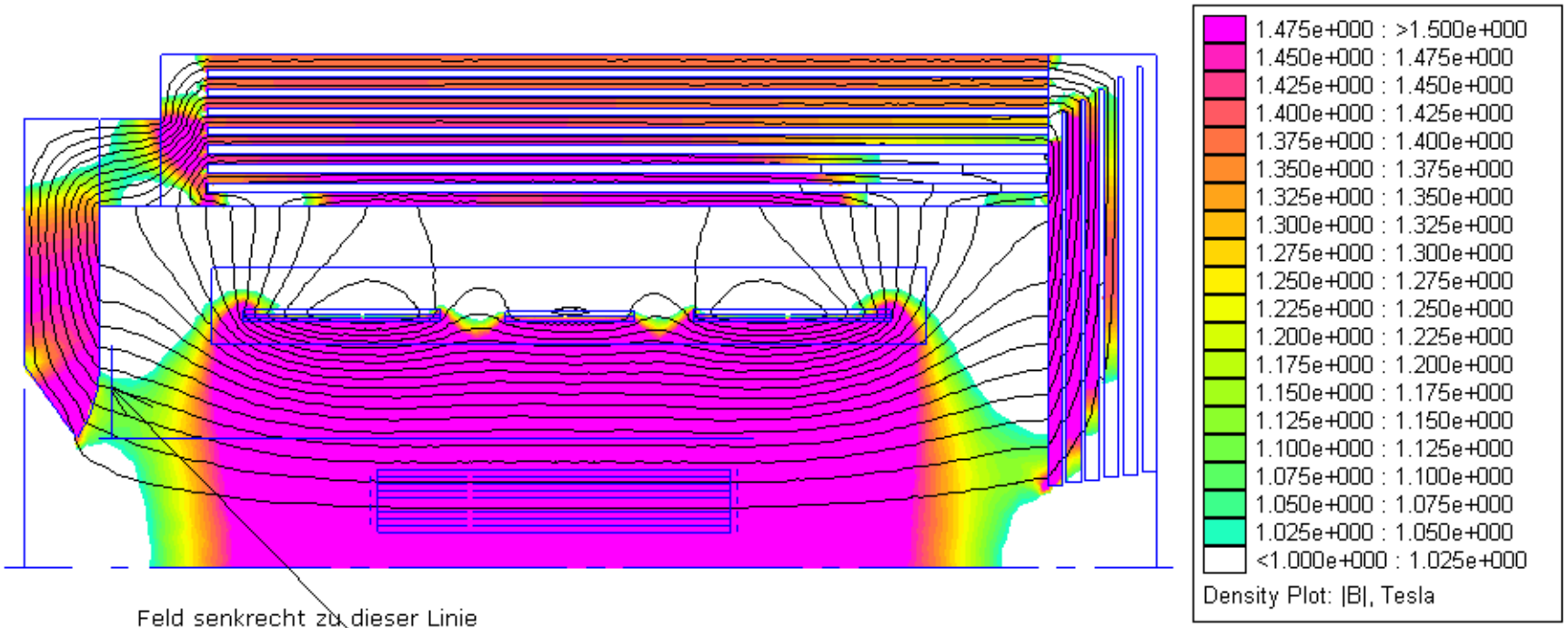
TRB
+ discriminator board
(HADES)



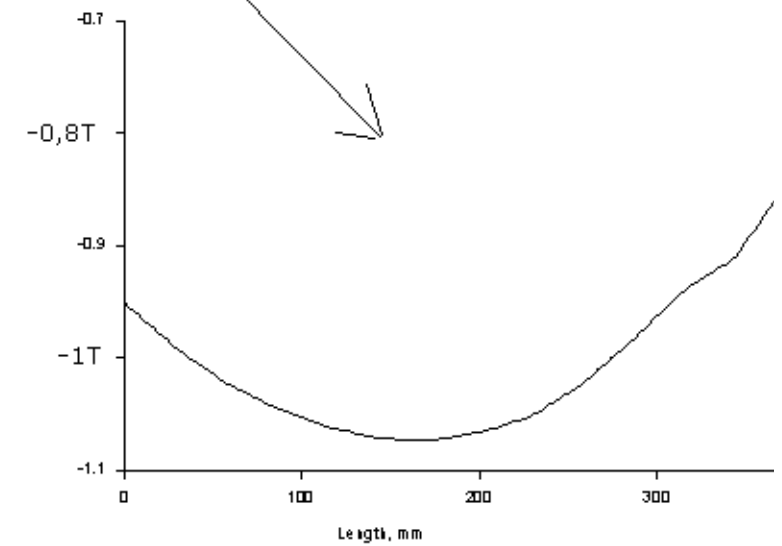
The TRB gives a power supply and a slow control

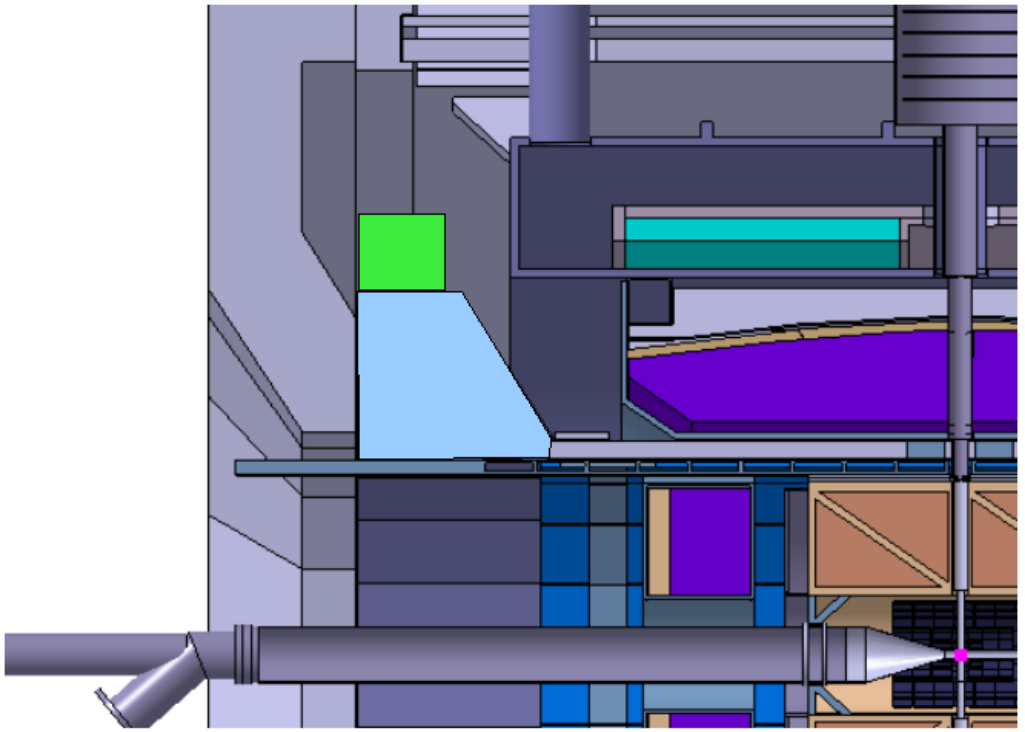
128 Q2W channels

Marek Palka IEEE Dresden



Feld senkrecht zu dieser Linie



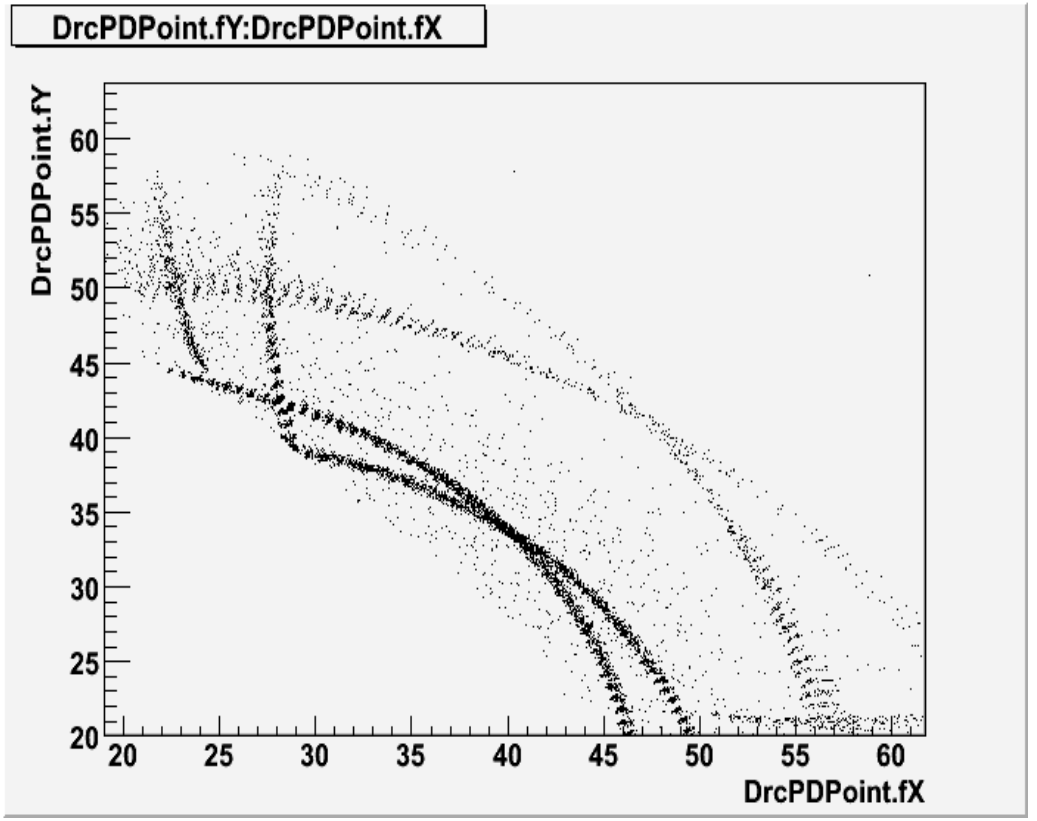


Photon detector and electronics have to work in magnetic field
B ~ 0.5-1 Tesla

Analysis

many muons 3 GeV theta=30

Trigger with Hough ?



20 photons, 5 dof: 20*19*18*17*16/5!

= 15500 combinations

Summary

- Barrel DIRC needs sub nano second timing information
  - Time over threshold information is preferred (walk)
- Idea of FEDAQ is existing
  - based on existing boards (Hades,GSI)
  - is being explored in test experiments
- DIRC in trigger needs a fast Hough transformation.