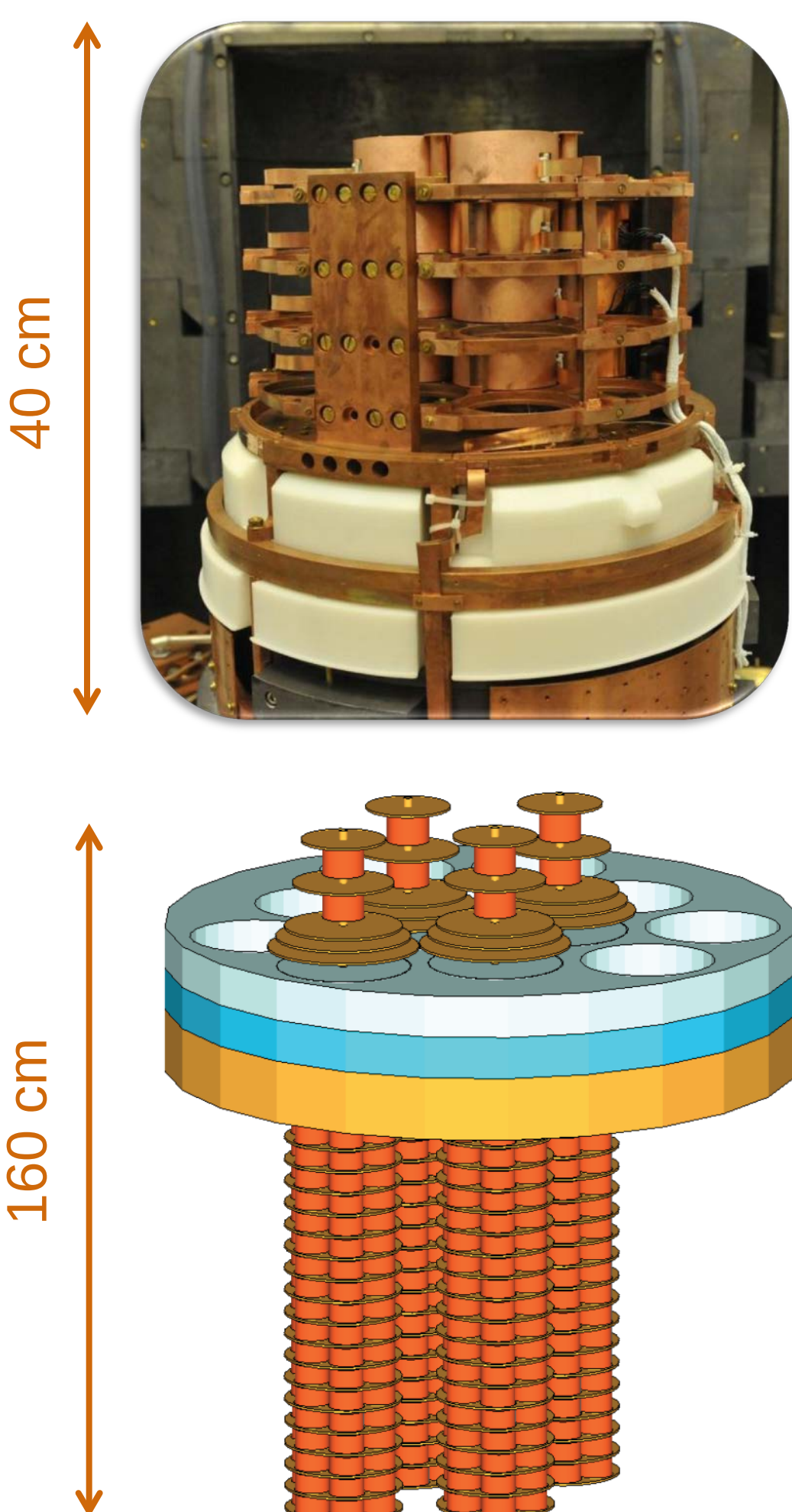


Direct DM search: from EDELWEISS to EURECA

Geertje Heuermann, Benjamin Schmidt, Bernhard Siebenborn (KIT)

EDELWEISS-3 data processing and analysis

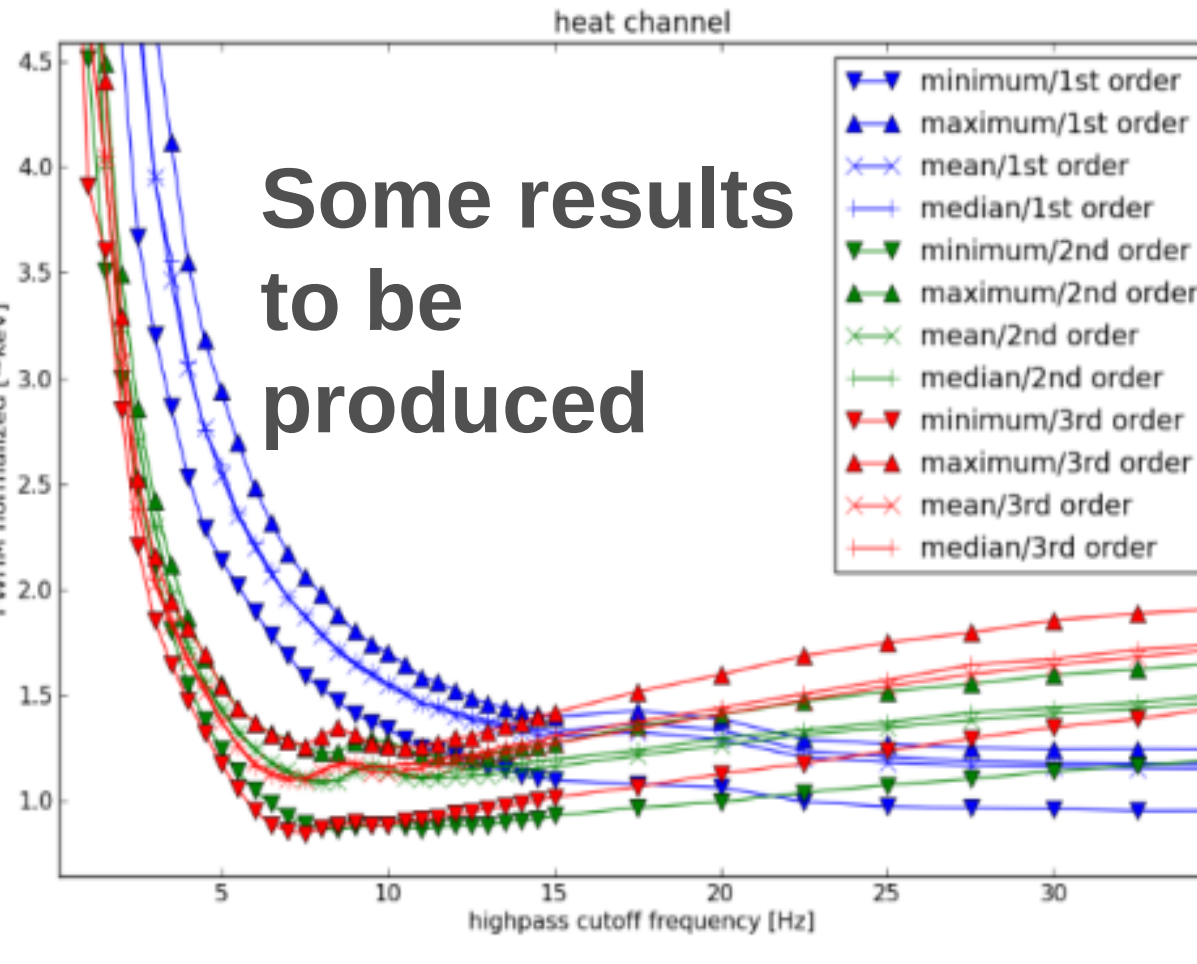
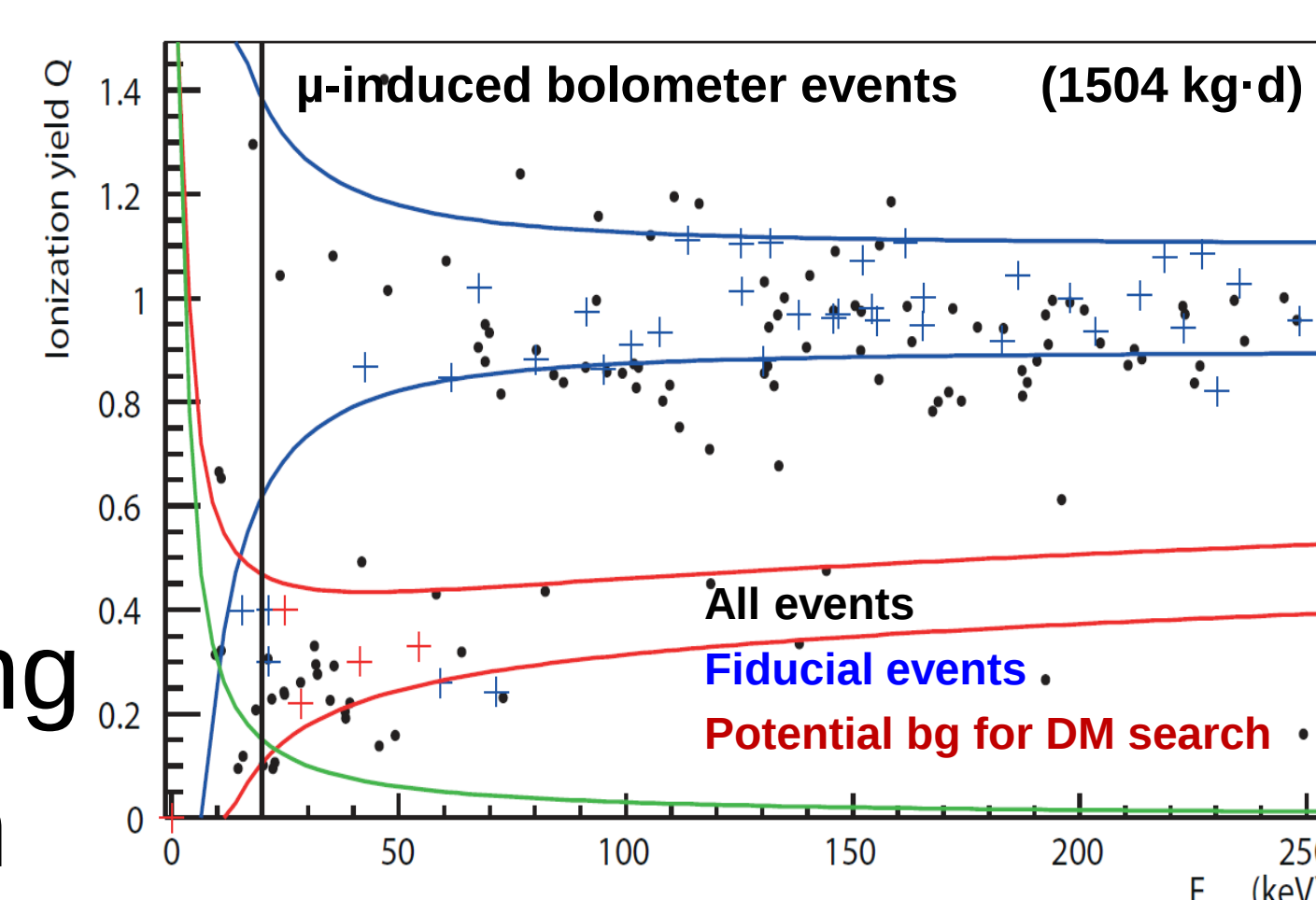
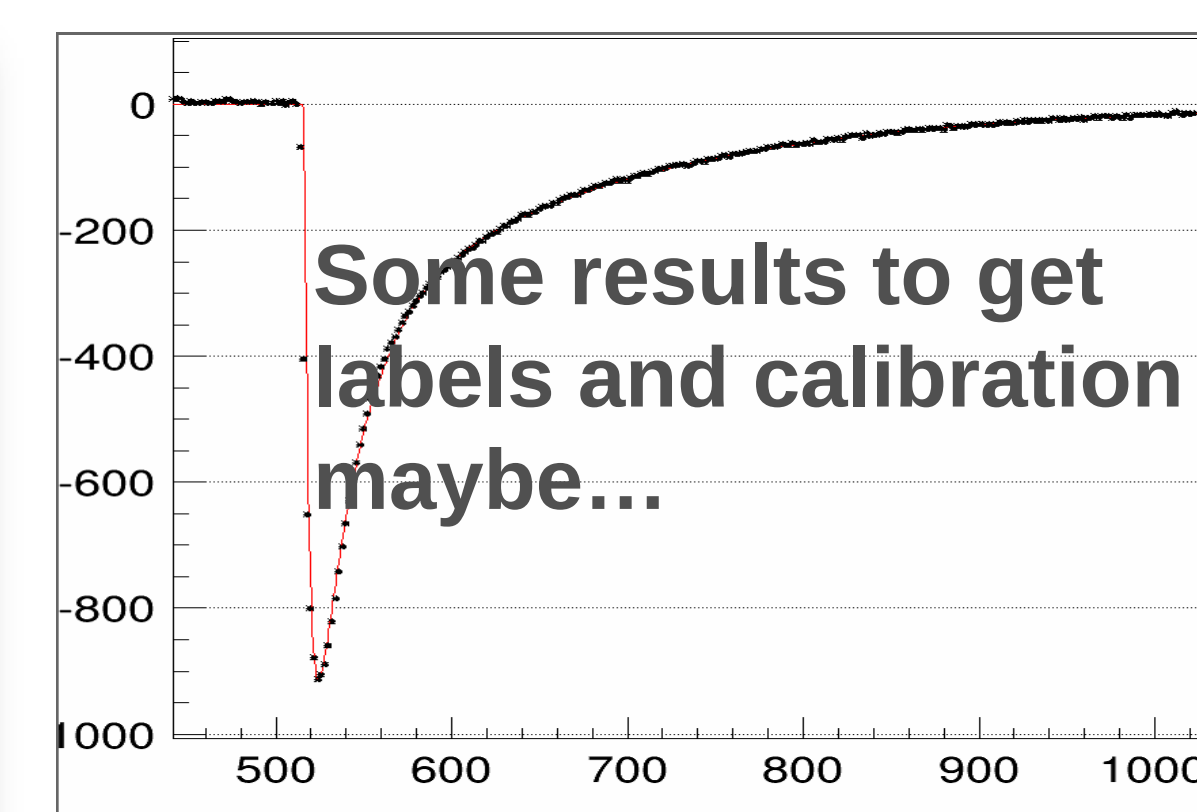
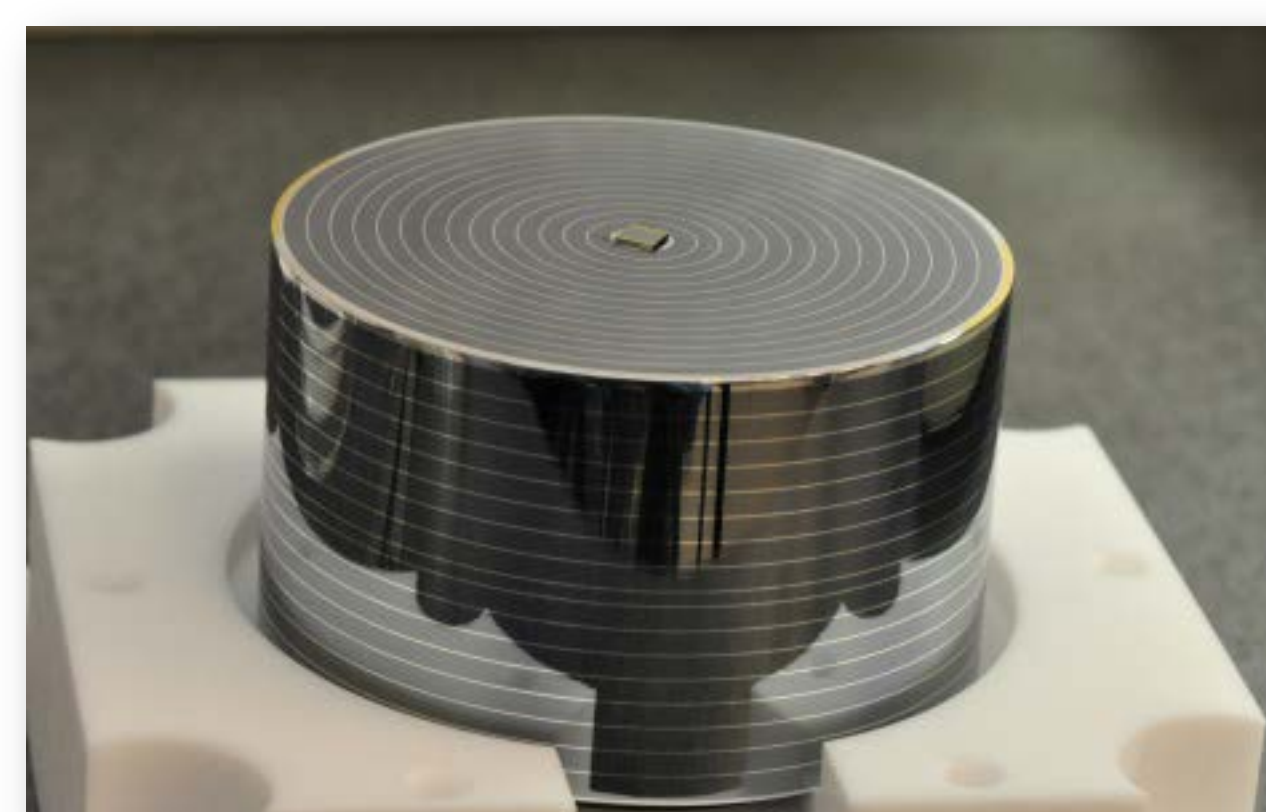


EDELWEISS - experiment
12 – 40 detectors (Edw2 – Edw3)

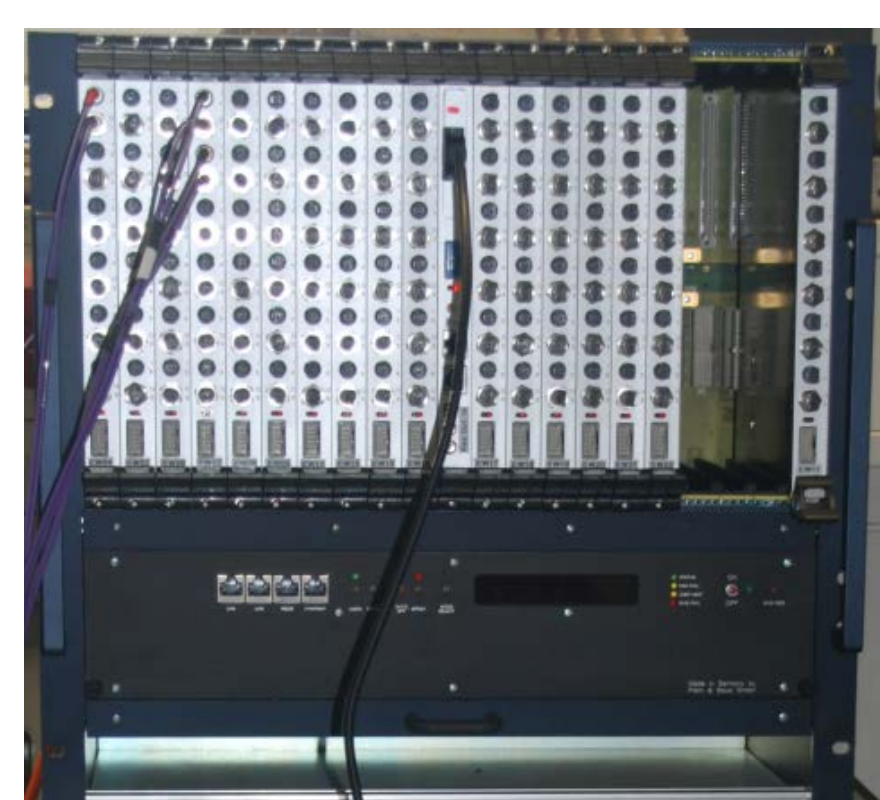
- Pulse length from $O(s)$ – $O(\mu s)$
- Low noise (high sensitivity) analysis

EURECA - experiment scale
100's of detectors

- Our solution: **Kdata** and **CouchDB**
- Flexible event based structure
 - Automatize:
Database (CouchDB) driven processing
 - Signal discrimination and identification

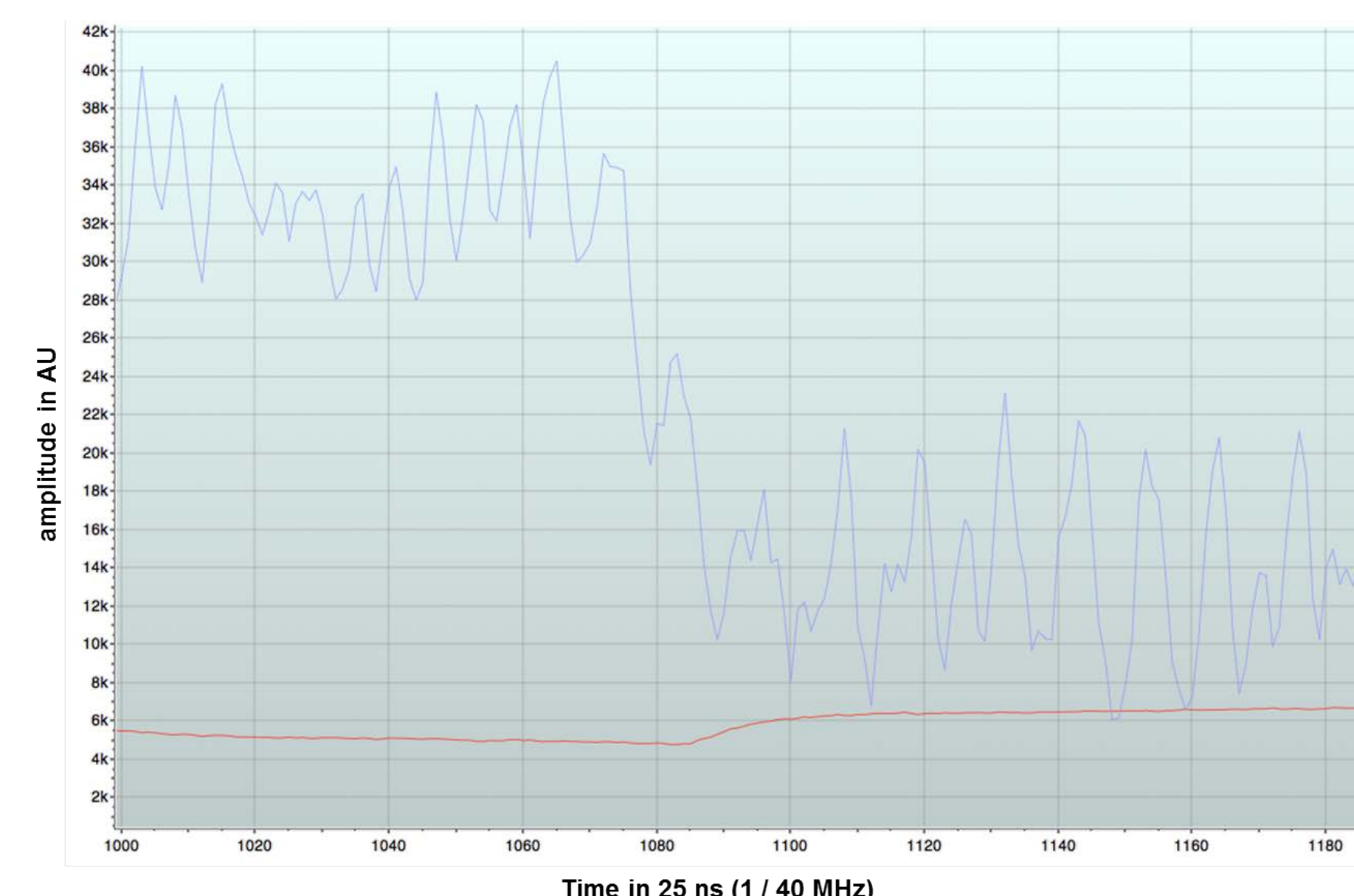
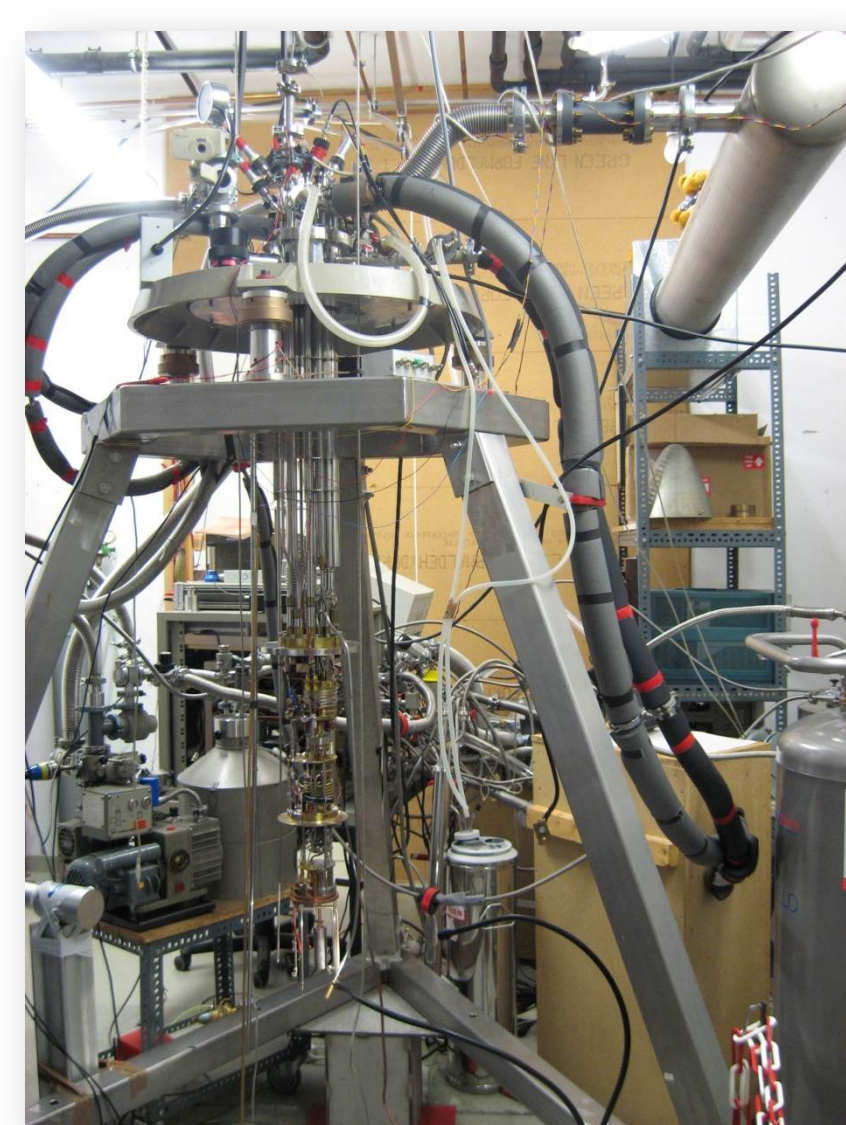
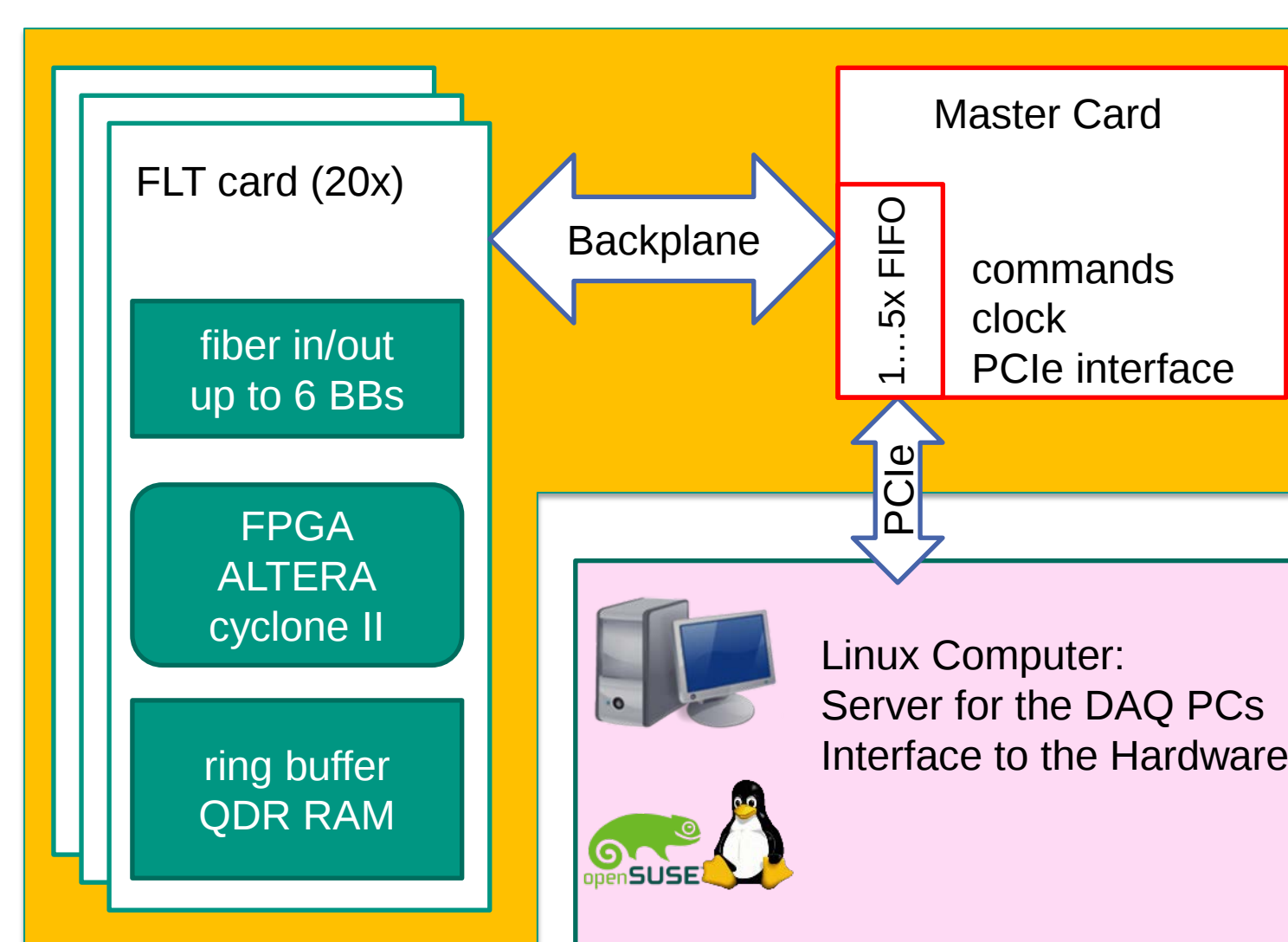
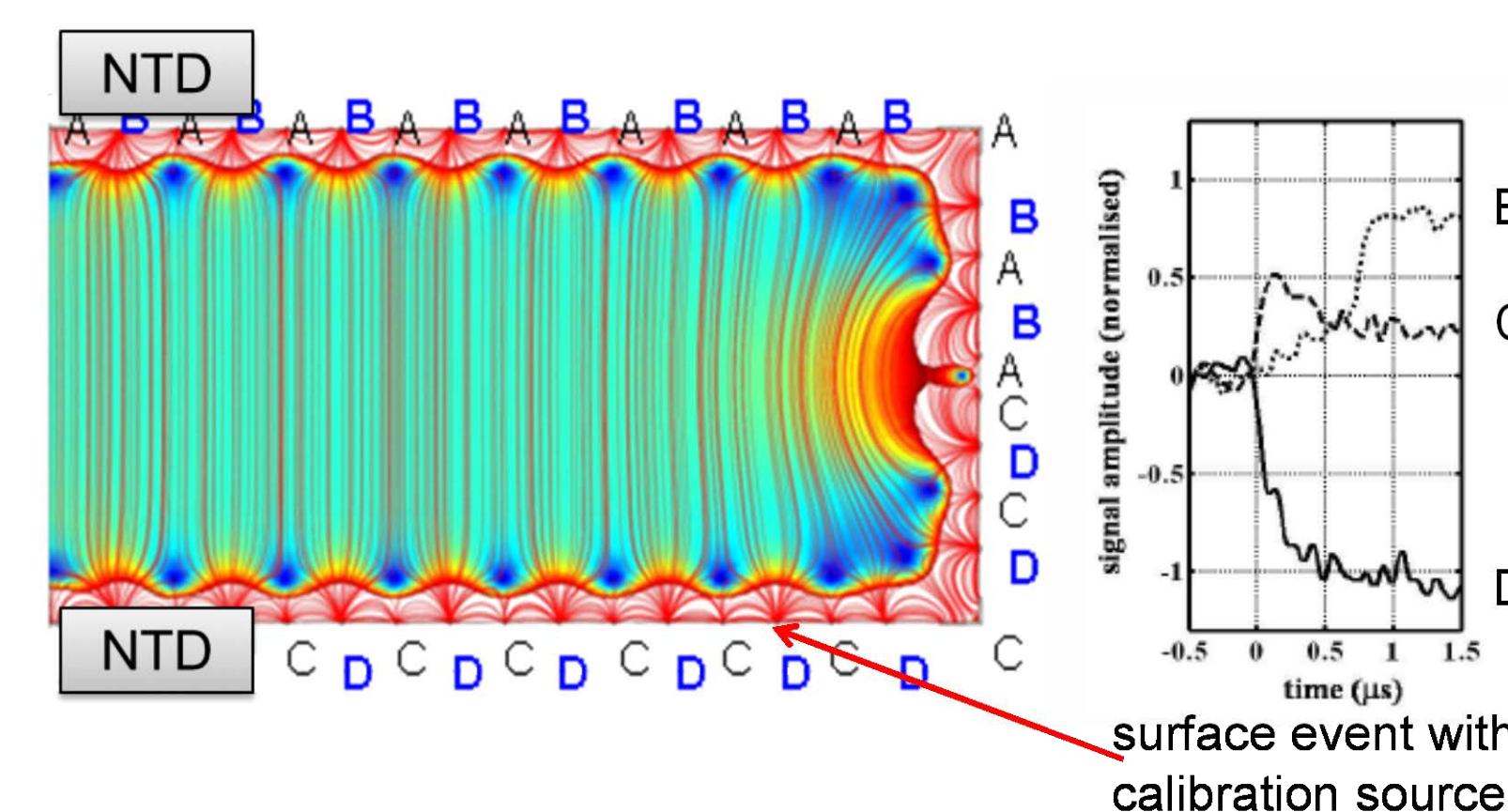


Integrated readout electronics

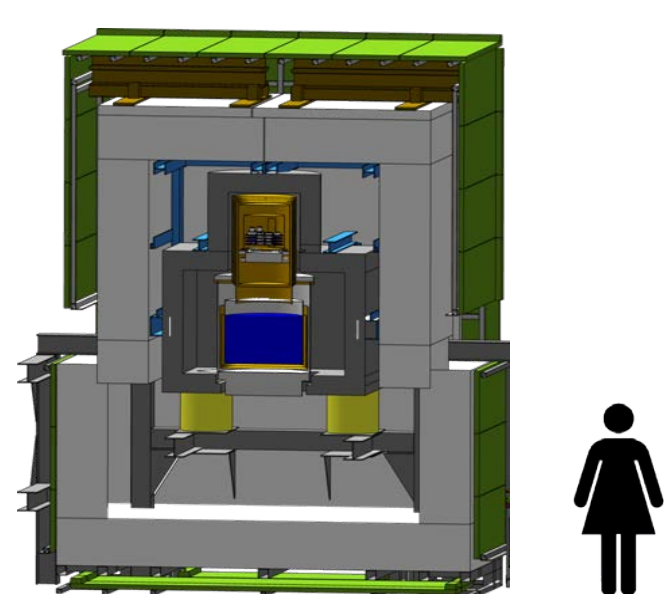


Our solution: **FPGA based DAQ**

- Internal trigger → event readout → data reduction
- Integration of external detectors → trigger on muons
- Time resolved ionization channel (40MHz) → event localization on z-axis



Shielding concepts and background suppression



EDELWEISS - experiment
 $< 10^3$ bkg evts/ton/year

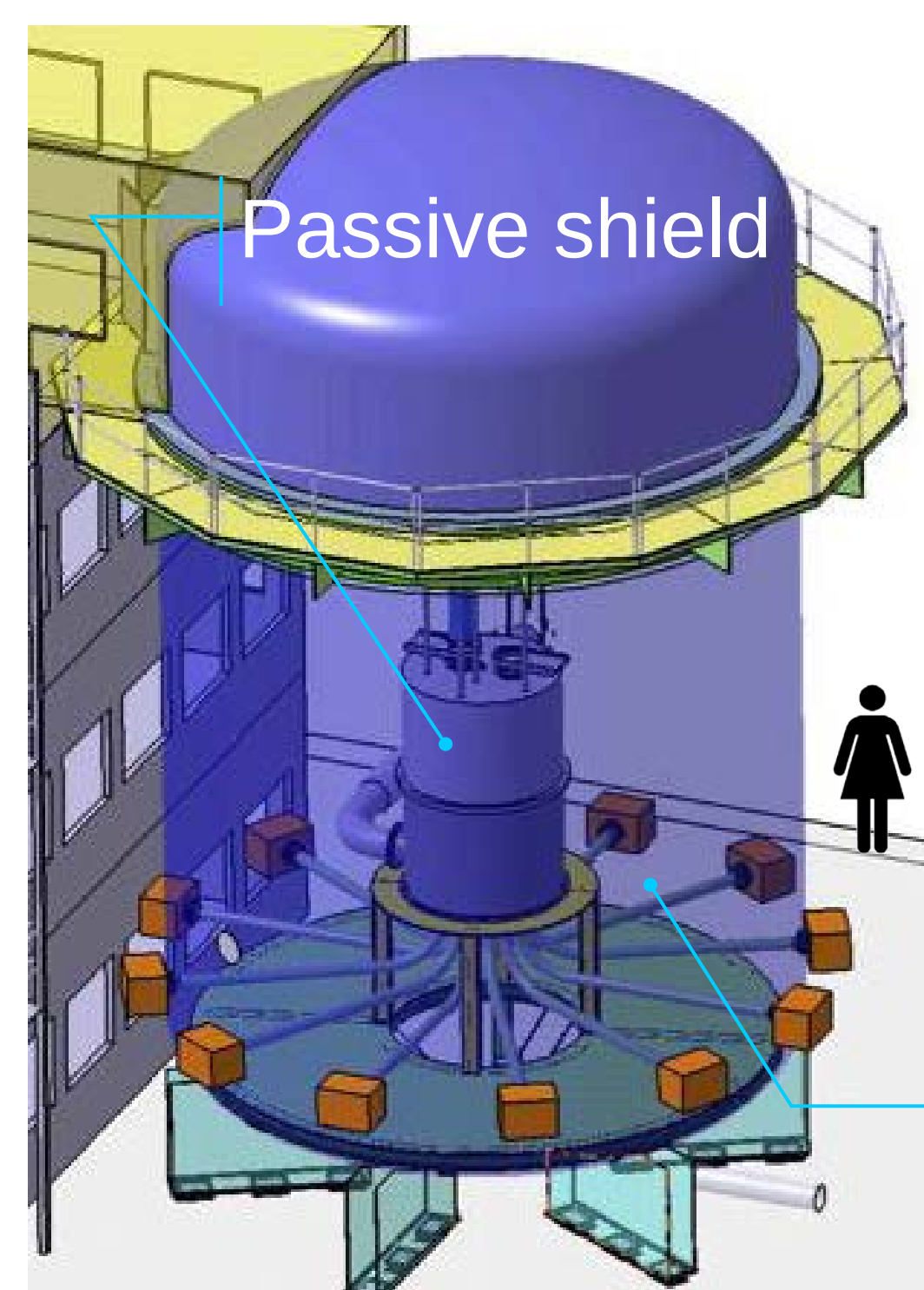
The challenge:

Cross section: $2 \cdot 10^{-11}$ pb
(3 tonne years)

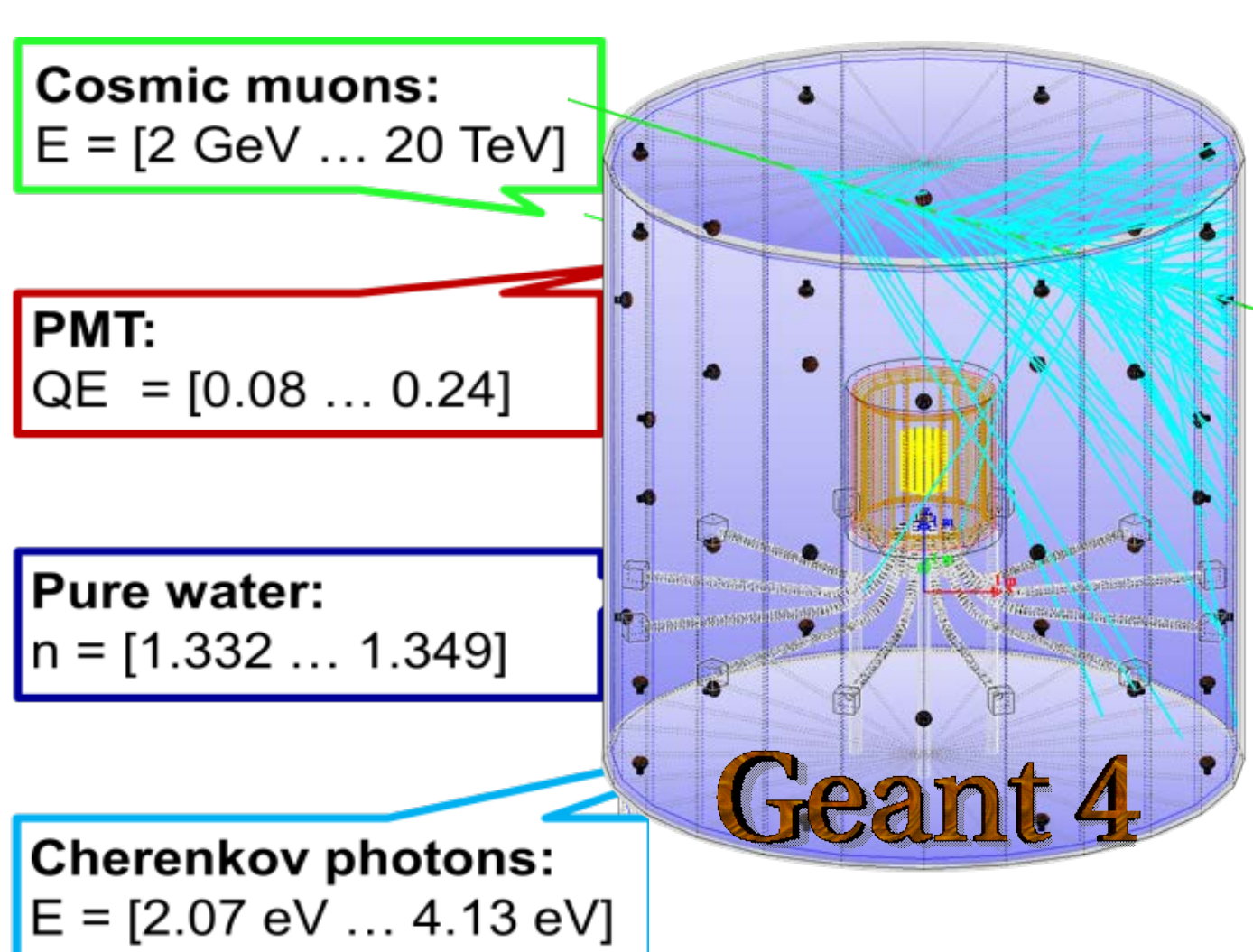
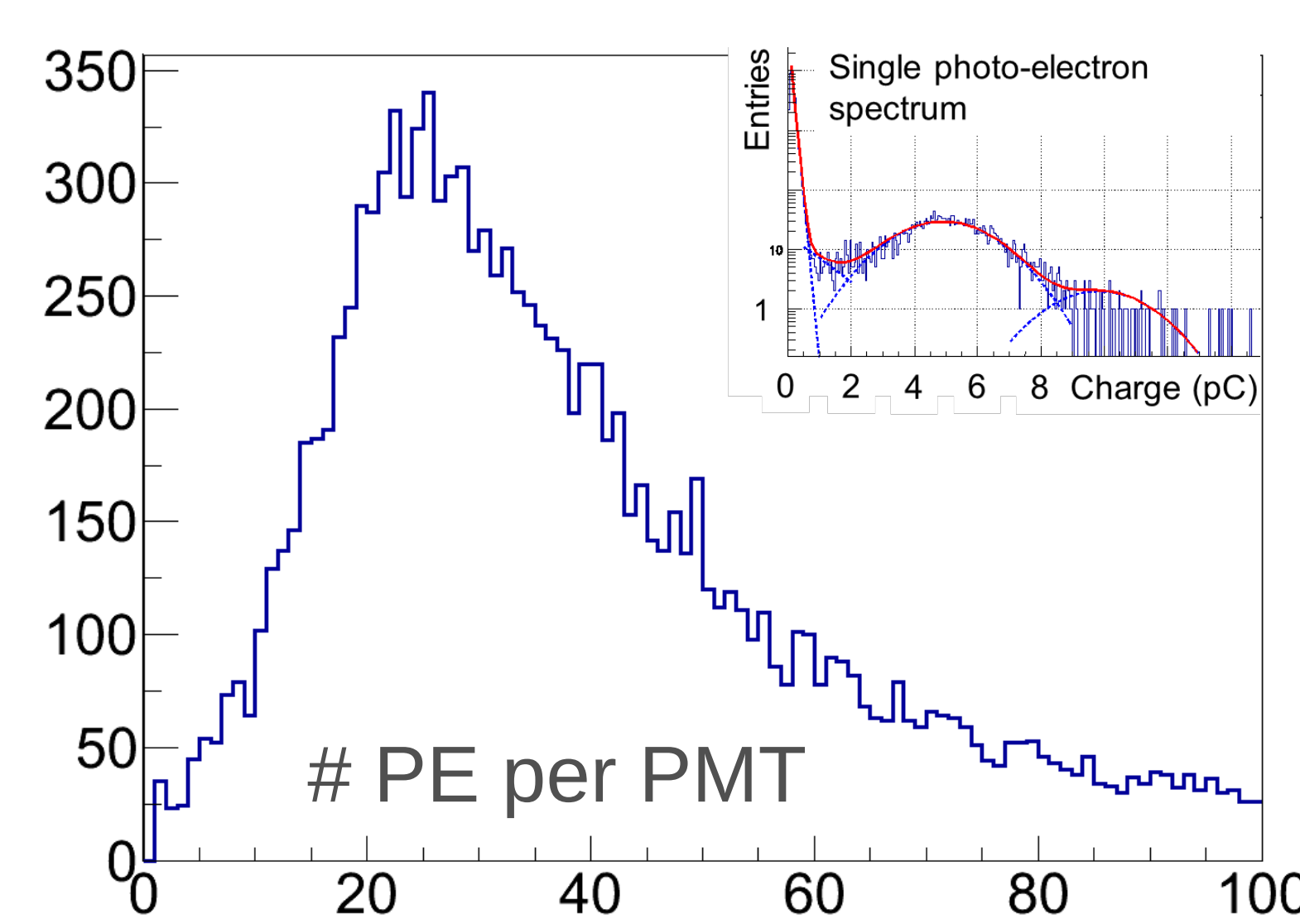
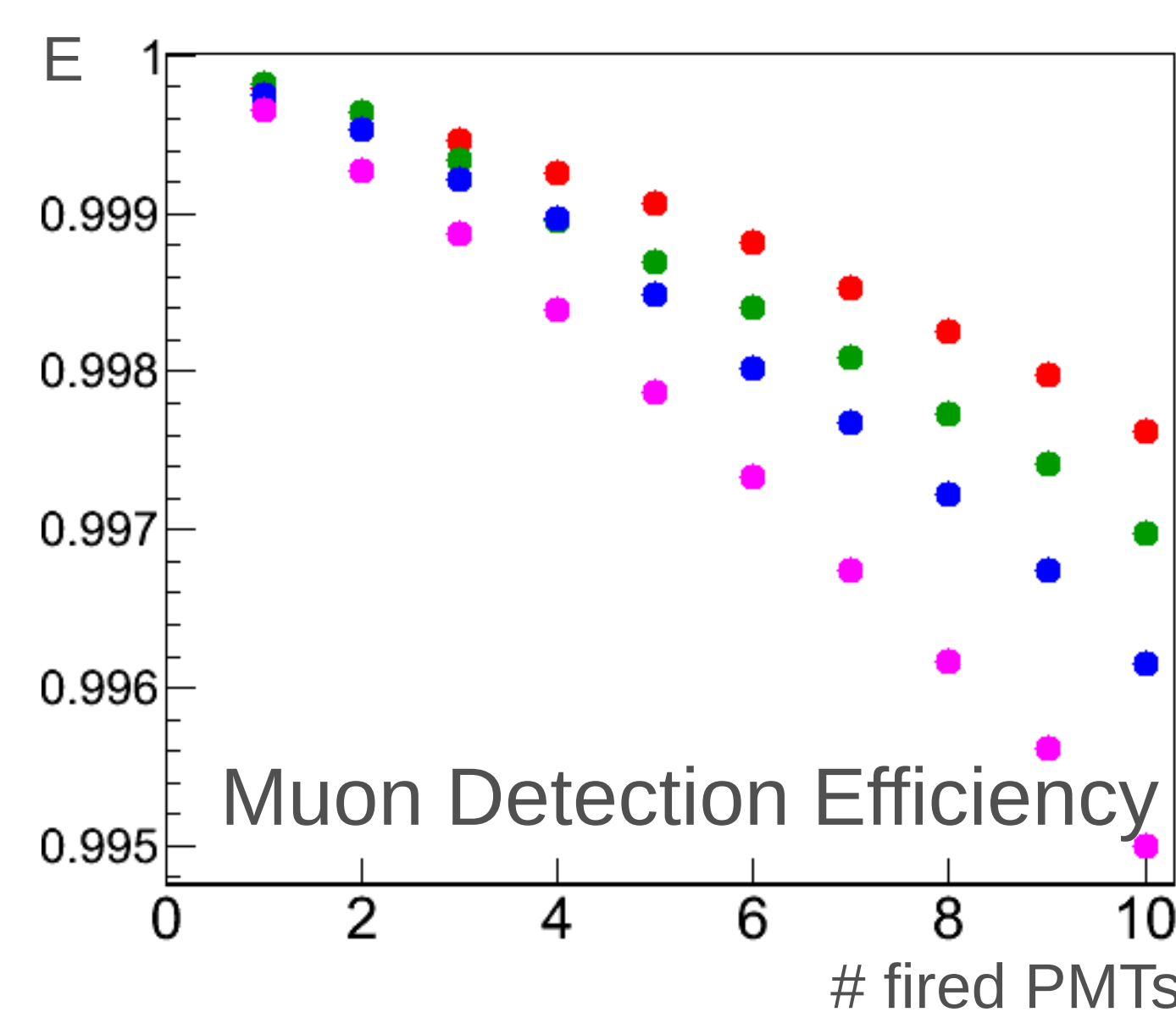
EURECA - experiment
 < 1 bkg events/ton/year

Our solution:

- optimize shielding concept
- improve radio-purity of materials
- lower detector tower bkg budget



Passive & active
water shield



Irreducible μ -induced BG

- without μ -veto:
 $\sim 1.4 \pm 0.5$ evts/ton/year
- with μ -veto: **PRELIMINARY**
 < 0.4 evts/ton/year