



Update on Phase II Detectors

TG 2



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Detectors at hand / ordered:

- N-type crystal, closed-ended geometry, unsegmented
- P-type crystal, true coaxial geometry, unsegmented
- P-type crystal, true coaxial geometry, 6 φ segments
- N-type crystal, true coaxial geometry, 6 φ x 3 z segments
- (P-type crystal, true coaxial geometry, 6 φ x 3 z segments)

→ Focus on 18-fold n-type detector → „Siegfried“

→ Successfully tested first three crystals



Suspension system with cabling:

- Stress tests ongoing at MPI
- Kapton vs. Cuflon
- Holders and cables will be mounted at CANBERRA



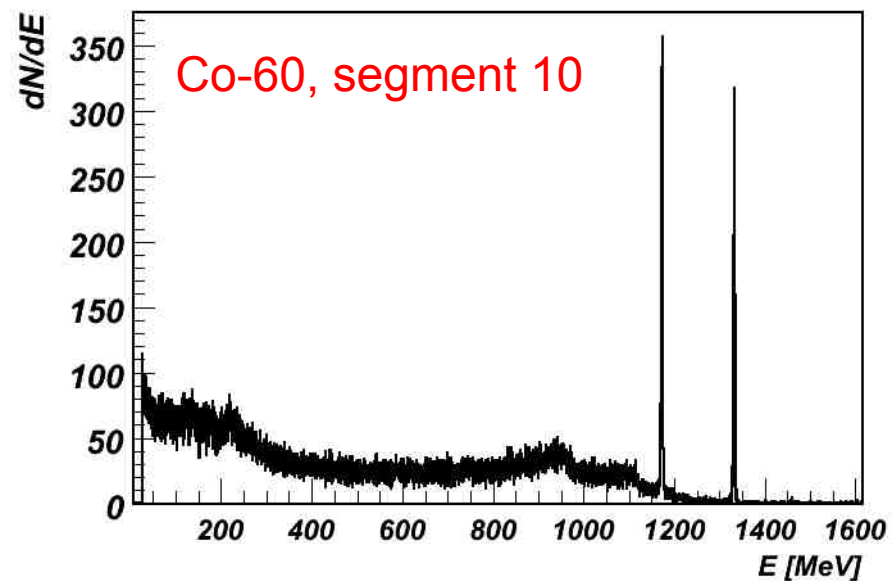
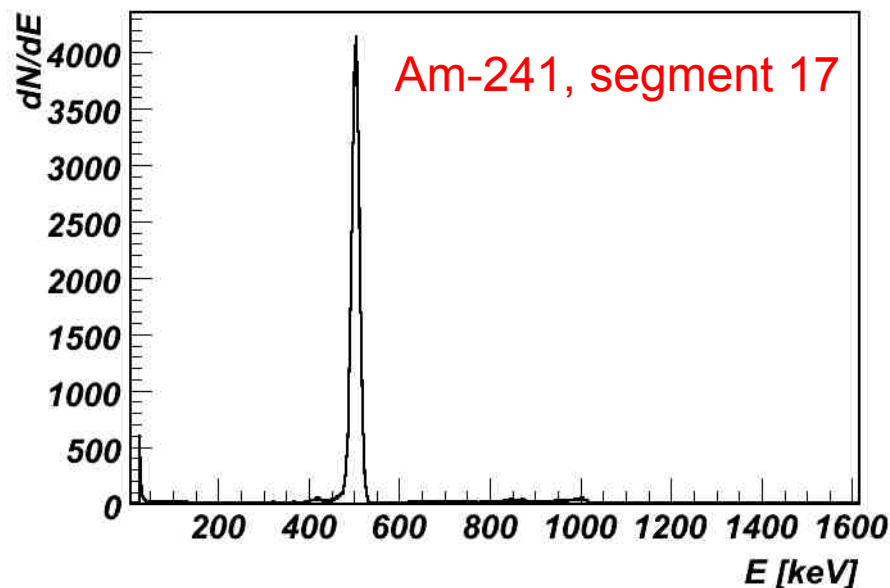


Detector Development (III) - Siegfried



Energy resolution: Plans:

- Core ~ 2.4 keV
- Segments ~ 4 keV (FWHM)
- Deliver detector to MPI Munich in march
- Operate in vacuum test cryostat first
- New teststand is being build \rightarrow Bela's talk





TG 2 - Key Questions



Key questions:

- Do n-type and p-type detectors work in liquid nitrogen?
- Do n-type and p-type detectors work in liquid argon?
- Do segmented detectors work in cryoliquid?
- Are the detector properties well understood?

→ **Teststands in Munich aim to answer these questions.**



Teststand: Milchkanne



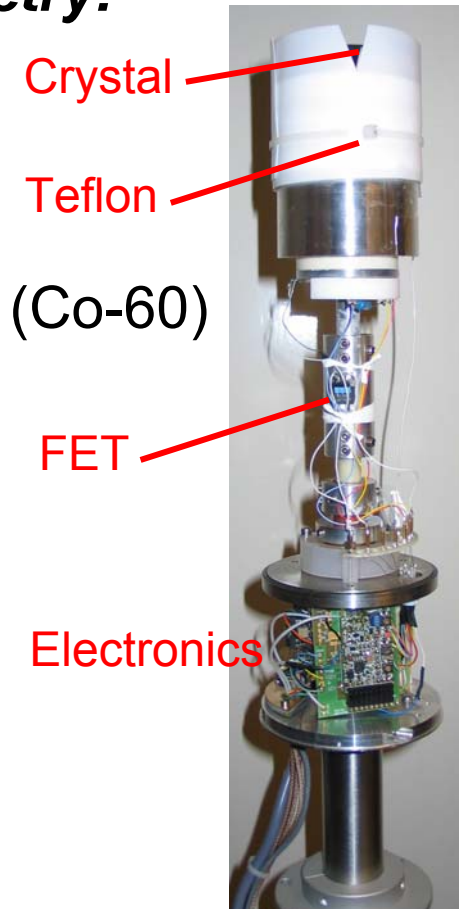
N-type crystal with closed-ended coaxial geometry:

- 20 cooling cycles in liquid nitrogen
- 3 cooling cycles in liquid argon
- Energy resolution ~ 6 keV (FWHM) at 1.332 MeV (Co-60)

→ No difference in energy resolution after
continuous cycling

→ No difference observed between nitrogen and
argon as cryoliquid

→ Robust if treated carefully (survived impurities and power glitches)

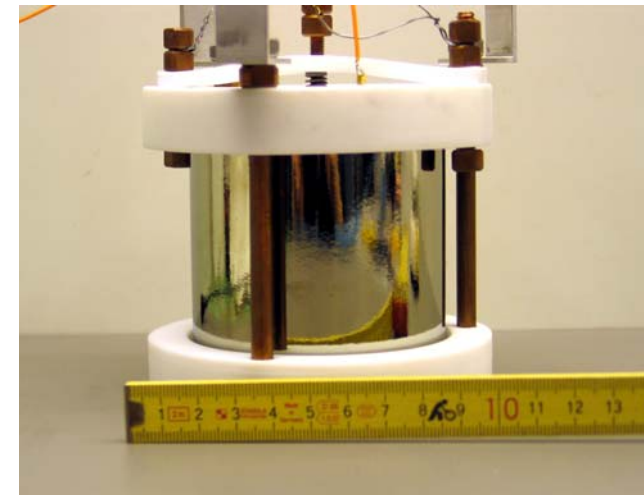
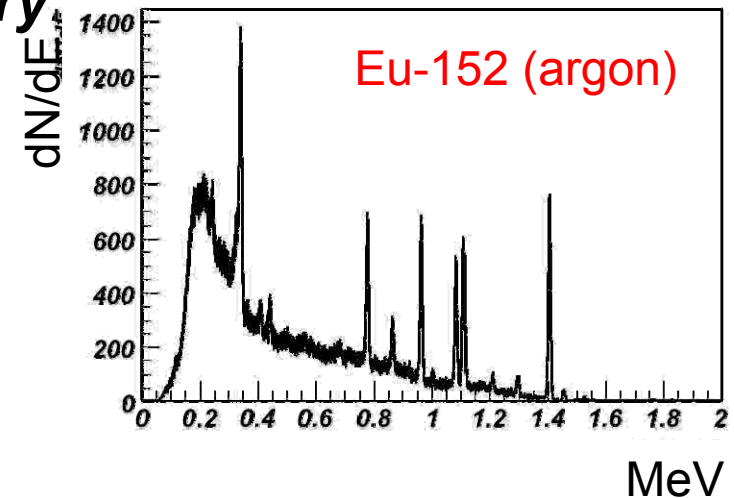




P-type crystal with true coaxial geometry:

- 7 cooling cycles in liquid nitrogen
- One cooling cycle in liquid argon
- Energy resolution ~ 10 keV (FWHM)
at 1.332 MeV (Co-60)

- No difference in energy resolution after continuous cycling
- No difference observed between nitrogen and argon as cryoliquid
- Robust if treated carefully



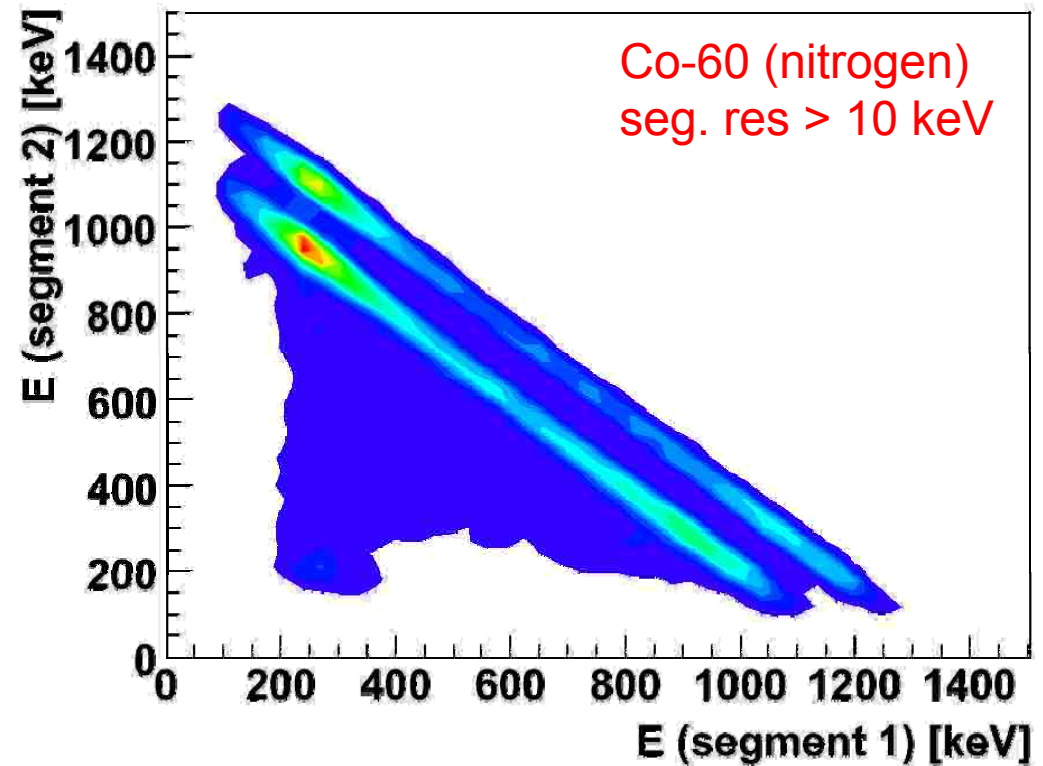
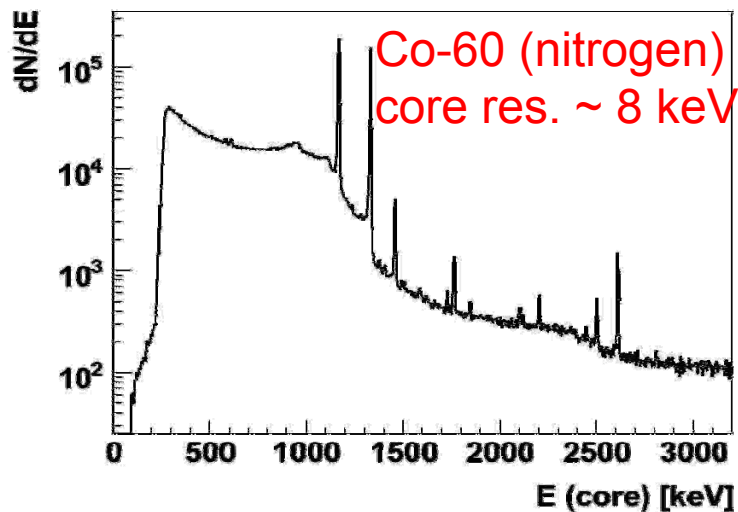


Teststand: GERDA linchen I (II)



P-type crystal with true coaxial geometry and 6 phi segments:

- 2 cooling cycles in liquid nitrogen
- Accident with heating liquid → crystal sent back to DSG
- But: **First segmentation results**



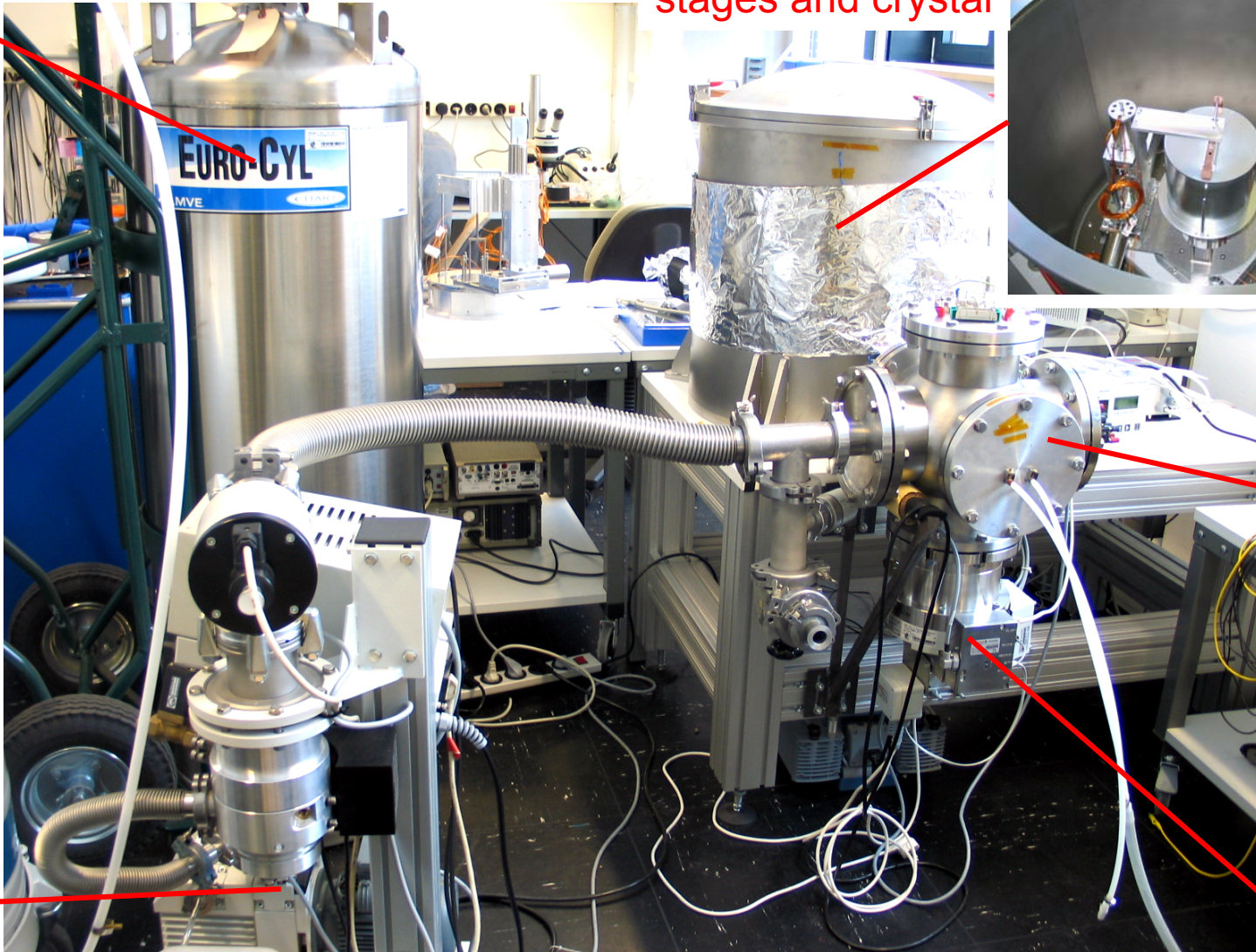


Vacuum Teststand: Galatea



nitrogen
reservoir

stages and crystal



nitrogen
in/out

(pump)

pump



Summary / Outlook



- 18-fold n-type prototype at hand
- Copper holders and cabling developed and produced at MPI
- Integration of suspension and cabling done at CANBERRA
- N-type and p-type detectors successfully operated in nitrogen
- N-type and p-type detectors successfully operated in argon
- Segmented detectors work in nitrogen
- More teststands are planned → detector properties
 - GERDAlinchen II (MPI) / III (LNGS)
 - Galatea
- Focus on segmented detectors in nitrogen (p-type, n-type)