

Status of Corrado and GeMPI III Spectrometers



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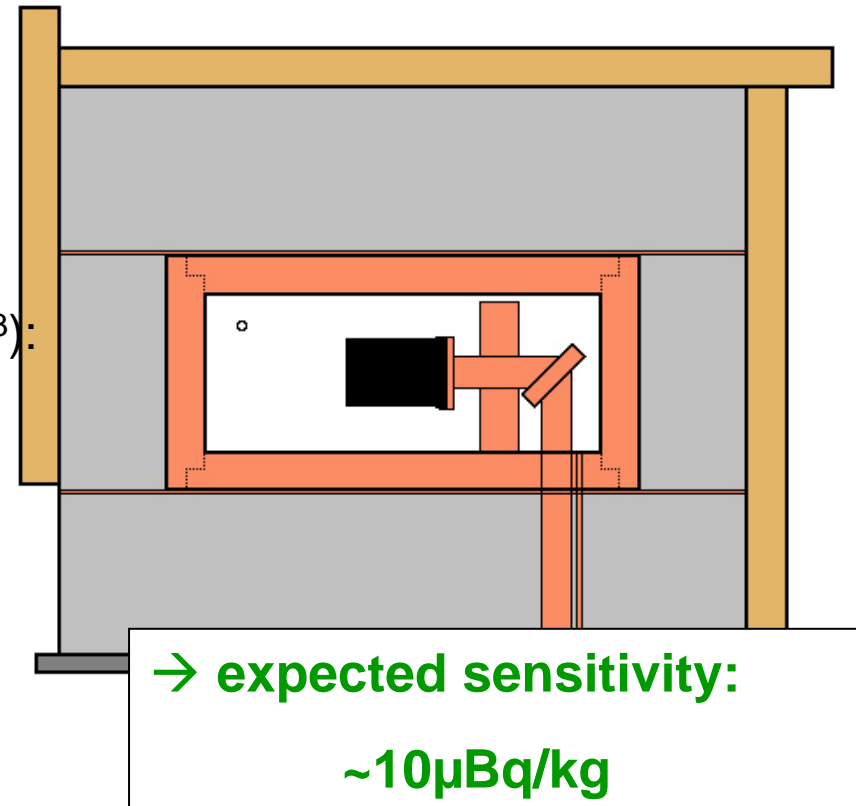
Gerda Collaboration Meeting
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Design of Corrado

- ❑ located in Low-Level-Lab (15m w.e.) at MPIK in Heidelberg
- ❑ HP Ge-crystal:

coaxial, p-type
0.96 kg
with aluminum cap
- ❑ sample chamber (20x20x35 cm³):
allows for N₂ flushing from dewer evaporation
- ❑ passive shielding:
5cm Cu and 15-20cm Pb
- ❑ active shielding:
MWPC in anticoincidence
~10⁴μ/min @40ms dead time

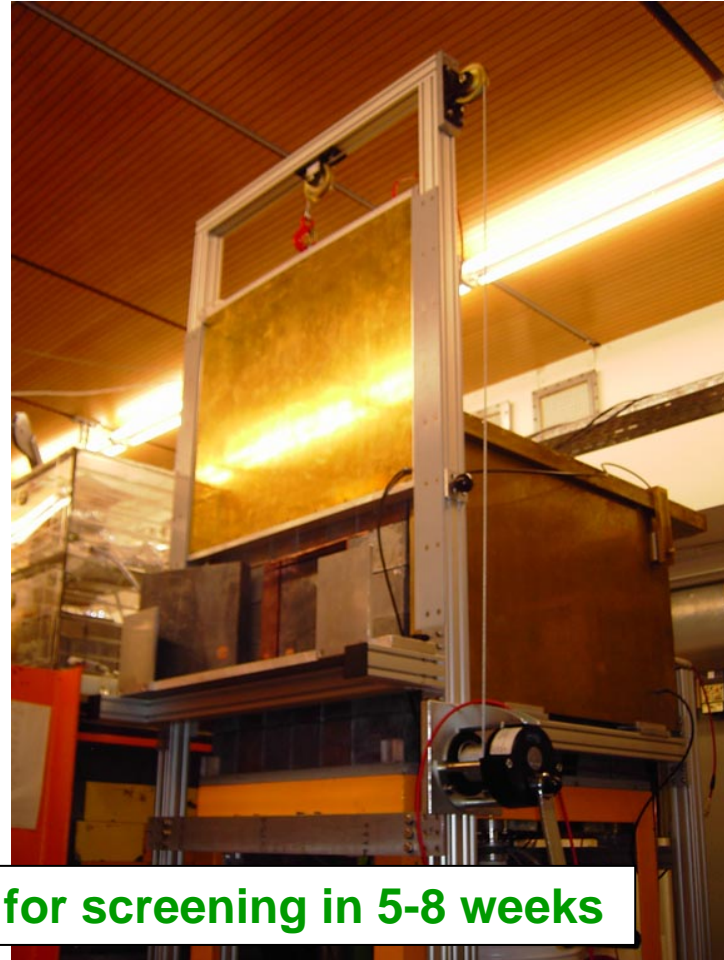


Status of Corrado

- ❑ assembly of detector, shielding system and electronics completed early this year
 - the first spectra have been taken (see next slide)
- ❑ MC-model of geometry is available

upcoming activities:

- ❑ fine tuning of electronics (optimising efficiency and resolution of crystal and veto)
- ❑ dead layer determination
- ❑ long background measurement



→ Corrado is expected to be ready for screening in 5-8 weeks

First BG-spectrum of Corrado

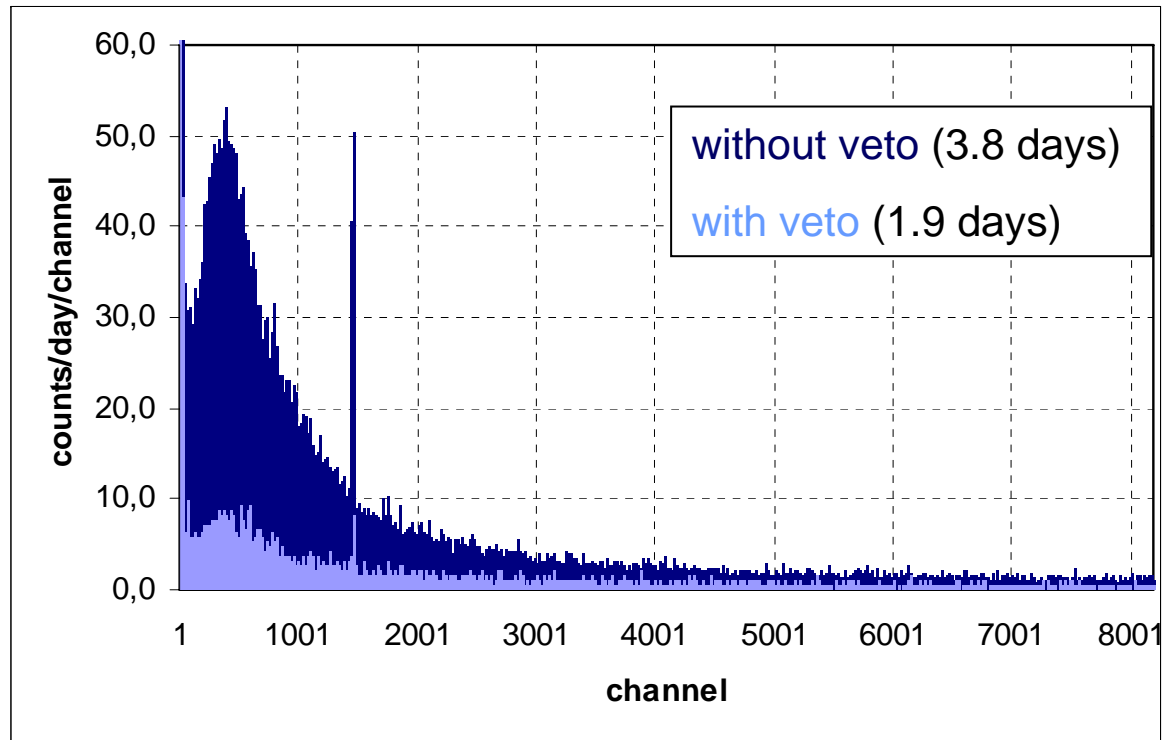
→ background suppression by veto is 88% - to be improved

→ total count rate (40-2700 keV) is slightly worse than in Dario (with veto):

Dario	2.5 cpd/chn
Corrado	3.8 cpd/chn

→ no line-BG observed (yet):

TI-208 (@2615 keV):	
Dario	13.1 cpd
Corrado	≤ 3 cpd



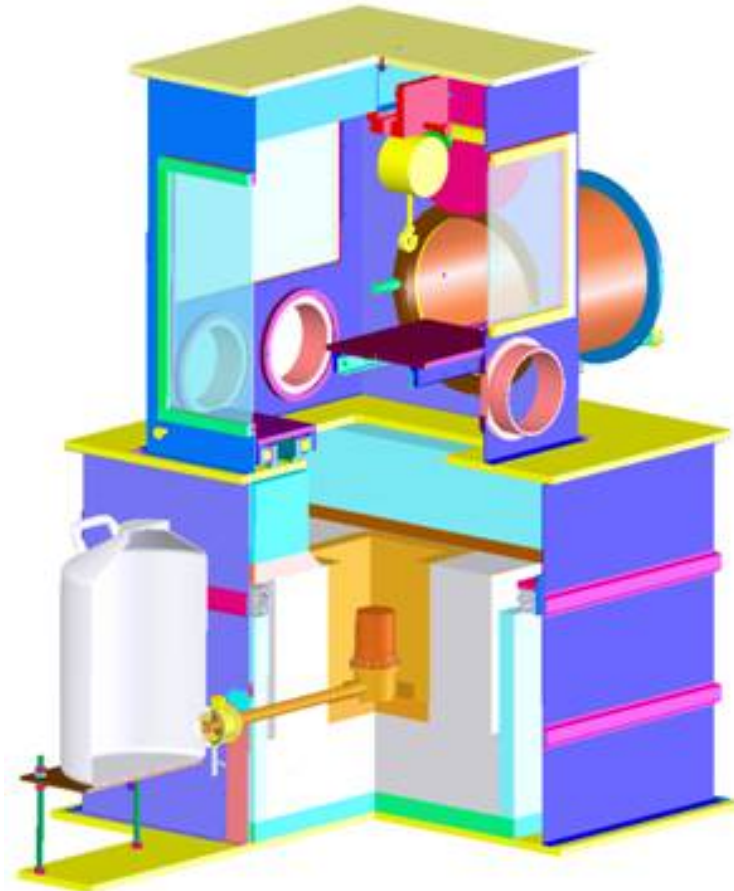
Design of GeMPI III

- ❑ located at LNGS (3500m w.e.)
- ❑ customized HP Ge-crystal in LENS-copper cryostat & roman lead as FET-shield:

coaxial, p-type
2.2 kg



- ❑ sample chamber (25x25x25 cm³):
- ❑ passive shielding:
5cm Cu and 20cm Pb
- ❑ radon tight steel casing with airlock
→ constantly flushed with boil off nitrogen

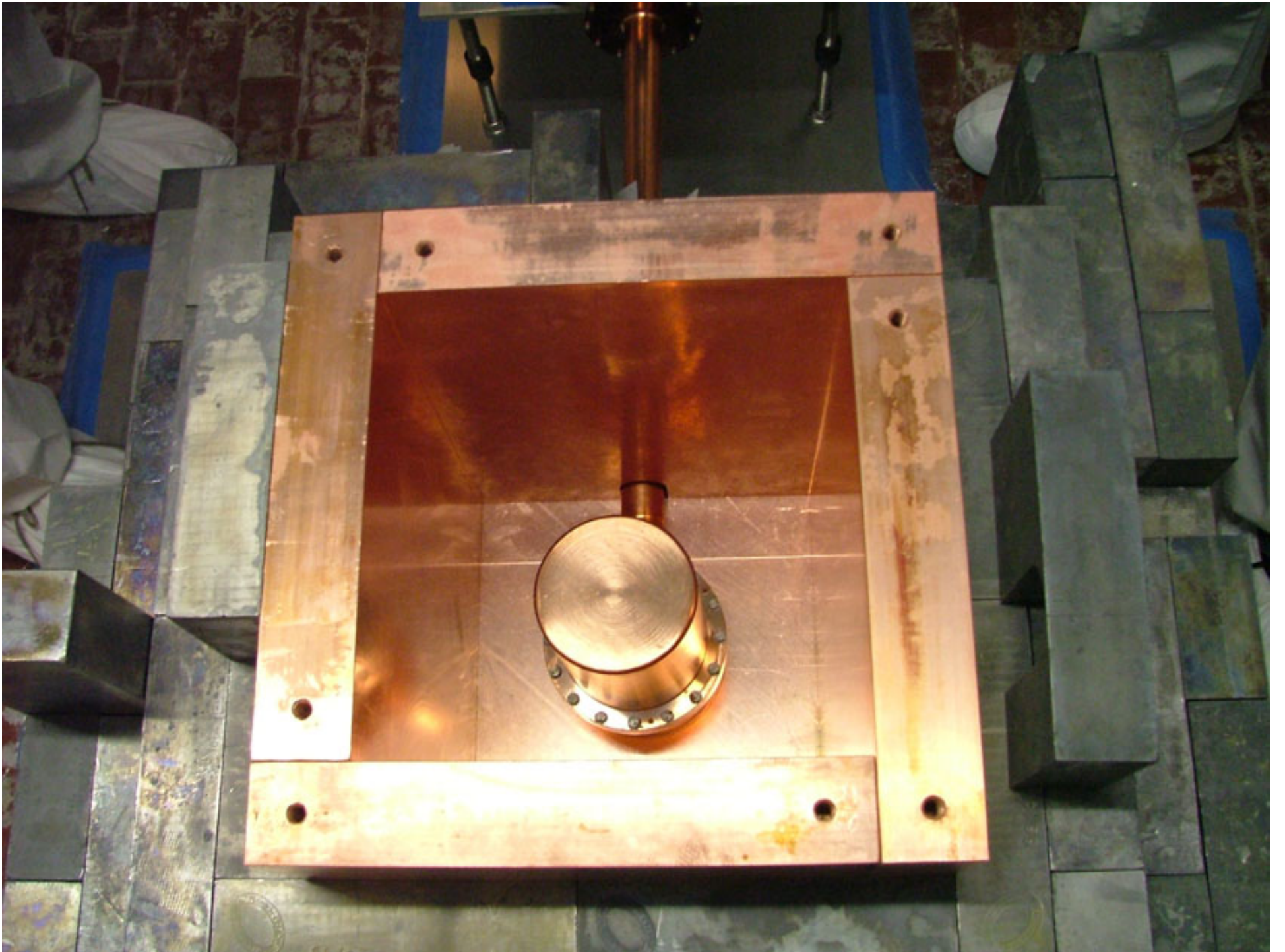


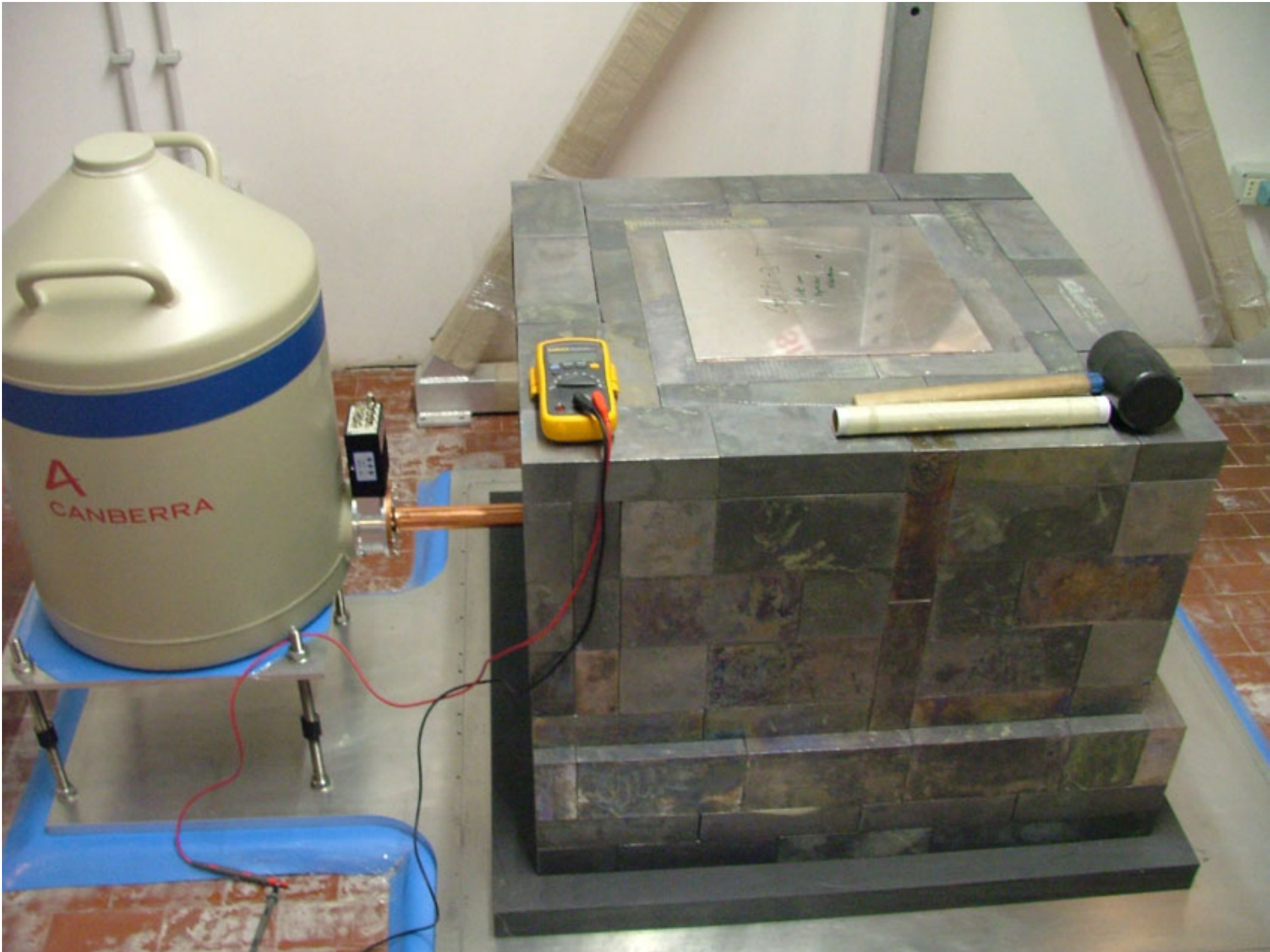












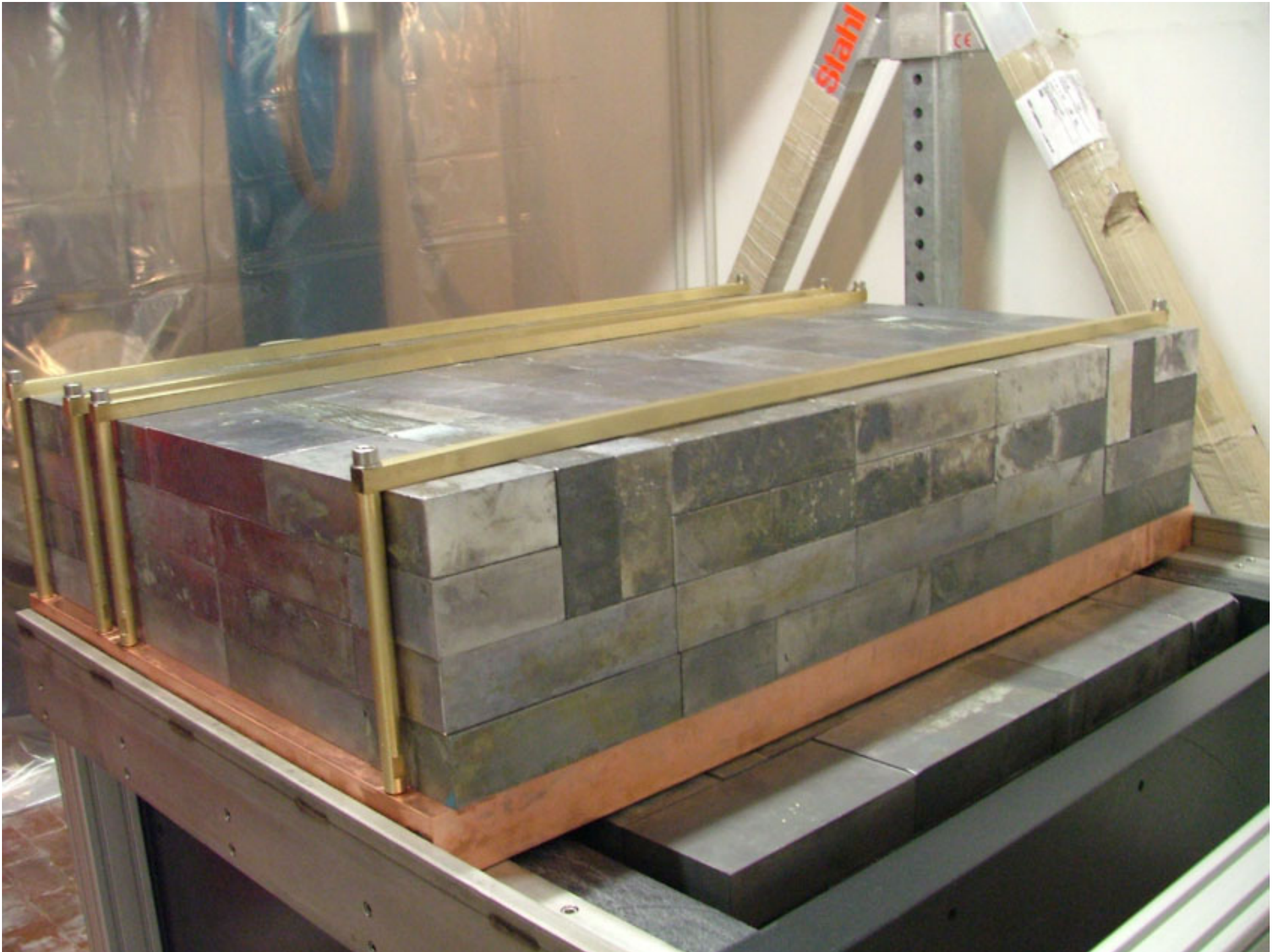


















very first spectrum of GeMPI III

→ mainly ^{222}Rn (^{214}Bi) lines from air in sample chamber visible (expected)

→ resolution worsened from 2.68keV (FWHM @1333keV) to ~4keV

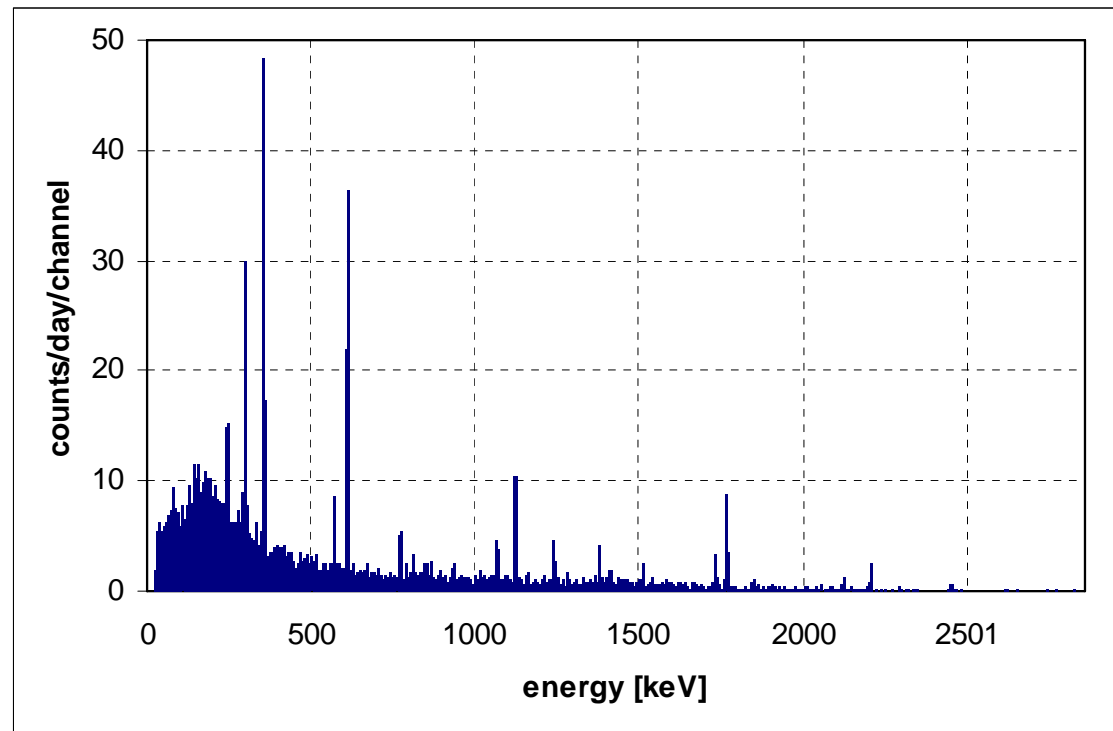
→ high ^{207}Bi contamination!
570keV: 171+/-18 cts
1064keV: 108+/-13 cts

→ latest bad news:

- counts at 2615keV (^{208}Tl)
(could be ^{208}Bi as well)

- x-rays from Pb/Bi

- maybe ^{137}Cs



only 4.6 days counting

where does the ^{207}Bi come from?

- ratio of counts:

$$R_{\text{Bi}207} = \frac{N_{1064\text{keV}} I_{570\text{keV}}}{N_{570\text{keV}} I_{1064\text{keV}}} = 0.83$$

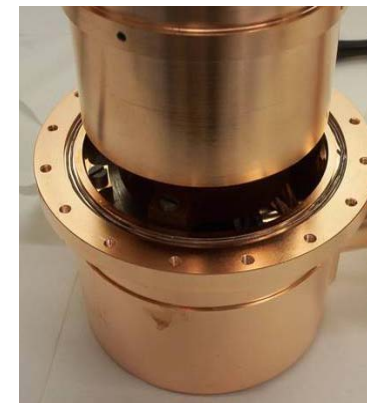
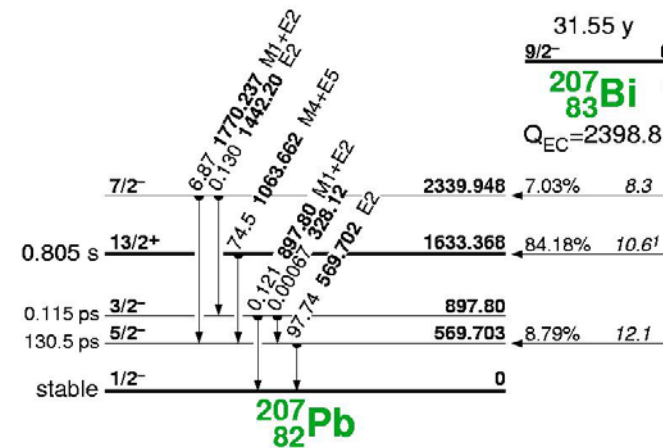
- in comparison with the ^{214}Bi from the air in the chamber (1120keV / 609keV)

$$R_{\text{Bi}214} = 0.82 \quad (\text{errors } \sim 15\%)$$

5cm Cu changes R by factor >2 ,
5cm Pb by factor >30 .

→ i.e. ^{207}Bi lies inside of shielding

- possible production process via (p,n)-reaction with ^{207}Pb
→ then ^{208}Bi should be produced as well and could be an explanation for the counts around 2615keV



picture of GeMPI II cryostat by Mart

upcoming activities

- ❑ take a background spectrum with good statistics and a nitrogen flushed chamber to get a clear picture of the contamination
- ❑ create MC model of detector and perform simulations of possible origins of the contamination
- ❑ once identified: open shielding and get rid of the contamination
- ❑ make GeMPI III run smooth and clean



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