

Status of Calibration

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Overview

- 1 Overview
- 2 Source Strength
- 3 Collimator Geometry
- 4 Outlook
- 5 Test Facility

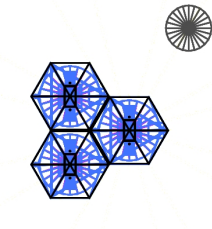
Estimate of Source Strength

Setup

- Phase I configuration
- 1 Calibration source: ^{60}Co or ^{228}Th
- Collimator materials: Cu or W
- 10 Mio. events for each source and each collimator material simulated

Goals

- Determine type of source and collimator material
- Determine minimal source strength



Analysis

- Spectra convolved with energy resolution and normalized to cts/kg/d/keV

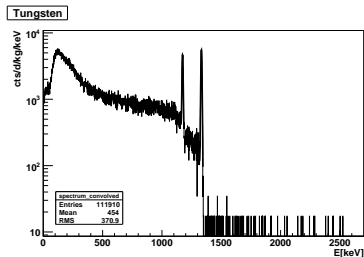
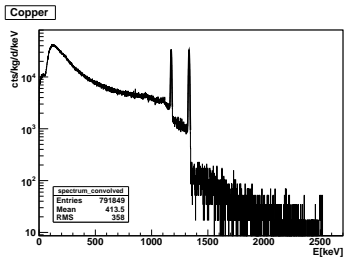
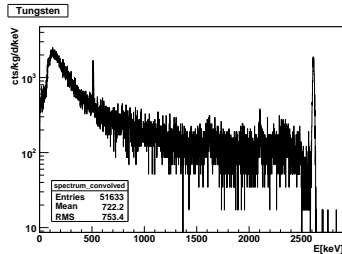
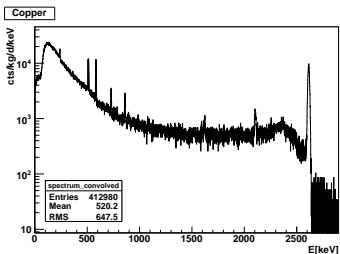
E_{peak} [keV]	FWHM [keV]	Ref.
1332.00	2.41	Günther et al. 1997
1621.12	3.02	Klapdor-Kleingrothaus et al. 2004
2103.52	3.86	Klapdor-Kleingrothaus et al. 2004
2614.53	3.27	Klapdor-Kleingrothaus et al. 2004

- Minimum activity of the source:

$$A = \frac{N}{T \epsilon_{tot}} \qquad \epsilon_{tot} = \epsilon_{peak} \cdot \epsilon_{event}$$

- ϵ_{peak} determined with integration of 5σ region of Gaussian plus linear background using a fit

Results: Energy Spectra

 ^{60}Co

 ^{228}Th


Results: Minimum Activity

^{60}Co	Cu (1174 keV)	Cu (1333 keV)	W (1174 keV)	W (1333 keV)
ϵ_{peak}	0.8862	0.9575	0.9800	0.9596
ϵ_{event}	0.0792	0.0792	0.0112	0.0112
A_{min} [kBq]	39.58	36.63	253.09	258.46

^{228}Th	Cu (511 keV)	Cu (2615 keV)	W (511 keV)	W (2615 keV)
ϵ_{peak}	0.5019	0.7819	0.5735	0.9790
ϵ_{event}	0.0413	0.0413	0.0052	0.0052
A_{min} [kBq]	134.02	86.02	931.38	545.63

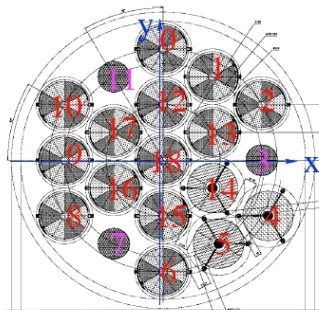
Collimator Geometry

Current

- Cylinder with $h = 8\text{cm}$ and $r = 3\text{cm}$
- Opening angle: 120°

Goals

- Compromise between low background in parking position and good statistic during calibration
- Enough weight for the lowering system



Outlook

- Detailed analysis of statistics in every detector for both phases with all three calibration sources
⇒ Determine minimum activity
- Influence of parking position with final collimator geometry
- Comparison with measurements at test facility in Zurich

First Setup

- Nonsegmented detector dismountable from cryostat
- Dewar ($V = 22\text{l}$)
- Electronics for spectroscopy and pulse shape analysis
- Calibration source: type to be decided

