

An aboveground facility for the characterization of scintillating bolometers

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2nd ISOTTA meeting
Orsay 24/06/2013

Goal:

systematic tests of new crystals

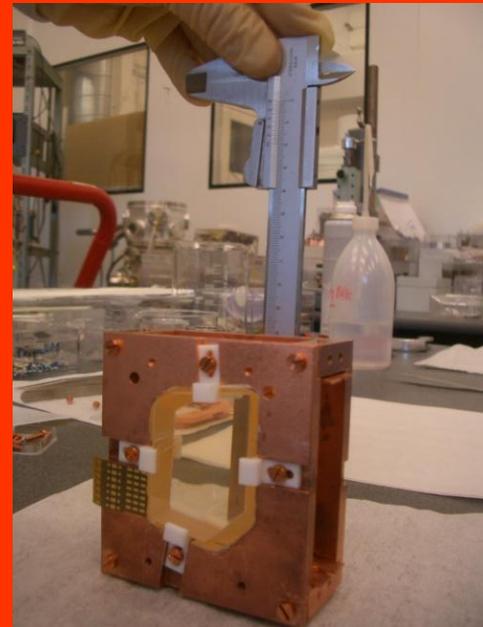
availability of a dedicated setup, for rapid assessment of:

- sensitivity
- Light yield (LY)
- quenching factor (QF)
- rejection power

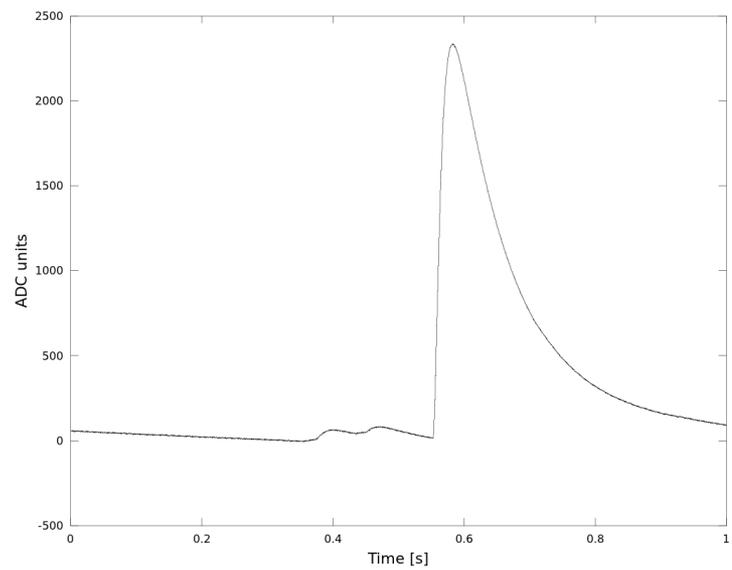
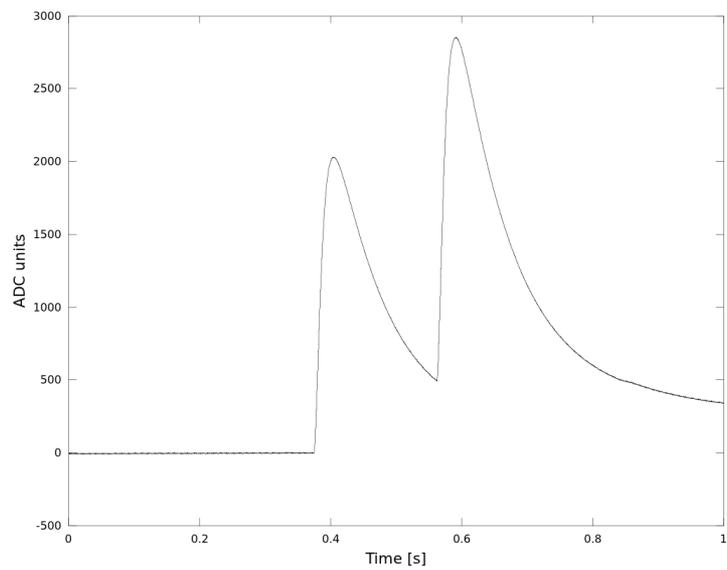
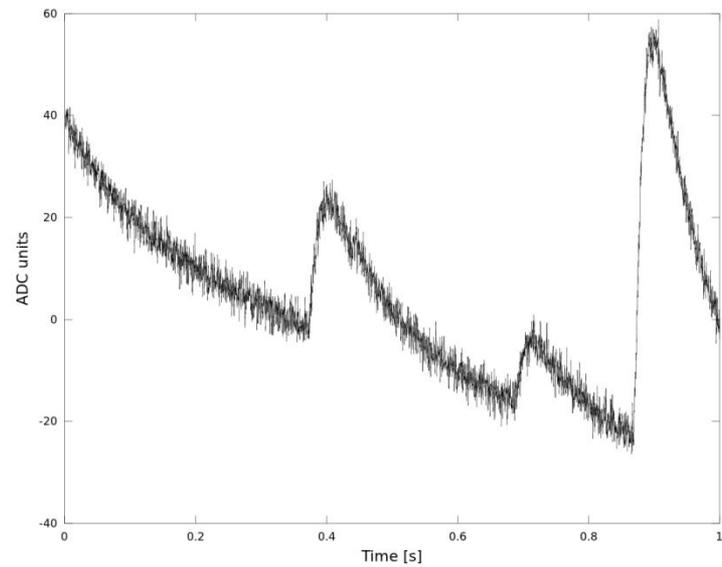
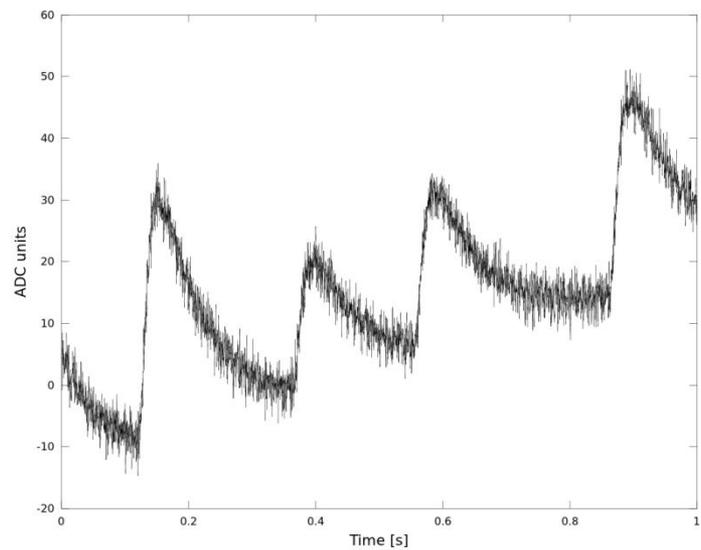
Aboveground test of a large mass bolometer: 313 g ZnMoO_4

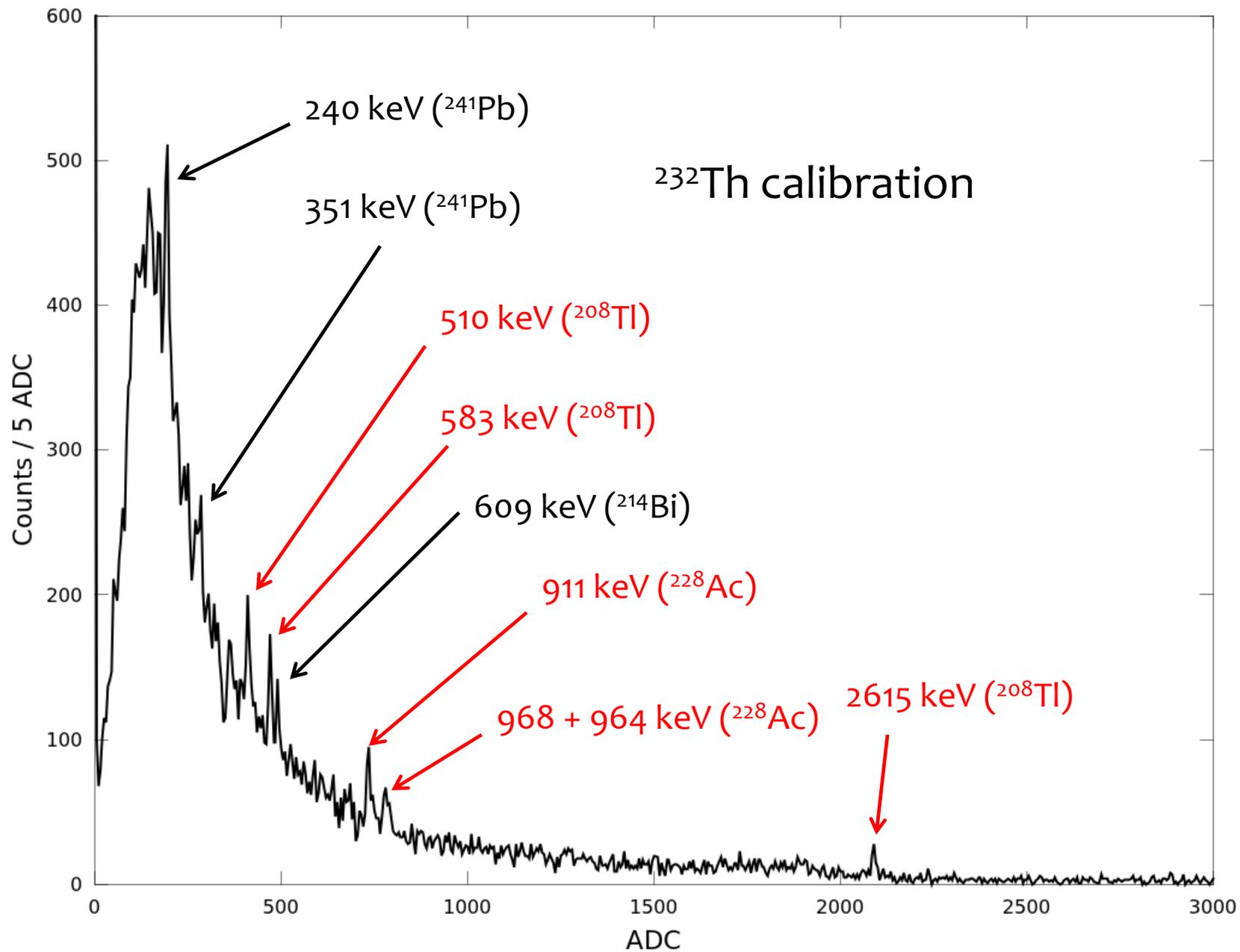
Channel	I_{work} [nA]	R_{work} [M Ω]
NTD1	2.89	1.11
NTD2	2.89	1.15
LT8	2	1.4

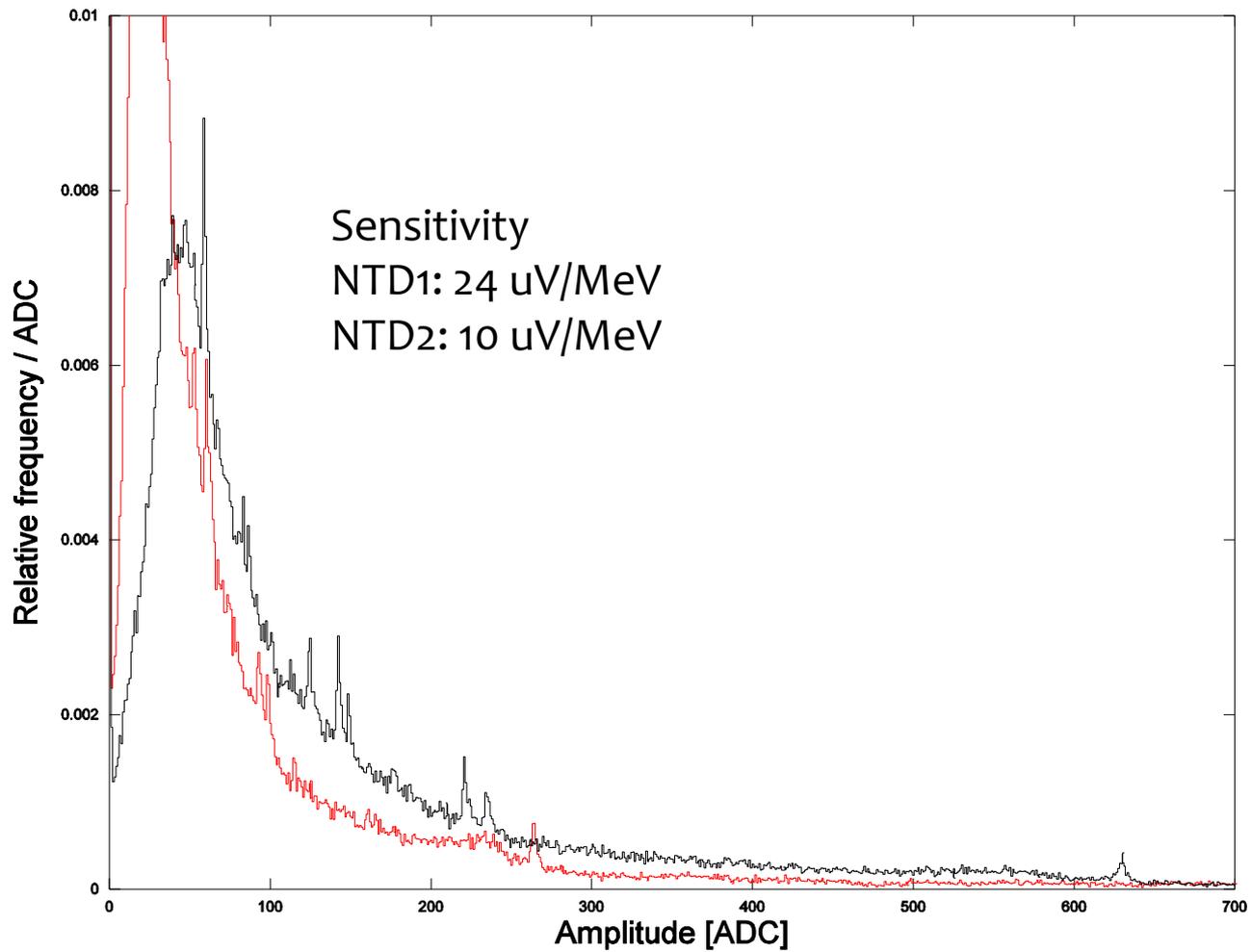
Run performed in wet cryostat
“Mulet Modane” in CSNSM, Orsay
Mixing chamber temperature ~ 17 mK

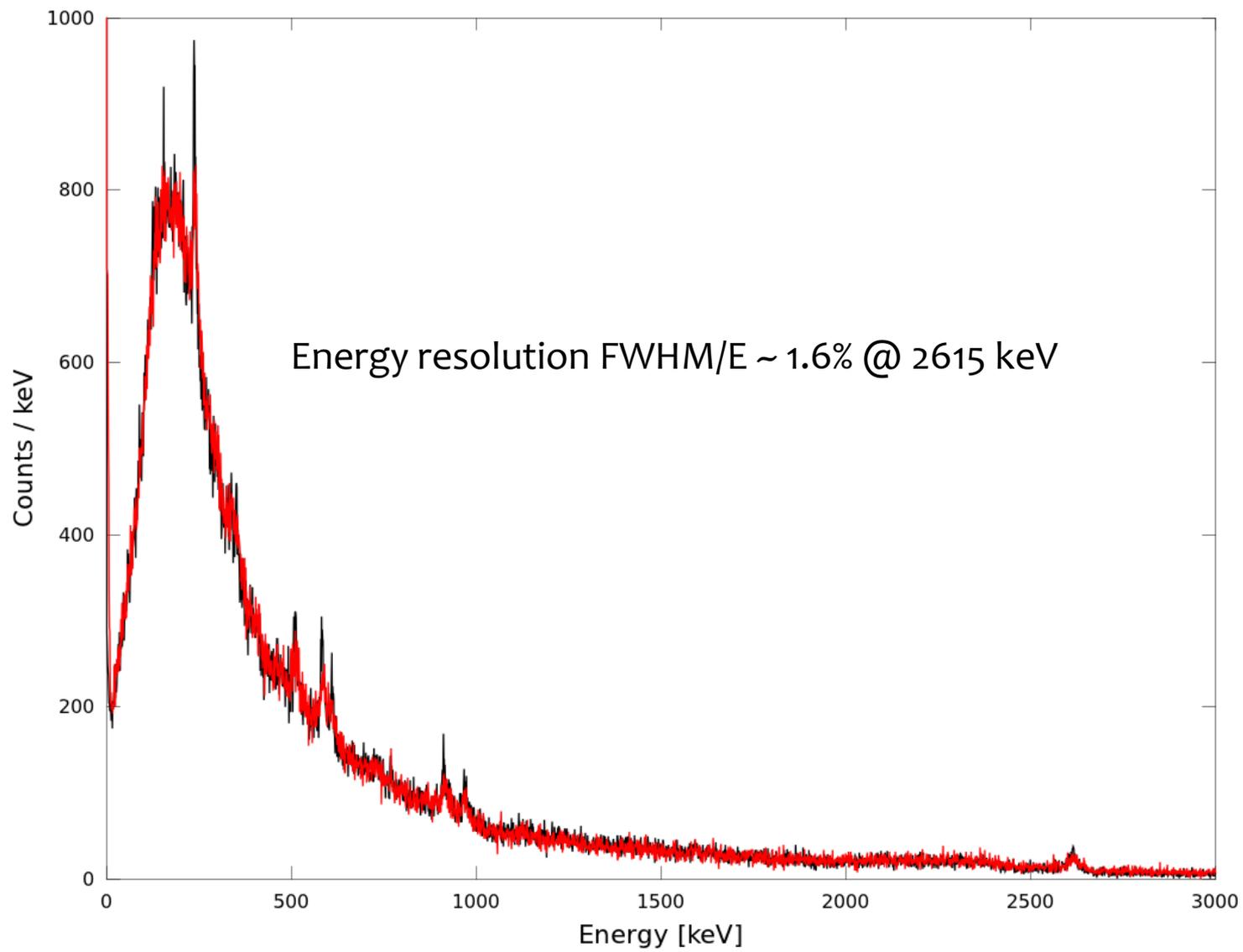


Average rate ~ 2.5 Hz

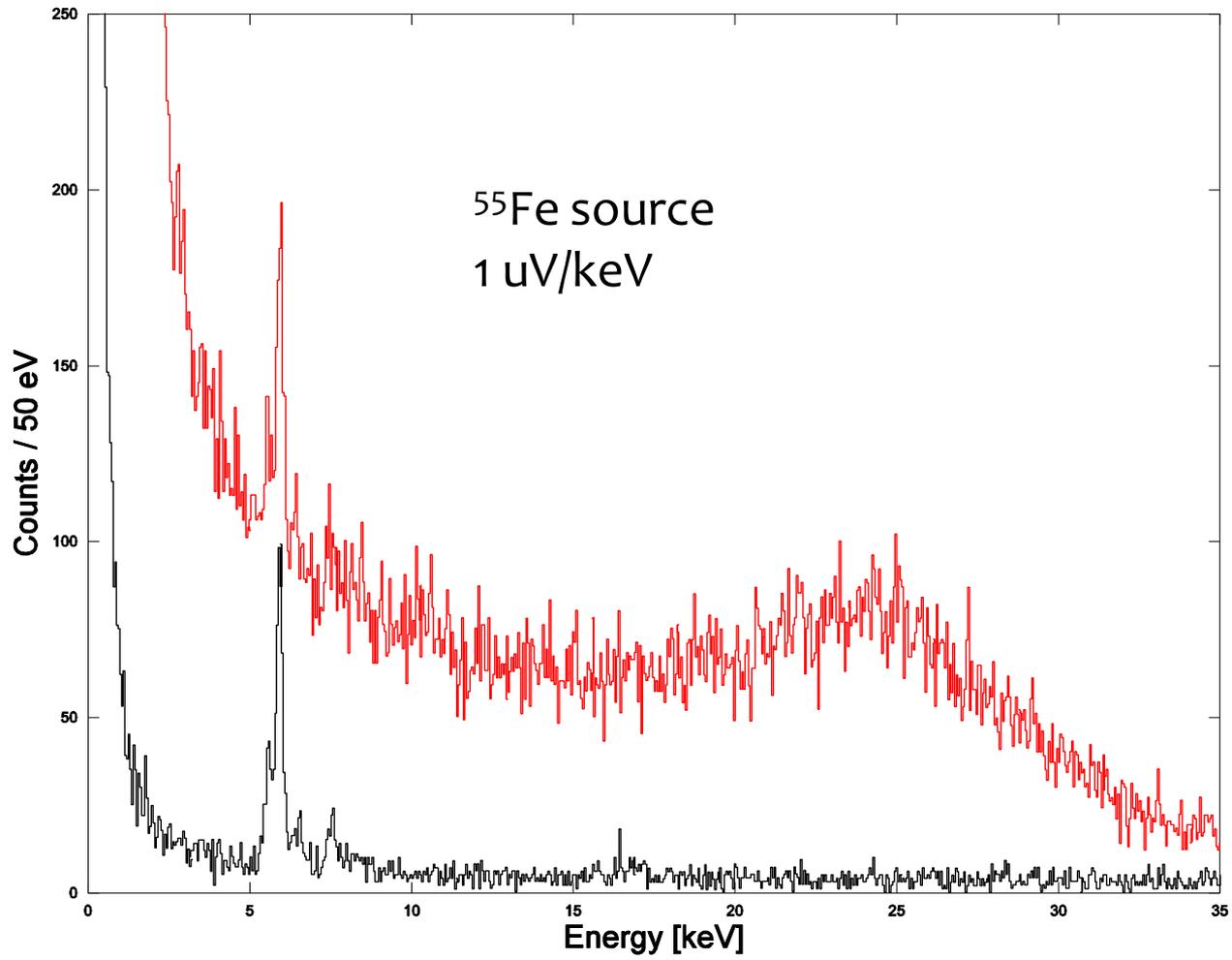


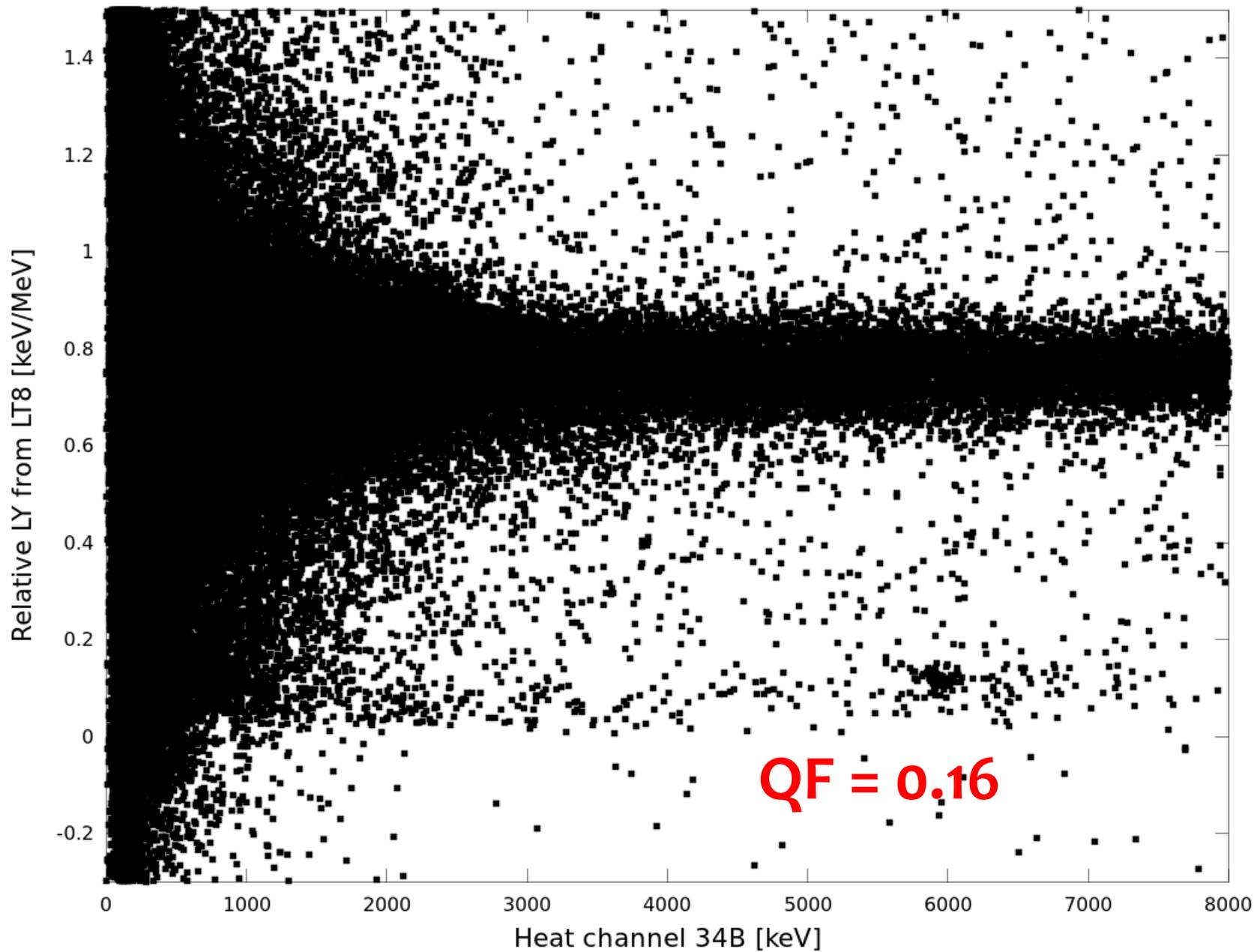






LT8



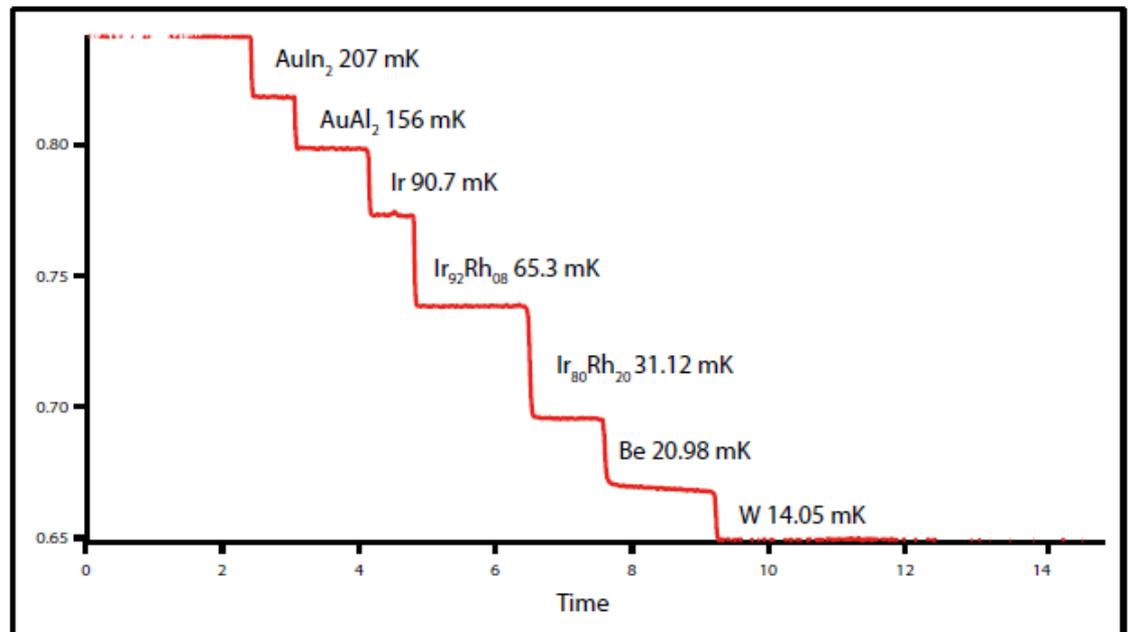


Ulisse

- Liquid free -> PT cooling
- Low injection pressure -> no compressor during normal circulation
 - Cooling down to base temperature in ~ 24h

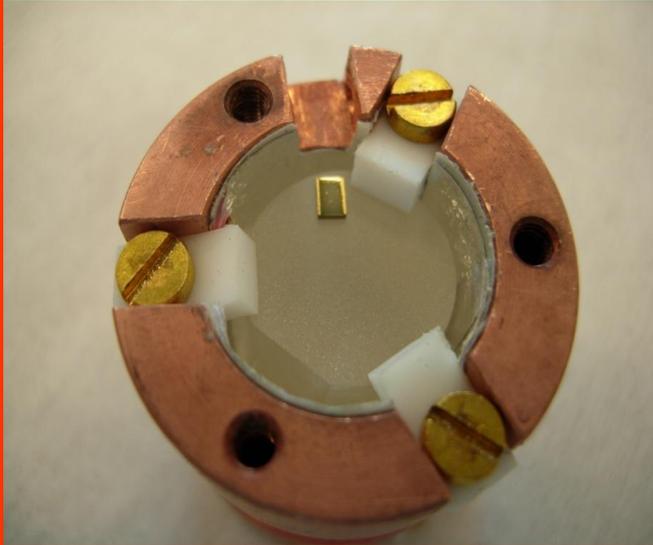


Calibration with a fixed point thermometer down to 14 mK



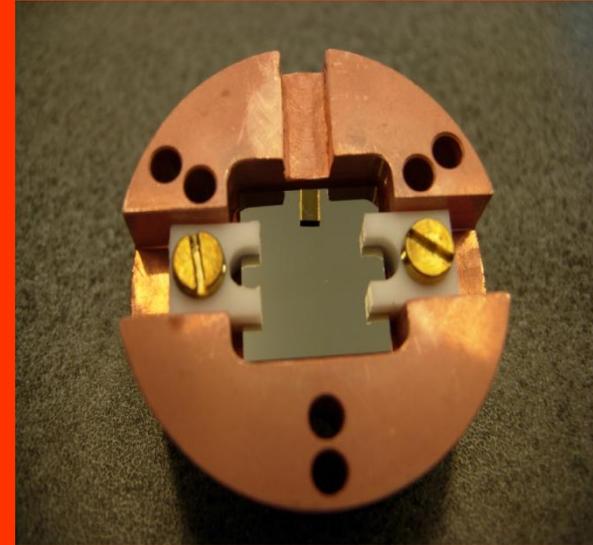
- 12 channels
- 6 channel-front-end electronics

23.8 g ZnMoO₄



$\varnothing = 16 \text{ mm}$
 $h = 28 \text{ mm}$

2 x Ge light detectors

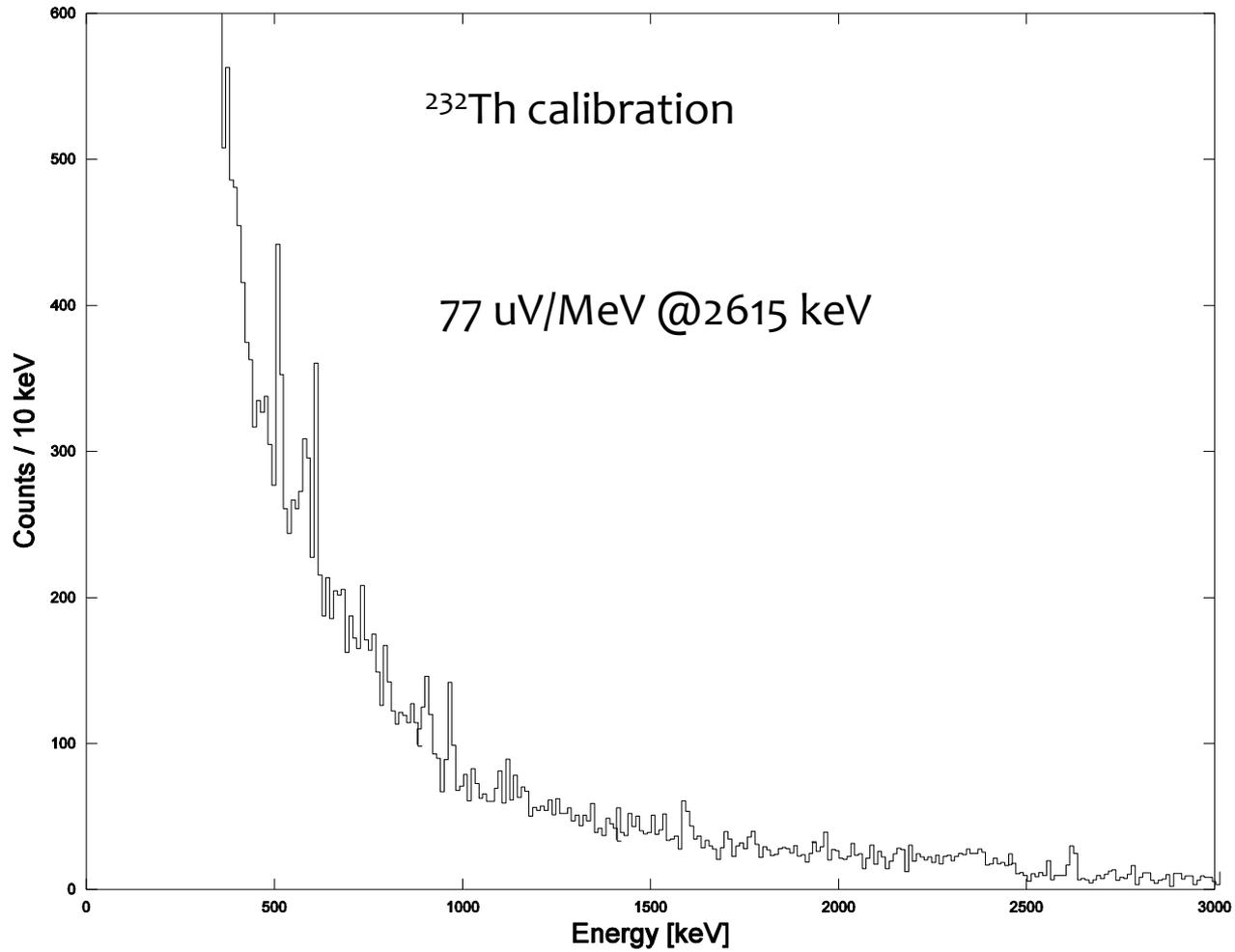


$m = 386 \text{ mg}$
 $15 \times 15 \times 0.5 \text{ mm}^3$

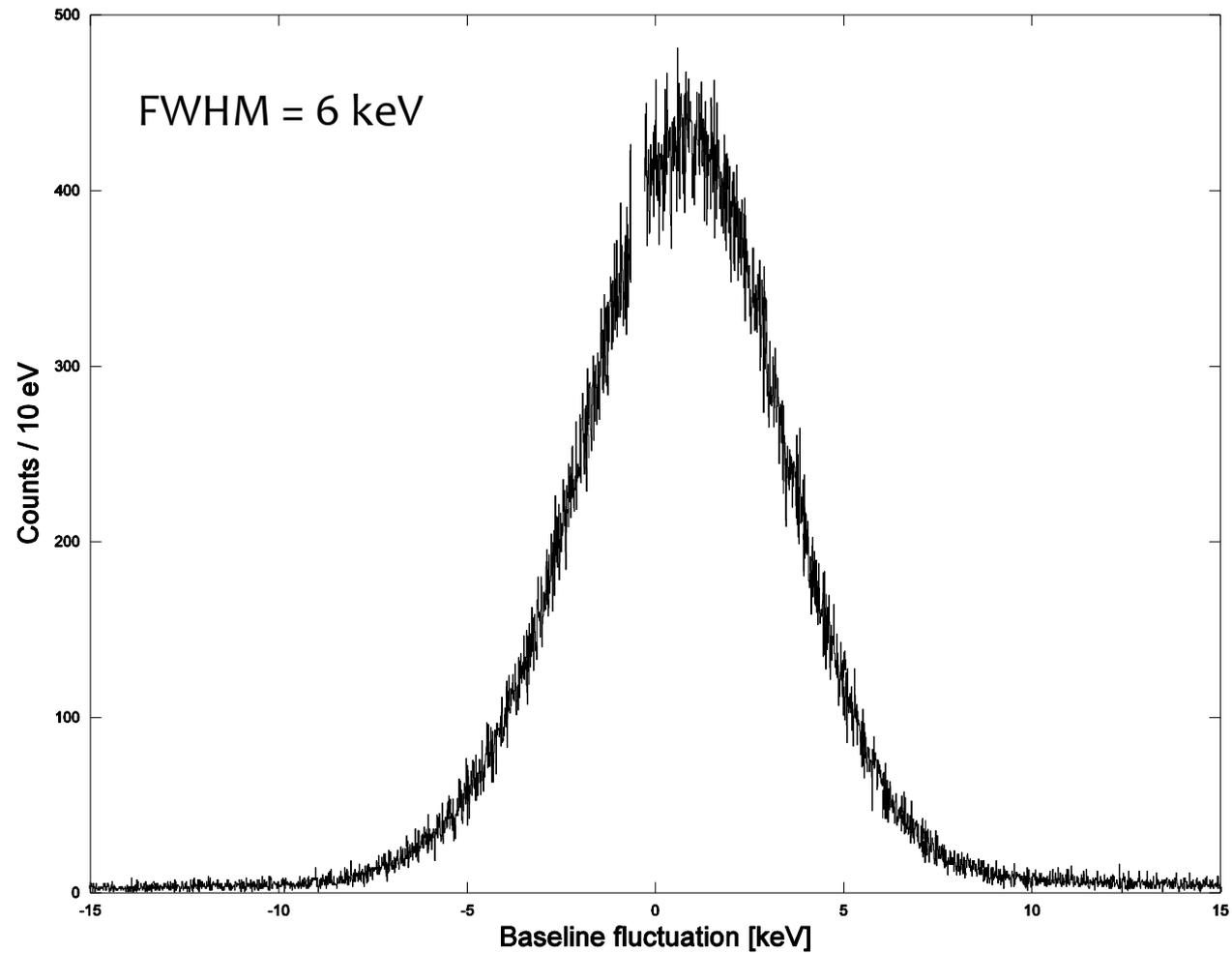
NTD Ge
thermistors
 $m = 19.5 \text{ mg}$

Detector	I _{work} [nA]	R _{work} [MΩ]
ZnMoO ₄	0.6	2.9
LT1	1.25	0.97
LT2	1.25	0.63

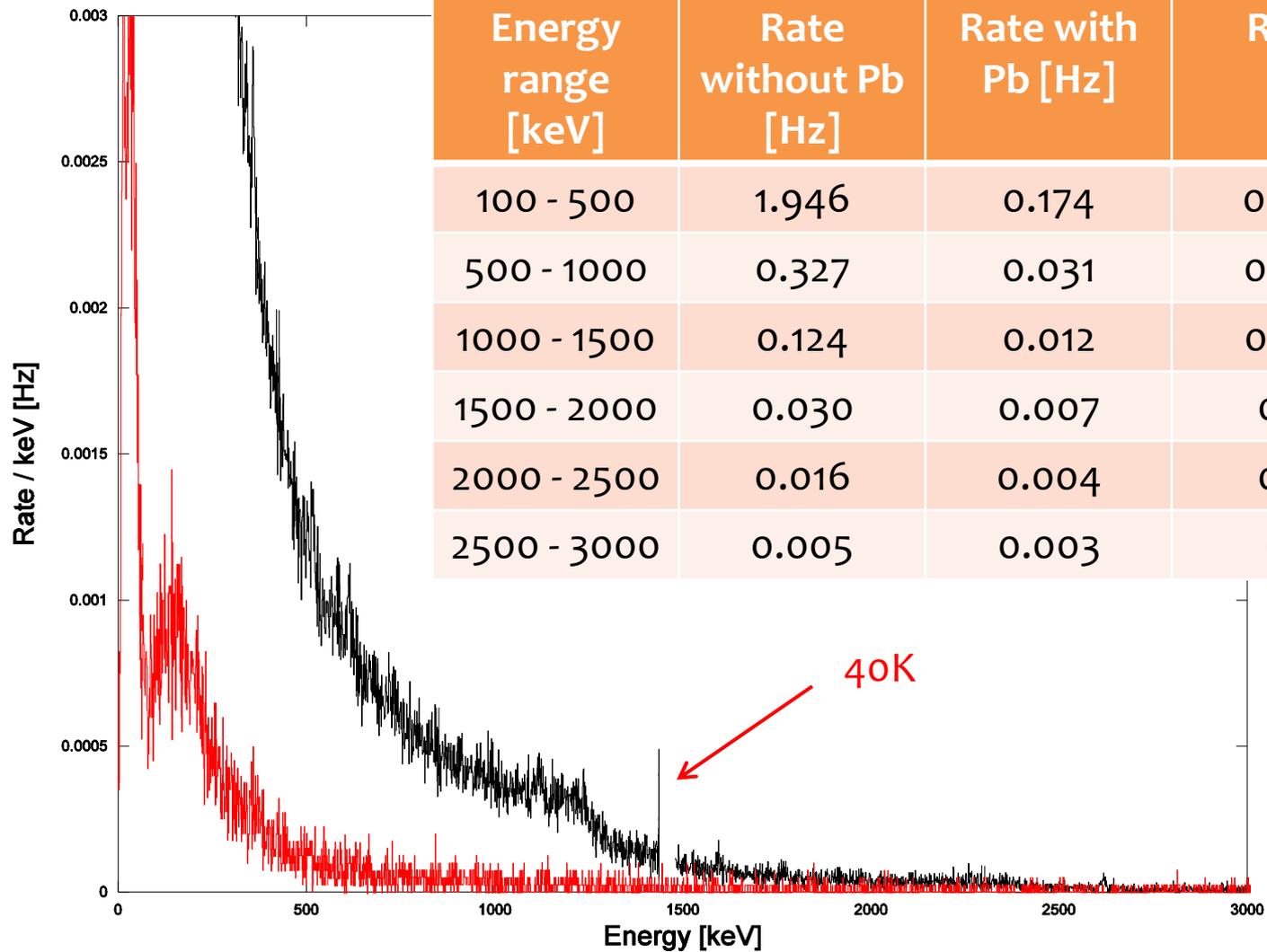
MC temperature $\sim 14 \text{ mK}$



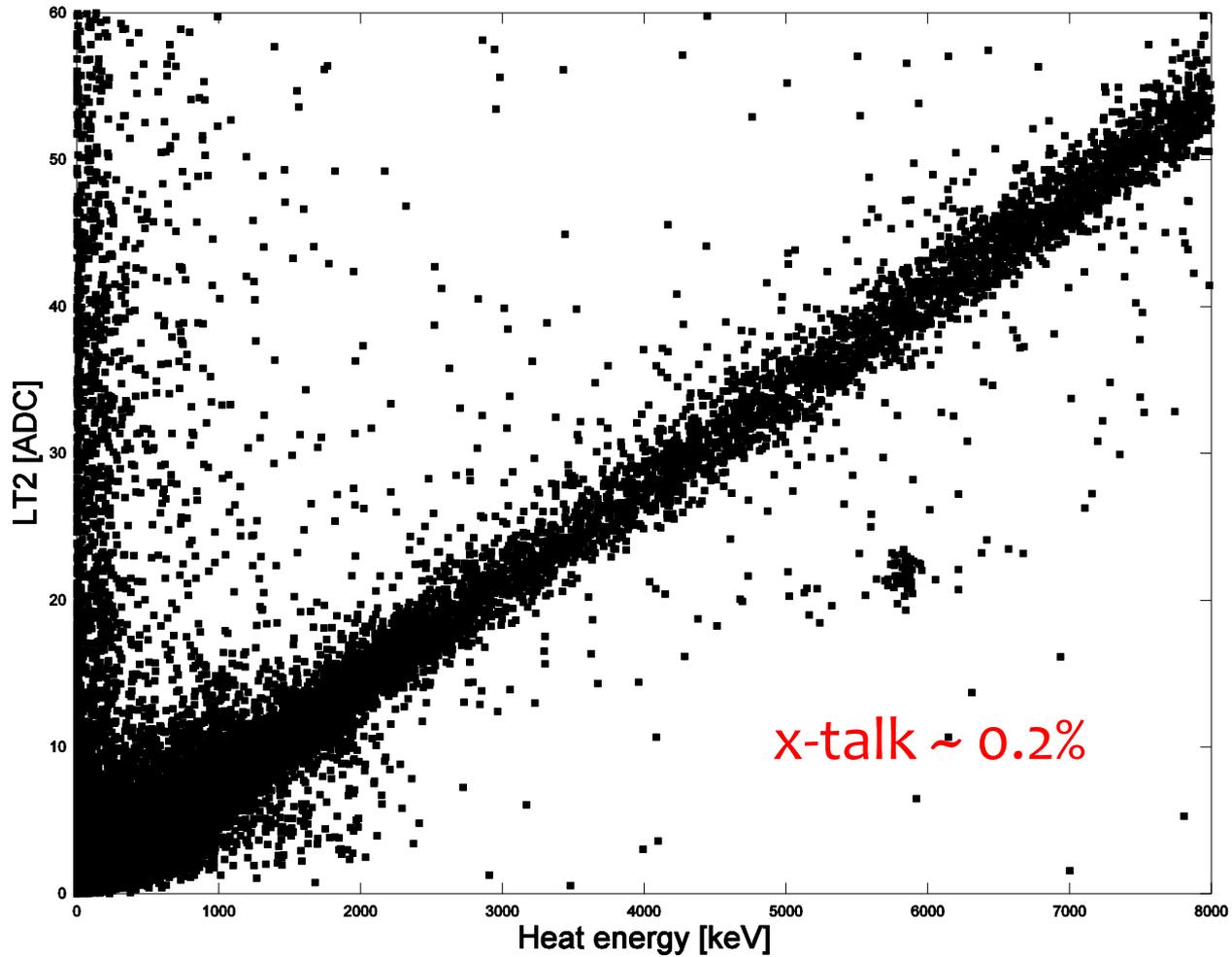
Preliminary



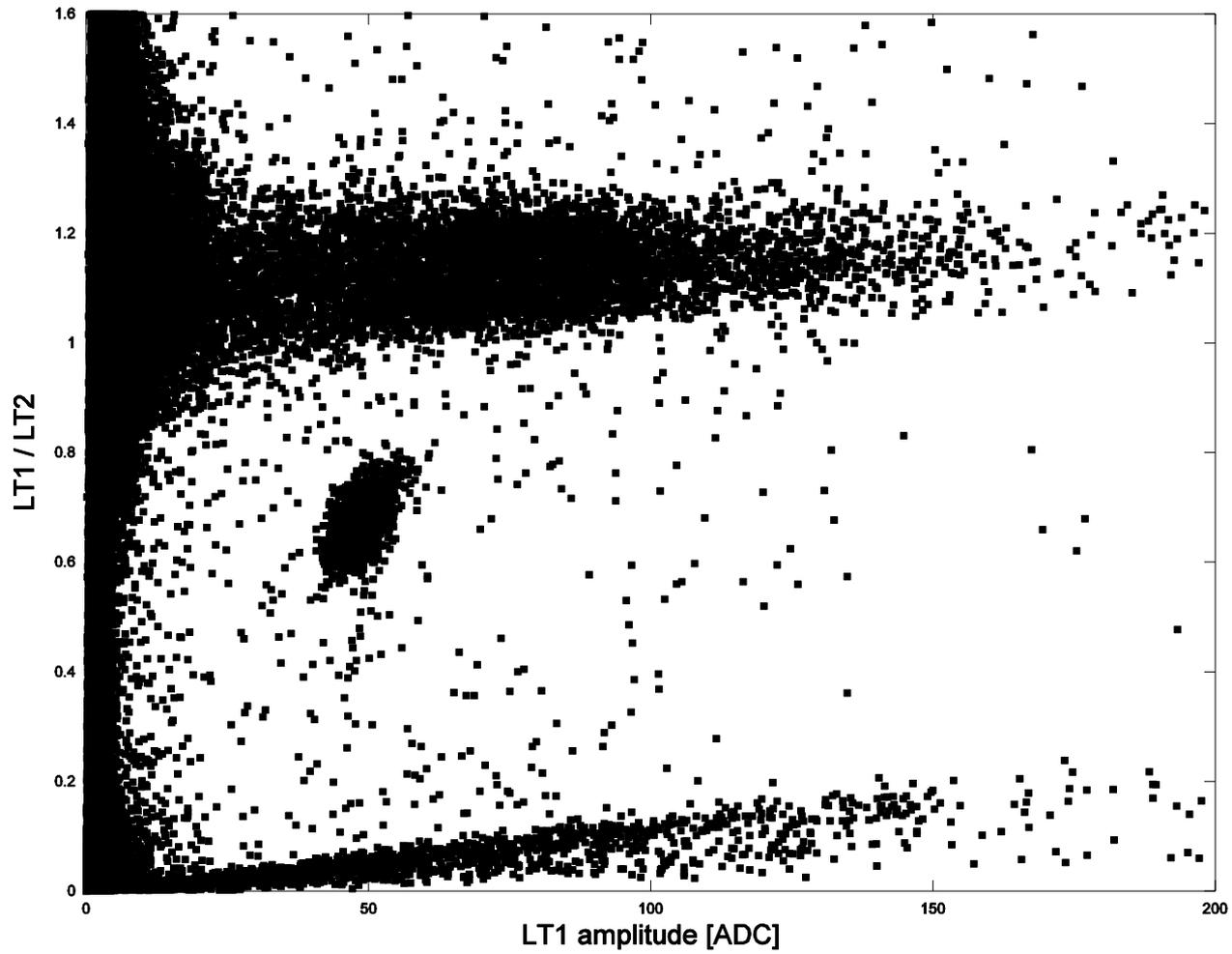
Preliminary

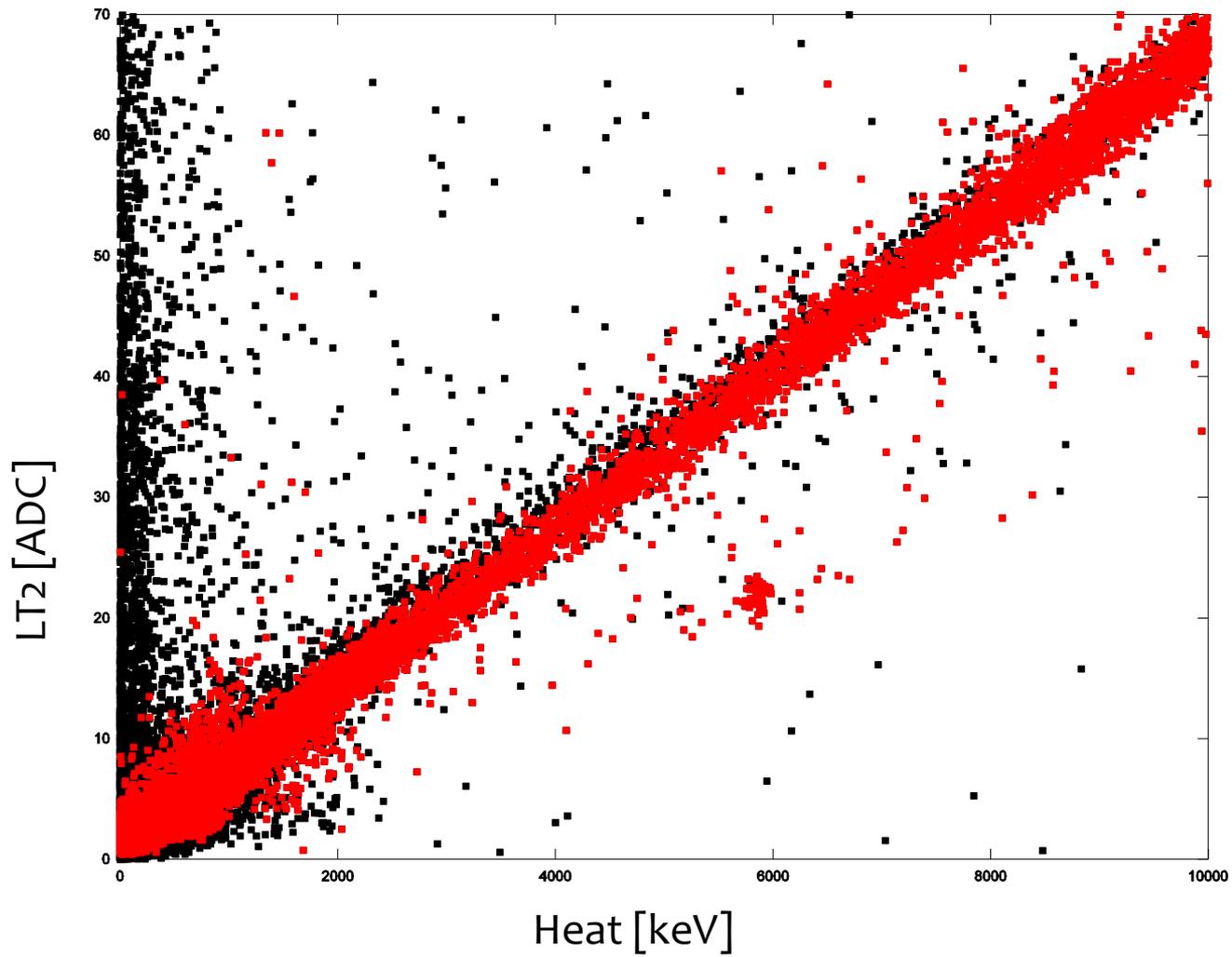


Heat vs light scatter plot

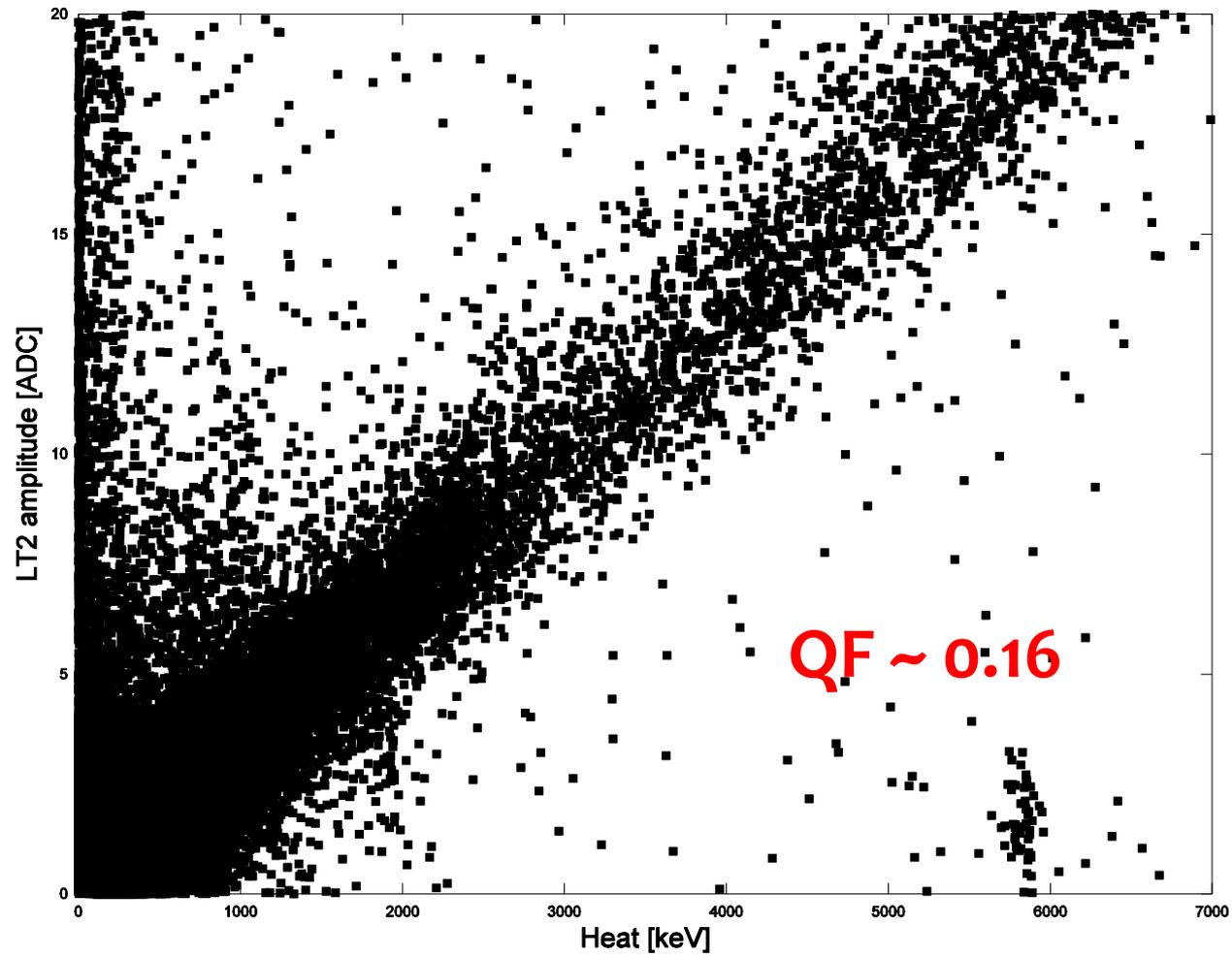


Light 1 vs light 2 coincidences





Xtalk correction



What's next:

- sample holder mechanical decoupling
 - removing X-talk
 - add Faraday cage