

to the AMB for information

Results of the acceptance test of the symmetric AGATA detector

S/N A001-73838

(owner Köln)

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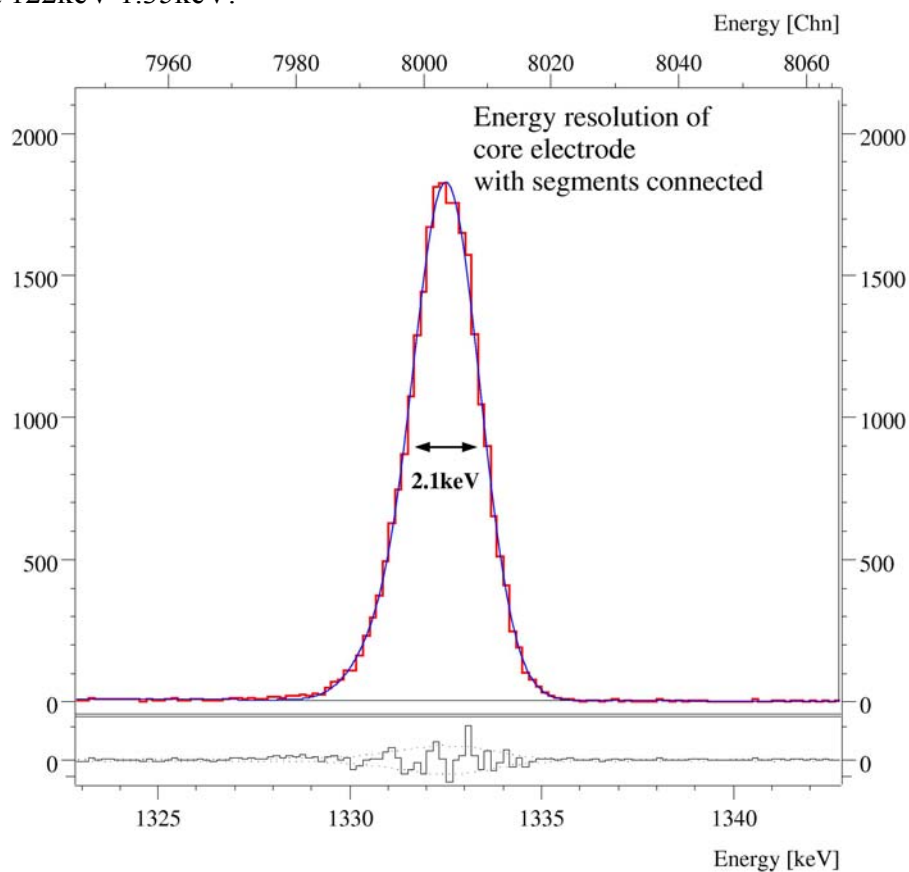
Energy resolution

All energy resolutions were measured with a standard ORTEC 571 shaping amplifier with 6 μ s shaping time and a PC based MCA system. The detector crystal was biased with 4000V.

In the first test the detector was mounted in the cryostat with all segments grounded. An energy resolution of **1.16keV at 122keV** and **2.21keV at 1.3MeV** was measured.

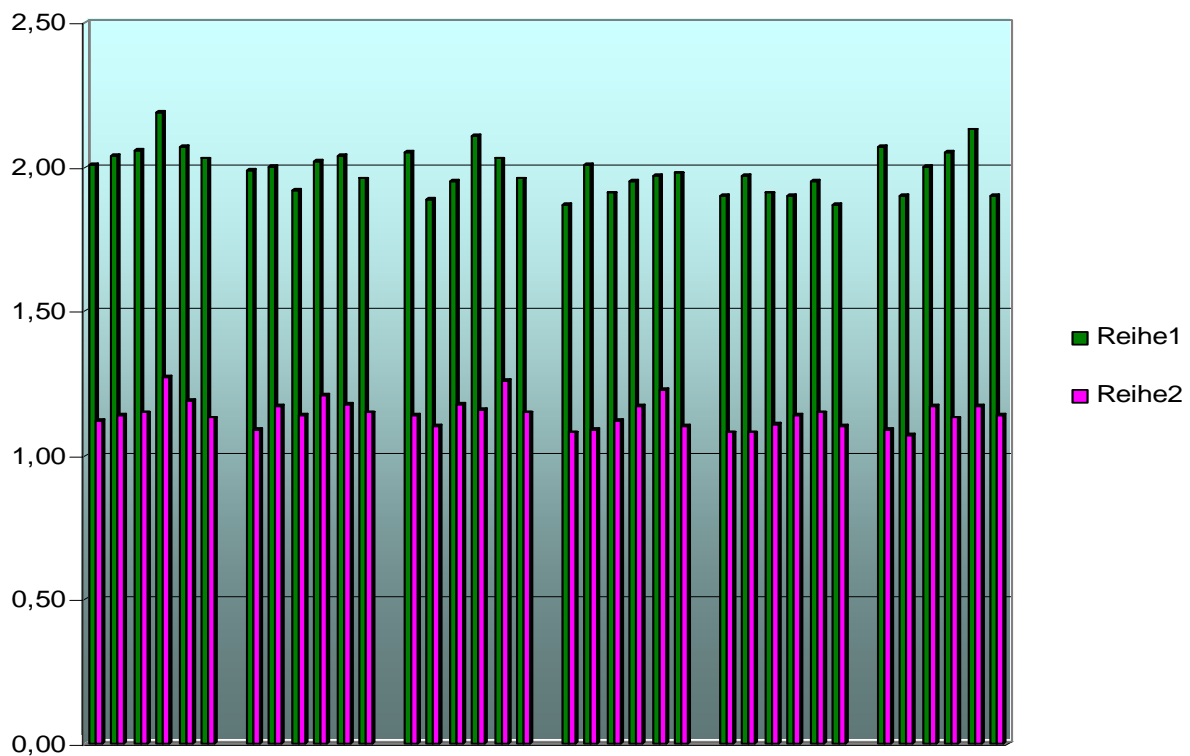
In the second test the detector was operated with all 36 segments connected to cold FETs. An energy resolution of **1.20keV at 122keV** and **2.10keV at 1.3MeV** was measured. Therefore no degradation of the energy resolution of the core electrode due to cross talk of segment channels to the core inside the cryostat could be measured. The figure below shows the peak at 1.3MeV of this measurement.

Guaranteed energy resolution by Canberra Eurisys at 1.3MeV for the core electrode is 2.35keV, at 122keV 1.35keV.



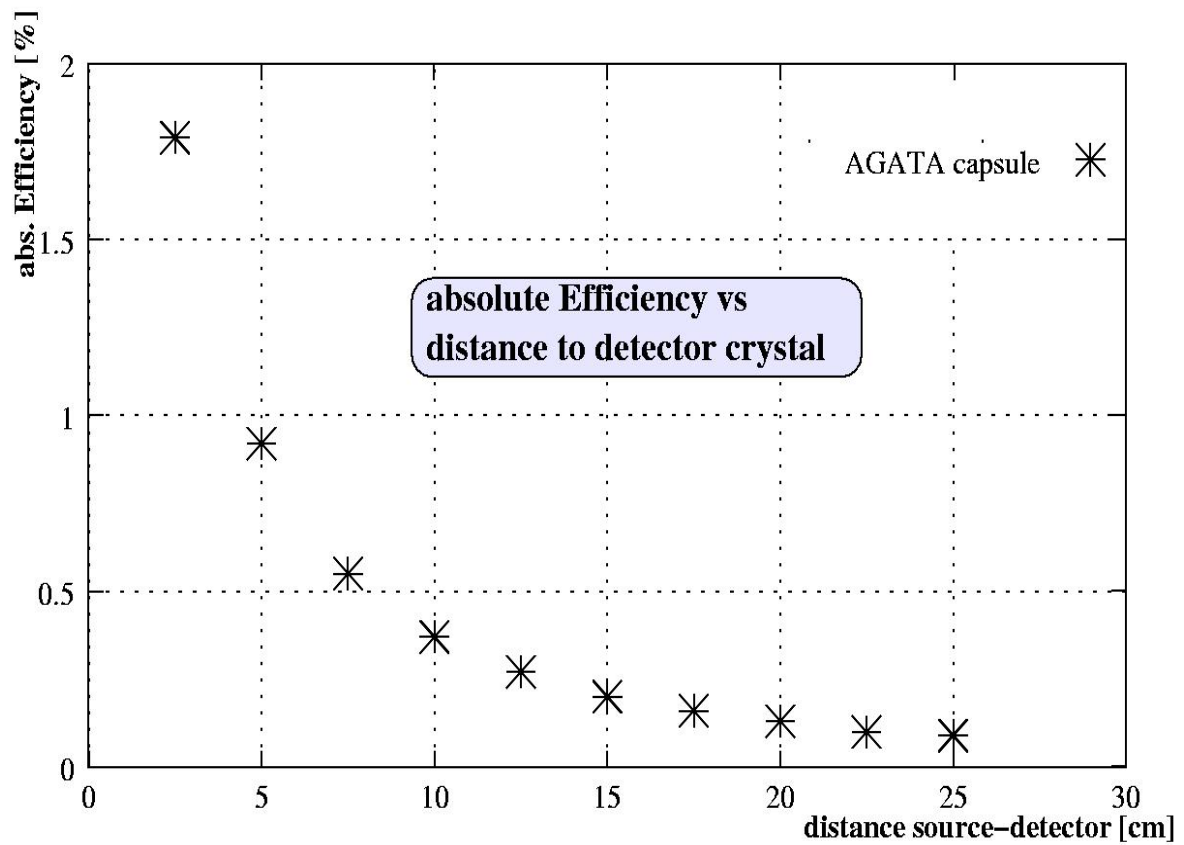
The energy resolutions of the segments are shown in the following figure. The energy resolutions of the **1.3MeV**-line were measured with a count rate of 100-200Hz in the segment and are shown as 'Reihe 1'. It is starting from left for the six front segments and ends right with the six last rear segments. The mean value is **1.99keV**. Guaranteed energy resolution by Canberra Eurisys at 1.3MeV for the segments is 2.3keV, mean value 2.1keV.

'Reihe 2' shows the energy resolutions for the **60keV**-line of ^{241}Am . Mean value is **1.14keV**. Guaranteed energy resolution by Canberra Eurisys at 60keV for the segments is 1.35keV, mean value 1.15keV.



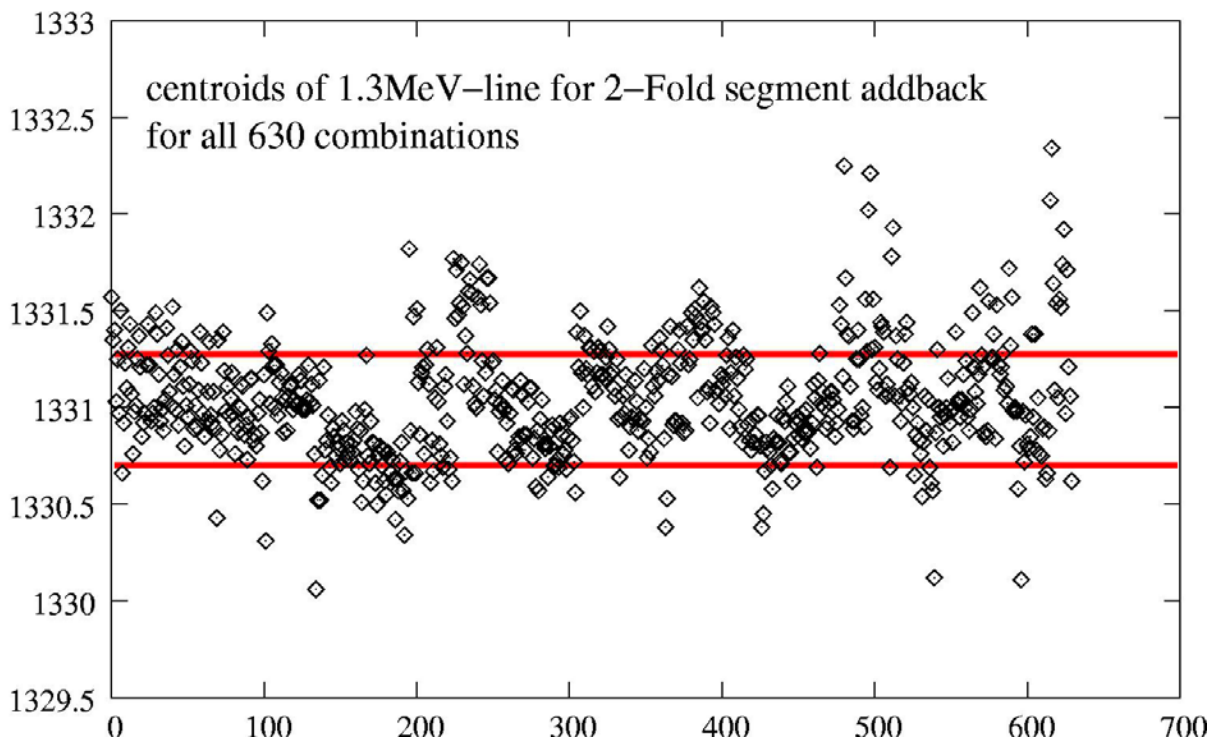
Efficiency

The measured **relative efficiency** of the detector is **75%**. No value for relative efficiency is guaranteed by Canberra Eurisys. A relative efficiency of 71.1% was measured by Canberra Eurisys. The absolute efficiency for different distances of source and detector was measured and is shown in the figure.



Cross talk between segments

A coincidence measurement of all 37 channels was performed with the digital spectroscopy system DGF Rev. D from XIA. Add back spectra of the segment energies for all 630 2-fold combinations ($36 \cdot 35 / 2$) were generated using the energy calibration given by 1-fold events in a segment. The centroids of the 1.3MeV-line in each spectrum are plotted in the next figure. The maximum spread with respect to the mean value at 1331keV is 1.3keV, the full width half maximum of the distribution is 0.6keV. Therefore the overall crosstalk of the system is below 10^{-3} . Canberra Eurisys guaranteed a cross talk $\leq 10^{-3}$ for the encapsulated detector itself.



Conclusion

The encapsulated, 36-fold segmented, hexaconical AGATA detector S/N A001-73838 passed successfully the acceptance test performed at the IKP Köln.