



GLAST Burst Monitor



The calibration of the GLAST Burst Monitor detectors

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Abstract:

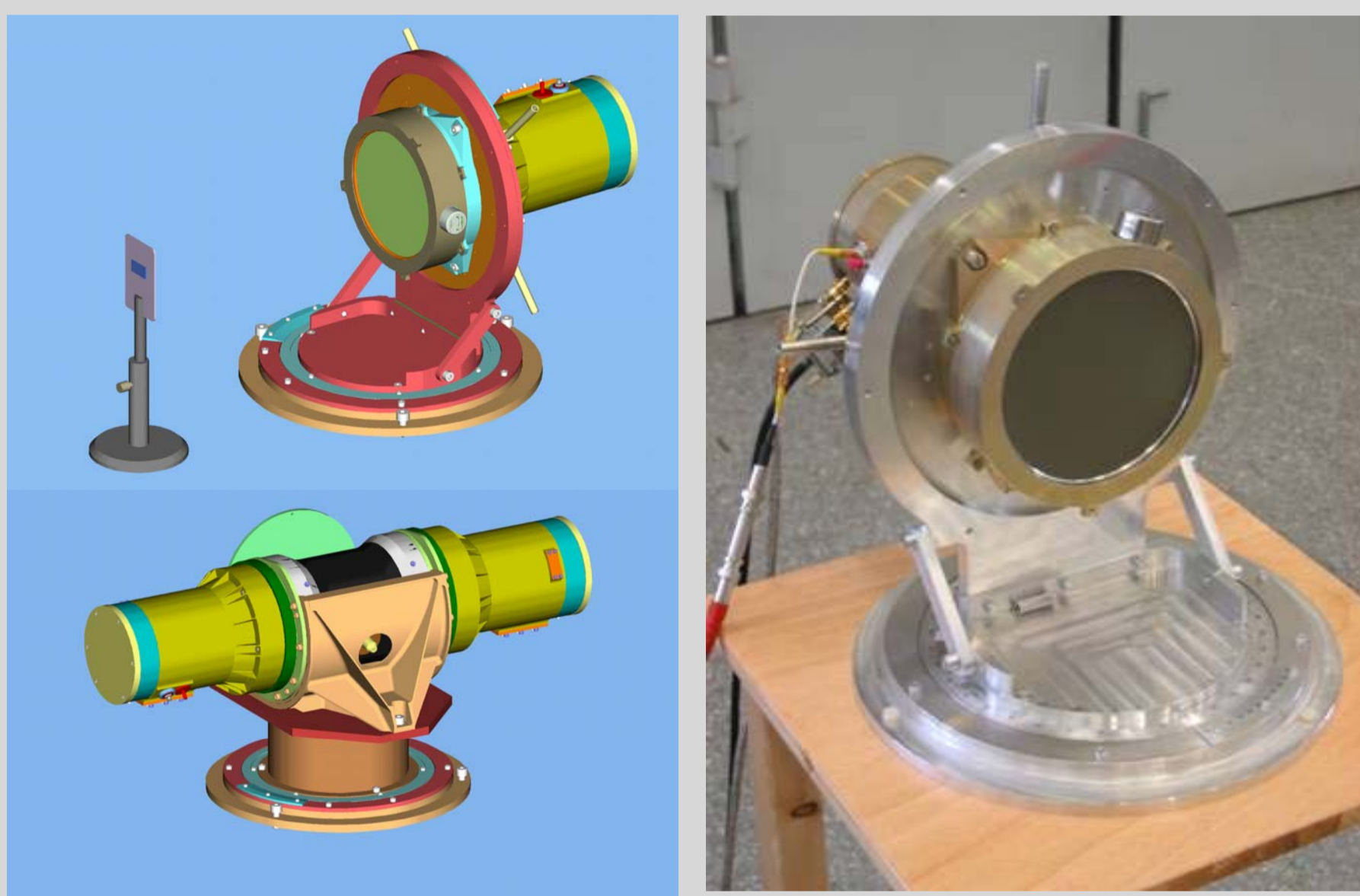
The GLAST Burst Monitor (GBM) is the secondary instrument on NASA's next Gamma-ray mission GLAST. It will augment the capabilities of GLAST for the detection of cosmic gamma-ray bursts by extending the energy range (20 MeV to > 300 GeV) of the Large Area Telescope (LAT) by two BGO-detectors (150 keV to 30 MeV) and 12 NaI detectors (10 keV to 1 MeV). GBM will also provide rapid on-board GRB locations and time-resolved spectra. GBM calibrations are performed on detector, instrument, and spacecraft levels, in order to establish a reliable instrumental response in energy and angular space. The calibrations on detector level were performed at MPE in 2005. All flight and spare detectors were irradiated with calibrated radioactive sources in the laboratory (from 14 keV to 4.43 MeV). The energy/channel-relations, the dependences of energy resolution, the effective areas and the angular responses were measured. Due to the low number of emission lines of radioactive sources in the low-energy range, calibration measurements in the energy range from 10 keV to 60 keV were performed with the Physikalisch-Technische Bundesanstalt (PTB) at BESSY synchrotron radiation facility in Berlin. The homogeneity of the NaI detectors was investigated in detail for energies around the iodine K edge. Our poster will summarize the results obtained with these measurements.

Purpose of Calibration:

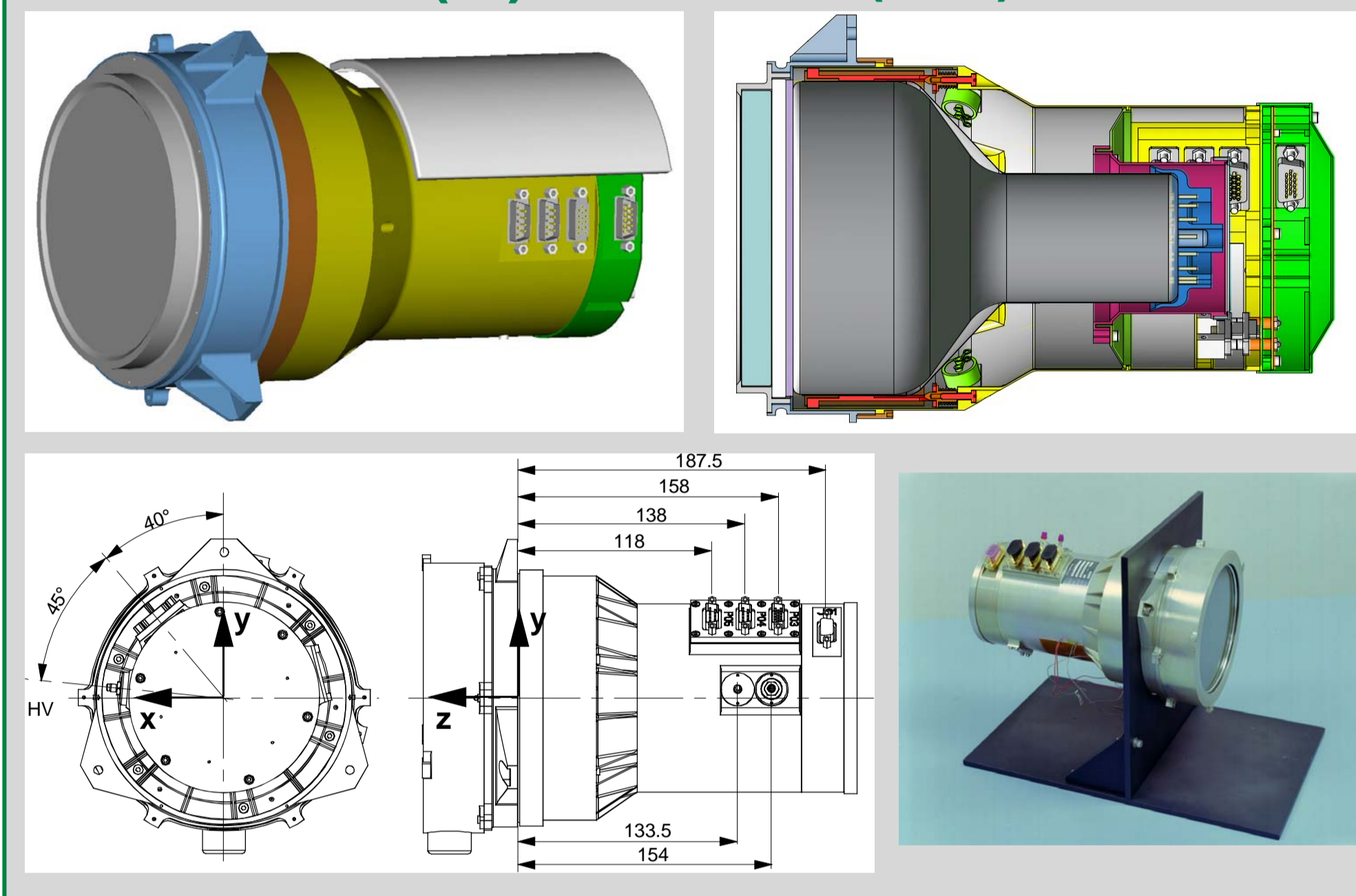
- provide performance verification of the GBM detectors.
- provide benchmark data to compare with calculated detector response data.
- provide accurate, well-characterized data for subsequent scientific analysis.

The Calibration Setup:

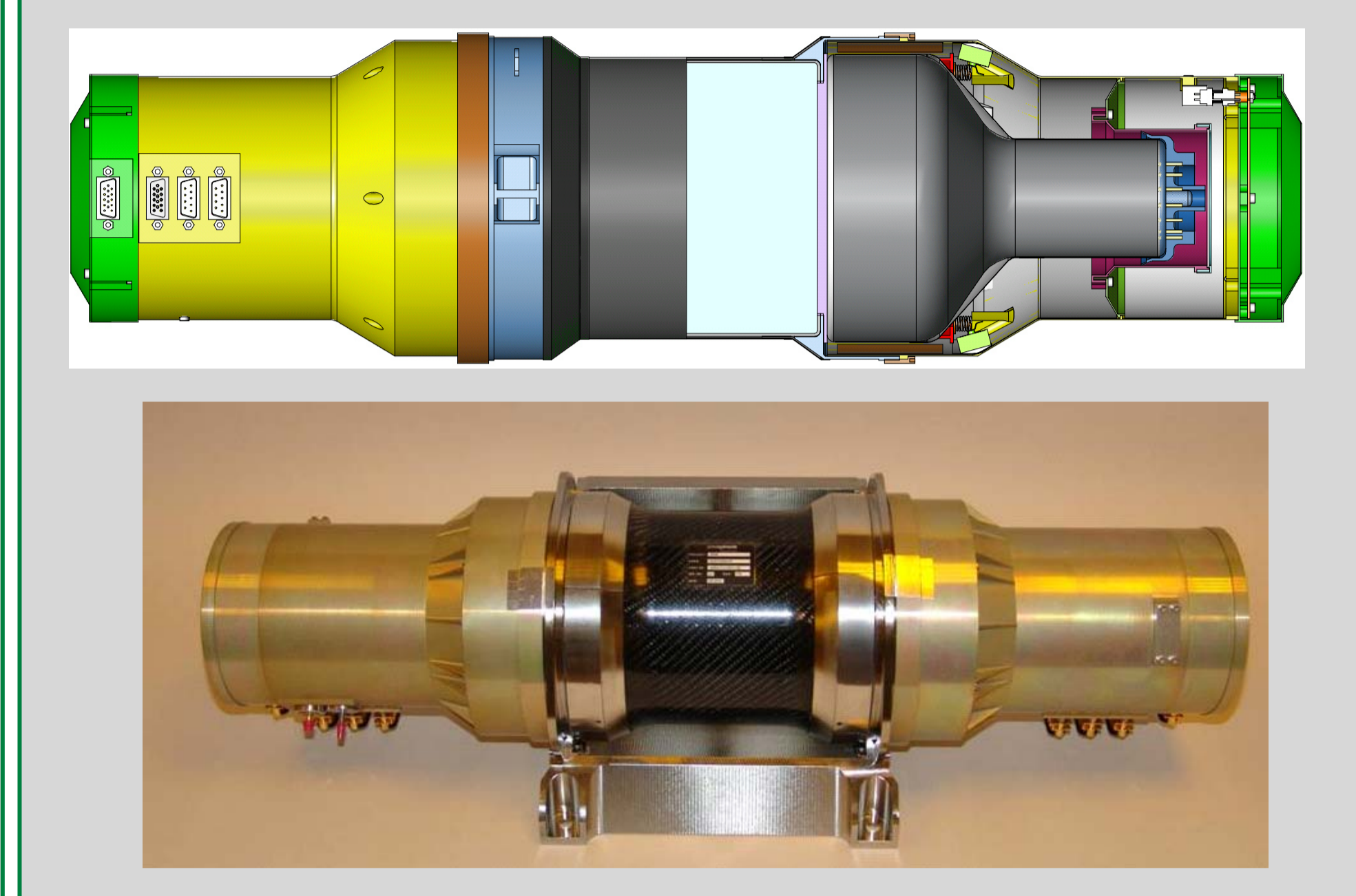
- allows the acquisition of spectra at different angles of incidence.
- high accuracy due to laser adjustment.



The GBM-NaI(Tl) Detectors (12 x):

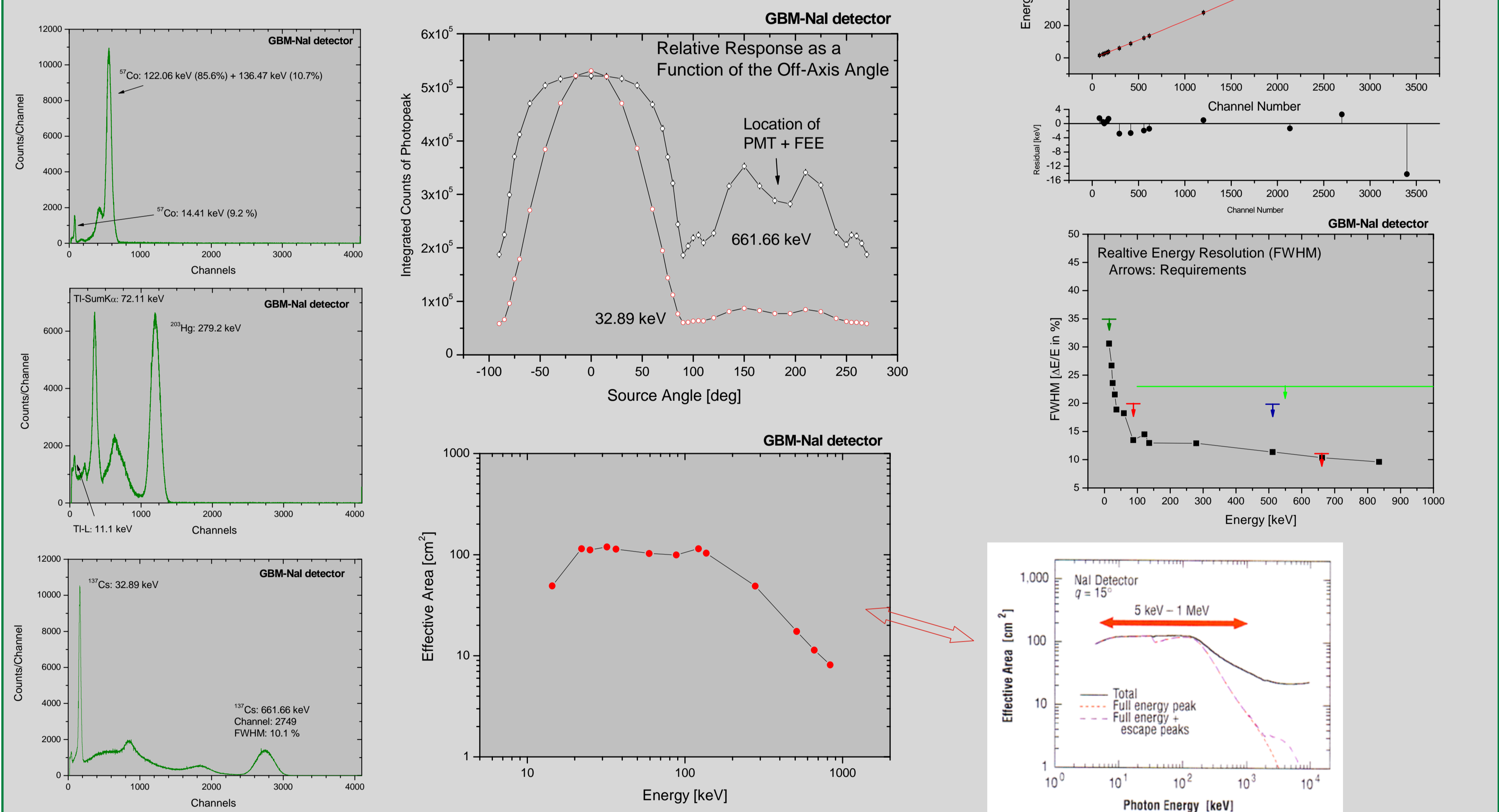


The GBM-BGO Detectors (2 x):



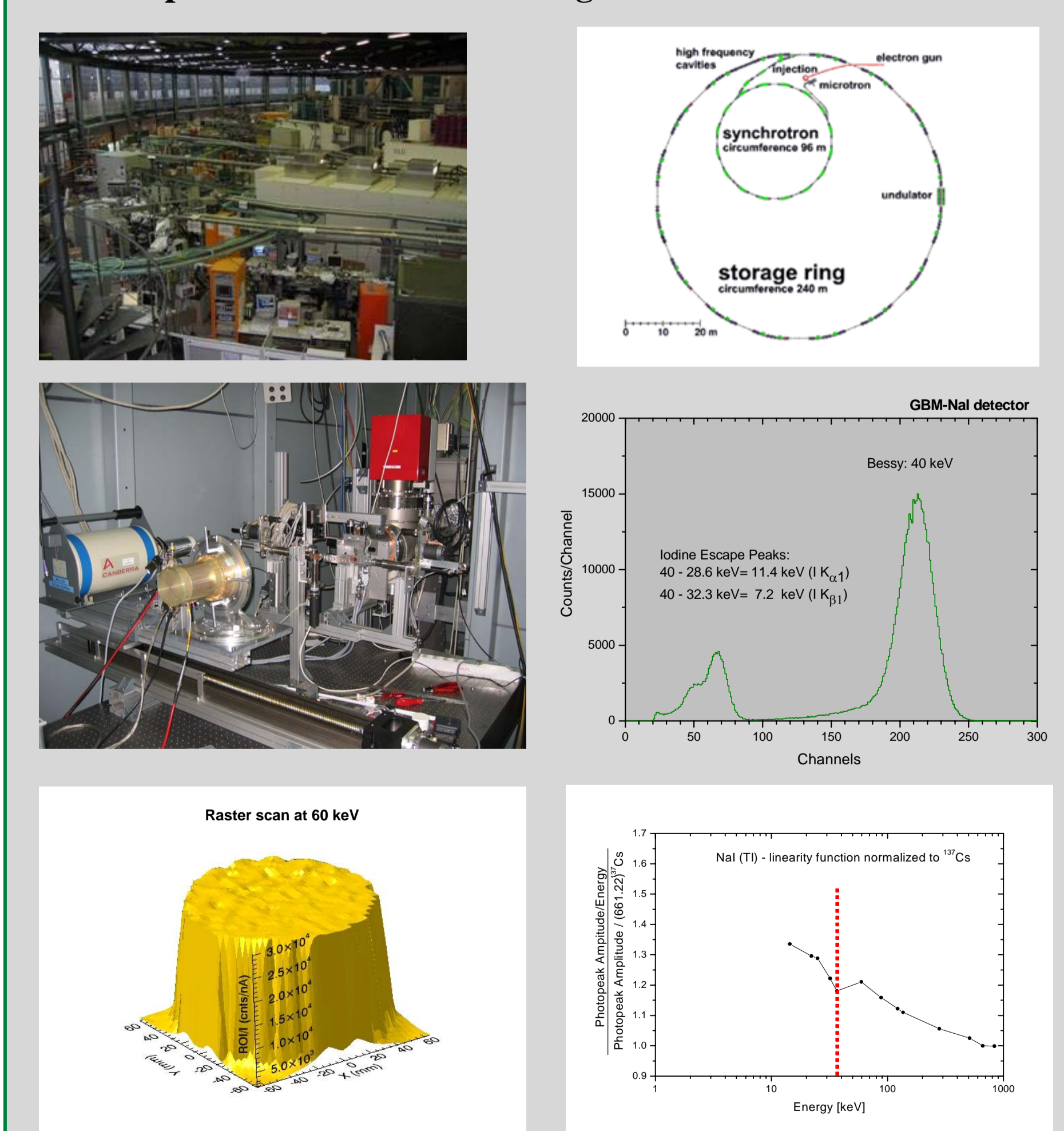
Calibration Results - GBM-NaI(Tl) Detector

Summary of the measurements performed with the NaI(Tl) flight detectors. All detectors showed nearly the same performance and all fulfilled the specified requirements.



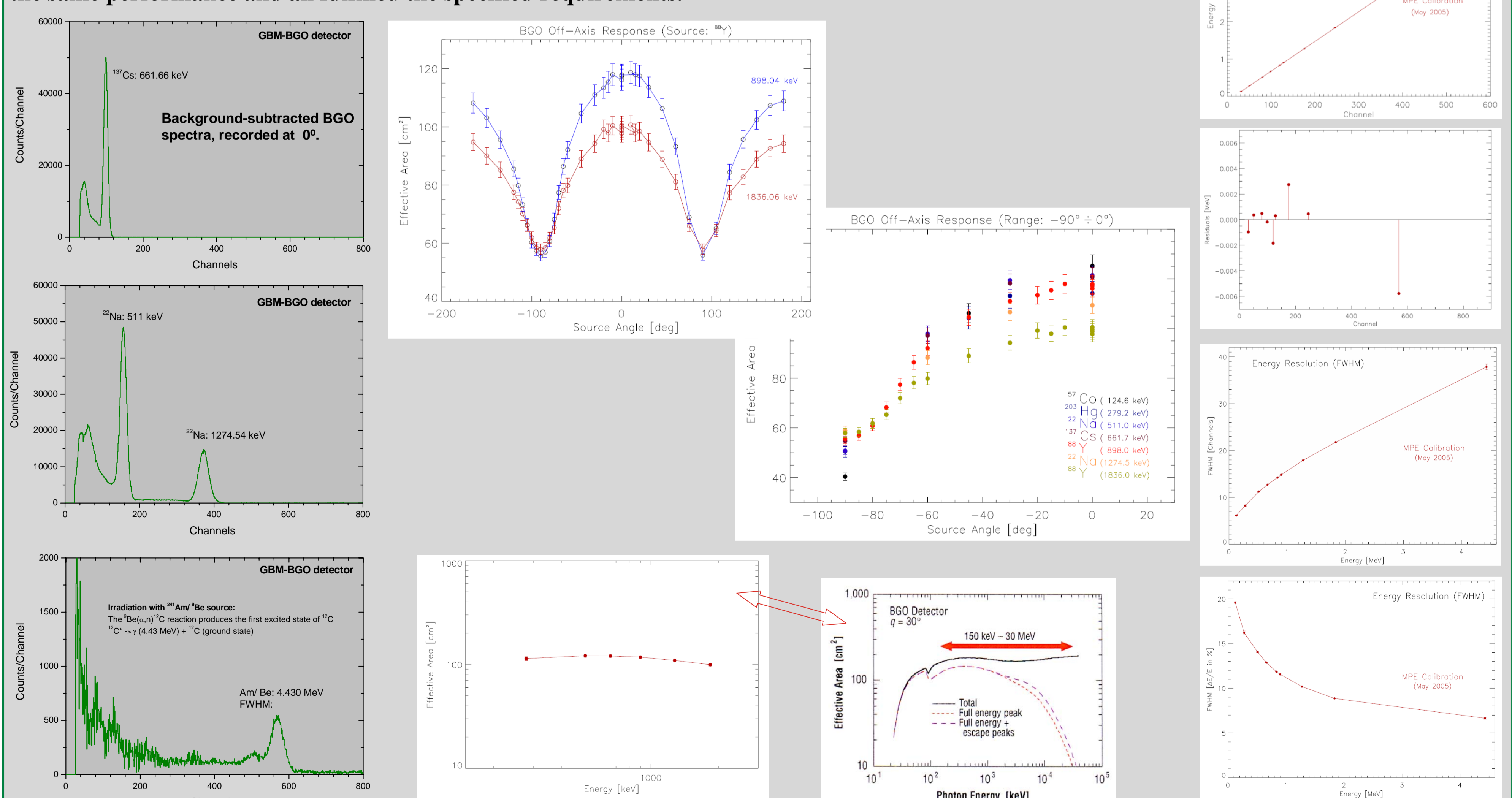
NaI Low Energy Calibration:

Performed at the BESSY synchrotron in Berlin with 4 FM-NaIs: Determination of absolute efficiency at low energies (8- 60 keV) and test of response around Iodine K-Edge



Calibration Results - GBM-BGO Detector

Summary of the measurements performed with the GBM flight detectors. All detectors showed nearly the same performance and all fulfilled the specified requirements.



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