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Université franco-allemande
Deutsch-Französische Hochschule
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Characteristics comparison of different photon detectors

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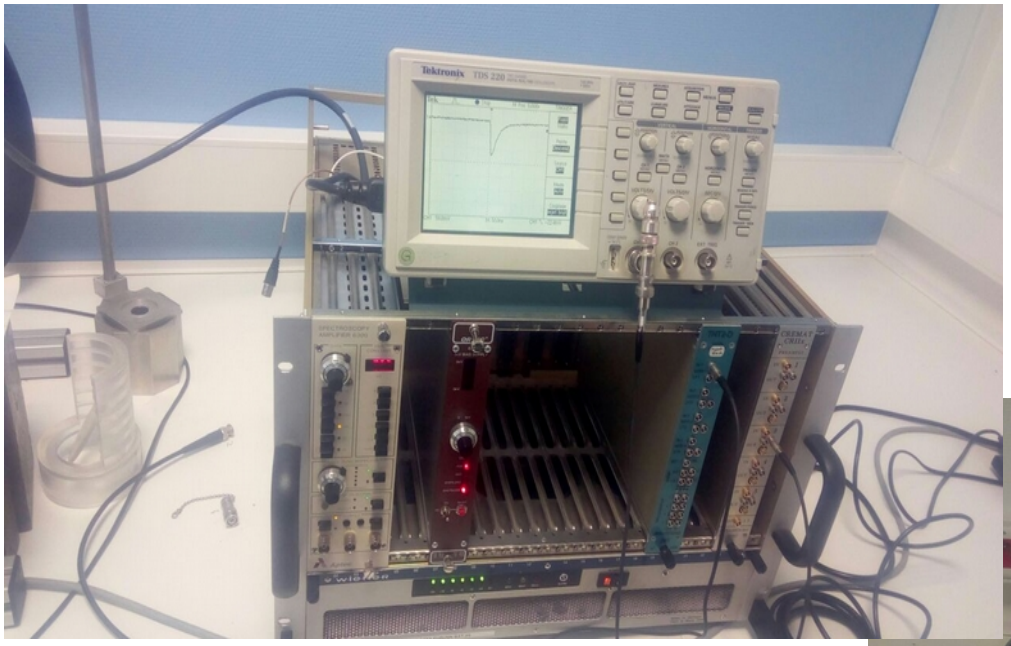
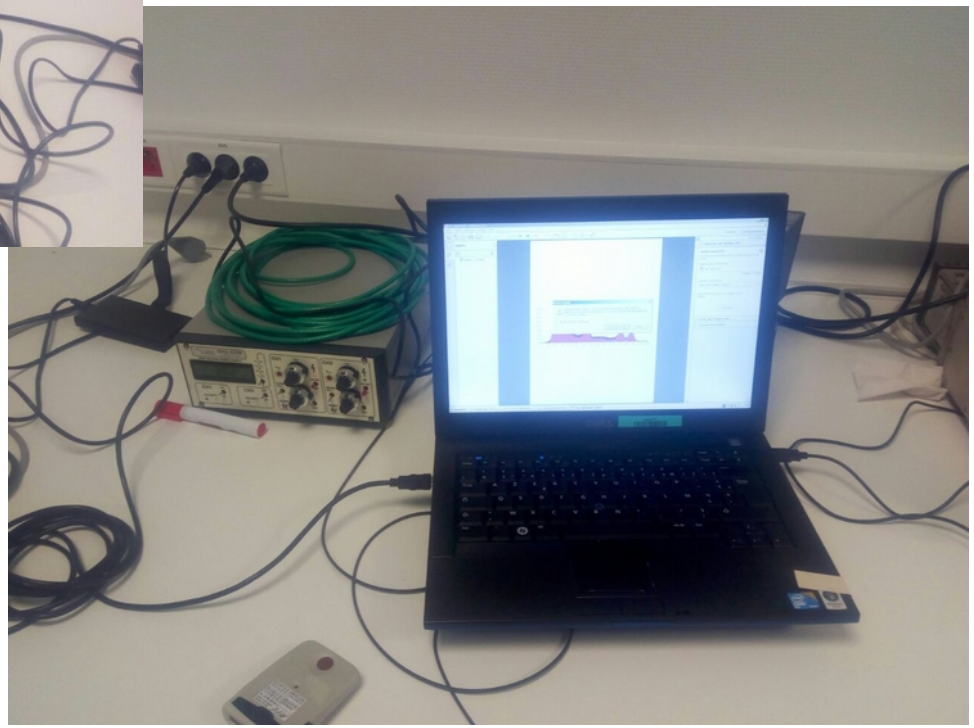
Goals

- Measure the energy resolution of the NaI and LaBr3.
- Calibrate a gamma spectrum from a digital acquisition system
- To compare the response of an analoge and digital data acquisition chain for each detector.

Experiemental Setup LaBr3



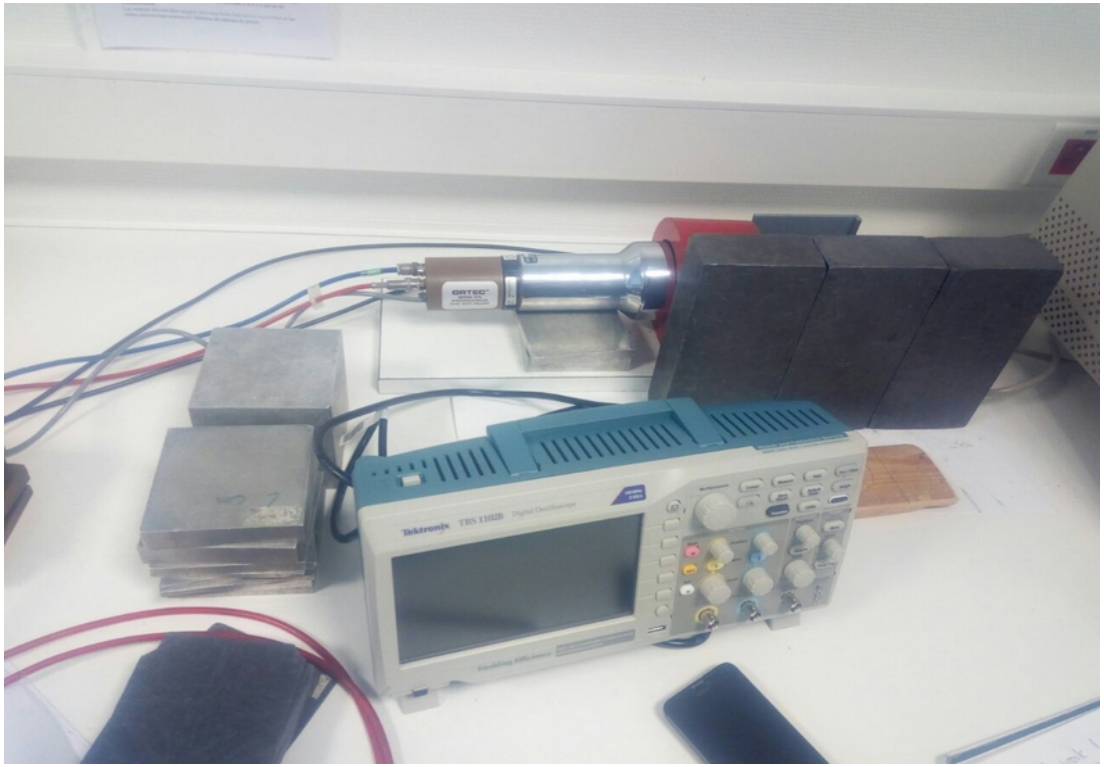
Acquistion sofware based on Jordanov algorithm.



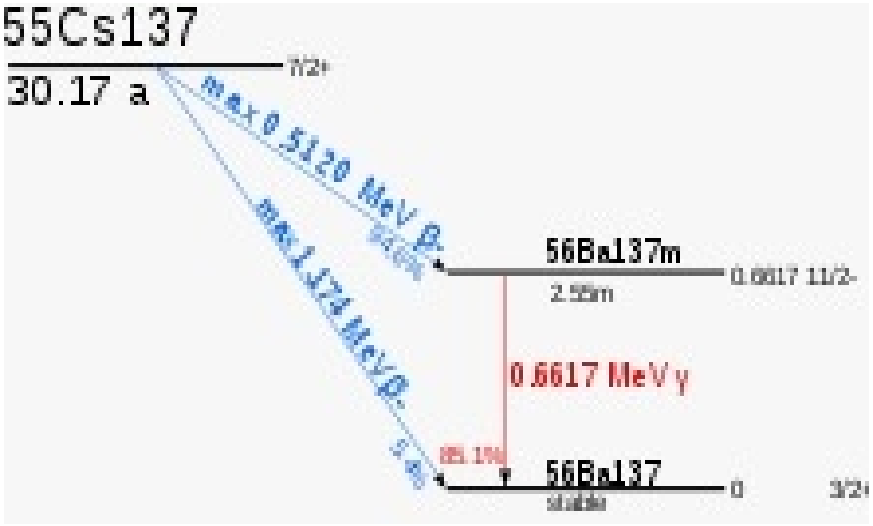
Nuclear electronics:
- HV power supply
- Amplifier
- Digitizer (based on FPGA)

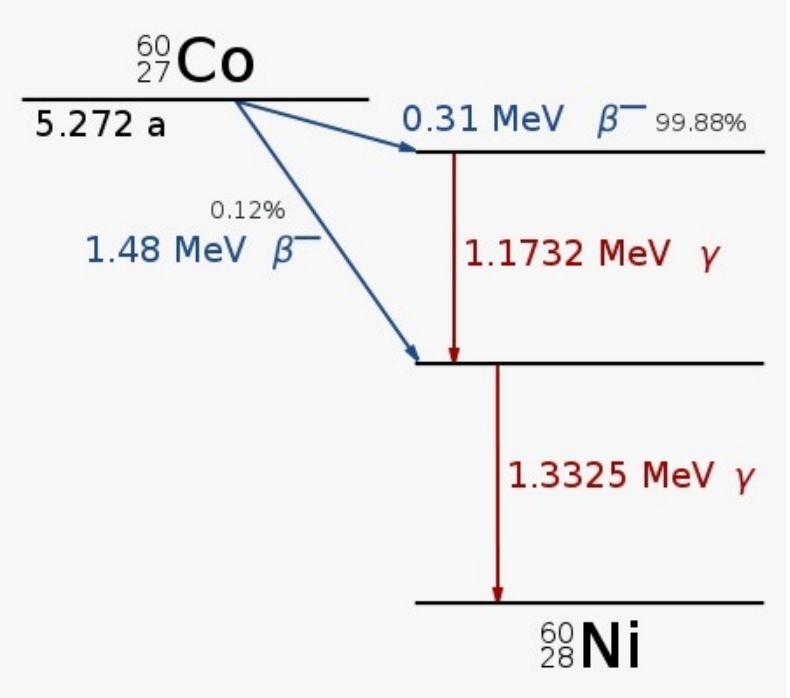
Experiemental Setup NaI

SETUP:
- NaI detector.
- Photomiltiplier.
- HV power supply
- Amplifier
- Camberra MCA + acquisition sofware GENIE2K



Radioactive sources





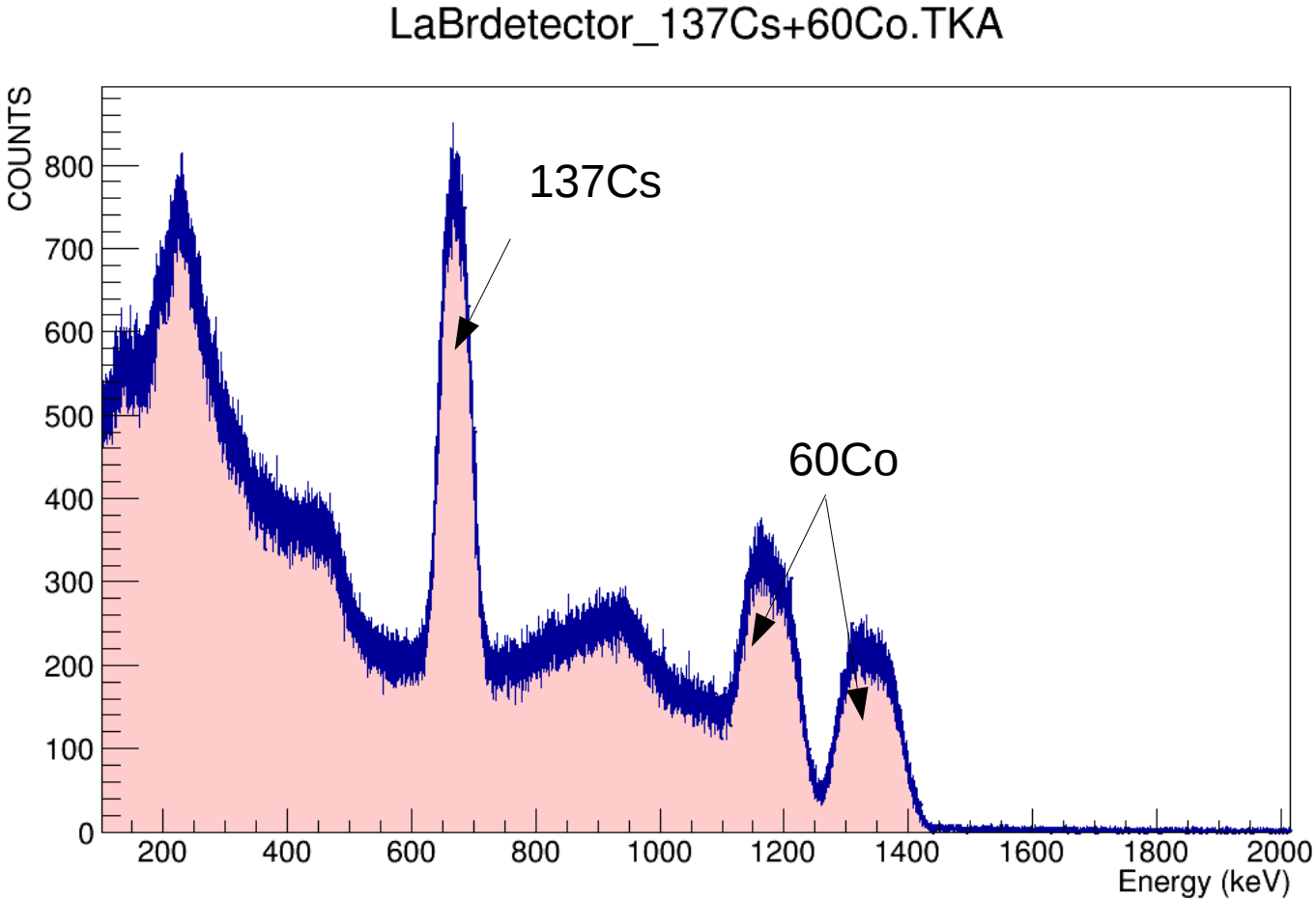
Energy resolution NaI detector

Internal tools from Genie2K were used for the energy calibration of the detector and the calculation of the resolution.

NaI detector + Analog acquisition system			
Radionuclide	**Energy (keV)**	**FWMH (keV)**	**Resolution**
137Cs	661.7	60.9	9.2%
60Co	1173.2	74.9	6.4%
60Co	1332.5	78.4	5.9%

Similar resolutions were obtained when using the digital acquisition system. The resolution limited in this setup by the amplifier characteristics.

Energy calibration LaBr3



E (ch) = 0.09605·ch-10.3

Probably the setting of the DAQ parameters should be optimized!

Energy resolution for LaBr3

LaBr detector + Digital Acquisition System			
Radionuclide	**Energy (keV)**	**FWMH (keV)**	**Resolution**
137Cs	661.8	48.0	8.7%
60Co	1172.7	81.4	7.8%
60Co	1332.9	94.6	7.8%

These values of gamma resolution may be improved by using an optimized set of DAQ parameters...