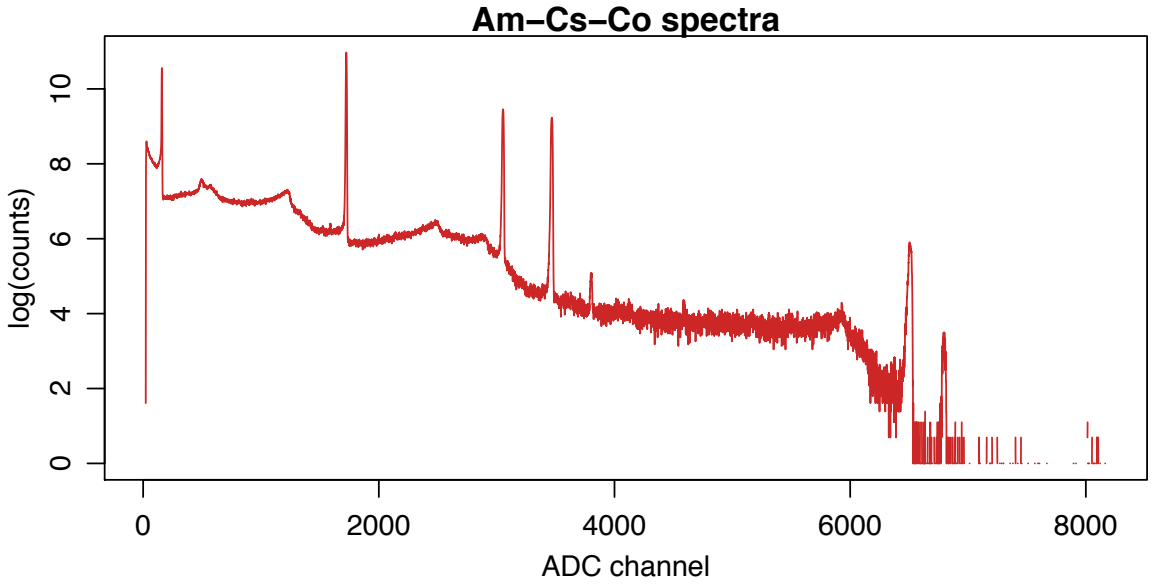
Extraction of signal over background from spectral data, in different data taking conditions, using a Markov Chain Monte Carlo with a Gibbs sampler

The plot shown in the following figure is an uncalibrated energy spectrum collected with a Germanium detector irradiated by a combination of three sources: ^{241}Am, ^{60}Co and ^{137}Cs.



According to [1], the source nuclides emit the following photons:

Nuclide	^{241}Am	^{137}Cs	^{60}Co	
Photon energy (keV)	59.54	661.66	1173.24	1332.51

and these are the first four peaks (starting from the left side) visible in the figure.

Using a Bayesian method similar to that presented during the course, and with the help of a MCMC, infere the number of events under the source γ peaks, taking into account for the underlaying background. (Hint: analyze separately and independently each peak of the spectrum).

Bibliography

[1] Laboratoire national Henri Becquerel, tables of eveluated data on radioactive nuclides, `http://www.nucleide.org/DDEP_WG/DDEPdata.htm`