Calibration from ¹³⁷Cs

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- Long Slab 8 ASUs
- Source ¹³⁷Cs, 370 kBq on 1 ASIC with babywafer @ D ~ 12 mm
- Threshold scan from 250 to 460, step 30
- Acquisition time = 25200 s



charge_hiGain[58][0][11] {charge_hiGain[58][0][11]>0&&badbcid[58][0]==0&&gain_hit_high[58][0][11]==1}



Fit for Chip 58 (ASU 4) ch 11, High Gain, SCA0, threshold 280 :

- Erf function caracterises the trigger resp.
- Erfc function caracterises the Compton Edge ≡ 477 keV
- Exp function modelises the spectrum



Fit parameters for all 16 channels, SCA0, high gain, threshold 280 Good fit for the Erf, less so for Erfc (OK if good stat) DAC_ADC_Linearity_allChan



- We can check the DAC-ADC linearity with a mean of all channels
- We observe a potential saturation beyond thr400



• DAC-ADC linearity relation for all 16 channels



- Linearity parameters for the previous fit
- The outlier is caused by an error in the pol1 fit

Compton Edge



 These variations can be explained by a bad fit or statistical variations due to the relatively small number of events • The same work can be done with the low gain





• DAC-ADC linearity, low gain



• DAC-ADC linearity, 16 channels, low gain



• Distribution of the linearity parameters, 16 channels, low gain



Statistics at end spectrum is largely DAQ limited (not source)

Higher statistics for Compton Edge

Same measurement, threshold 240, acquisition time 60000 s

chip122/sca00/adcHG_chan_Hit



chip90/sca0/adcHG_chan_Hit



Fit for Chip 90 (ASU6) ch 4, High Gain, SCA0, threshold 240 :

- Erf function caracterises the trigger resp.
- Erfc function caracterises the Compton Edge \equiv 477 keV
- Exp function modelises the spectrum



• Fit parameters for the 16 channels



Fit parameters for all 16 channels, SCA0, high gain, threshold 240 Good fit for the Erf, less so for Erfc (OK if good stat)

A measurement was also made on the stack prototype





- Source 137Cs, 37MBq
- D~10 cm
- Acquisition time = 60000 s
- Threshold 240

chip10/sca0/adcHG_chan_Hit



- Fit for the sum of all SCAs
- Degrades the quality of the fit of Erfc



A simulation of the energy deposited in the detector was realised with Geant4



Energy deposit in the detector







Next...

- Extract calibration for LS (almost there)
- Extract all parameters for stack
 - Pedestals per CH and SCA.
 - Thr. = $a + b \times DAC$
 - σ of thr. (should be cst)
 - Edge position & σ
 - Complement mip (CE ~ 4 mips)
- Understand slope discrepency data/MC