BACKGROUND & SOURCE RUNS

INTRODUCTION

This is a summary of measurements done along the installation period.

There are 3 different runs:

1. BACKGROUND (6 December 2011)
2. ^{22}Na source (9 September 2011)
3. ^{137}Cs source (July 2011)

...taken in VERY different data taking conditions.

- Different HVs
- Different FADC DAC Offsets
- Different hardware thresholds
- Several operations on the apparatus (change PMT bases, move PMTs, LED etc...)

DATA SELECTION

Same selection of events for all the runs taken.

Integrals with DAC offset subtraction

The selection was done in few different steps:

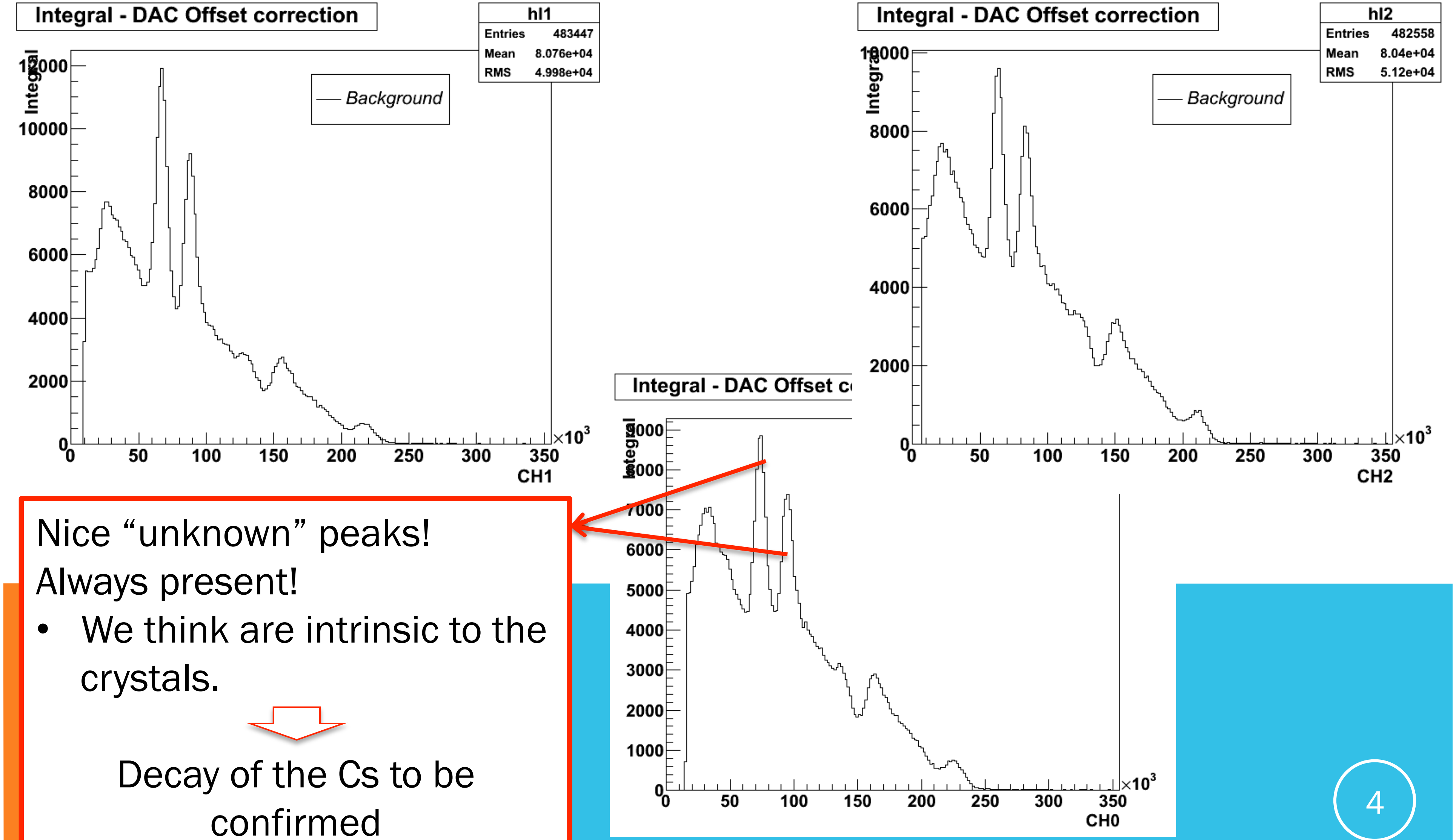
- Optimization of the triggering fired channel by defining appropriate DAC threshold to identify the triggering channel
- The final requirement is the signal of the "triggering channel" above the previous threshold and signals of all other PMTs below their respective thresholds

The labeling is done considering the front face of the polarimeter

6	7	8
3	4	5
0	1	2

BACKGROUND RUNS (CH = 0, 1 & 2)

Long run of 3M events, VME discriminator and Majority level =1

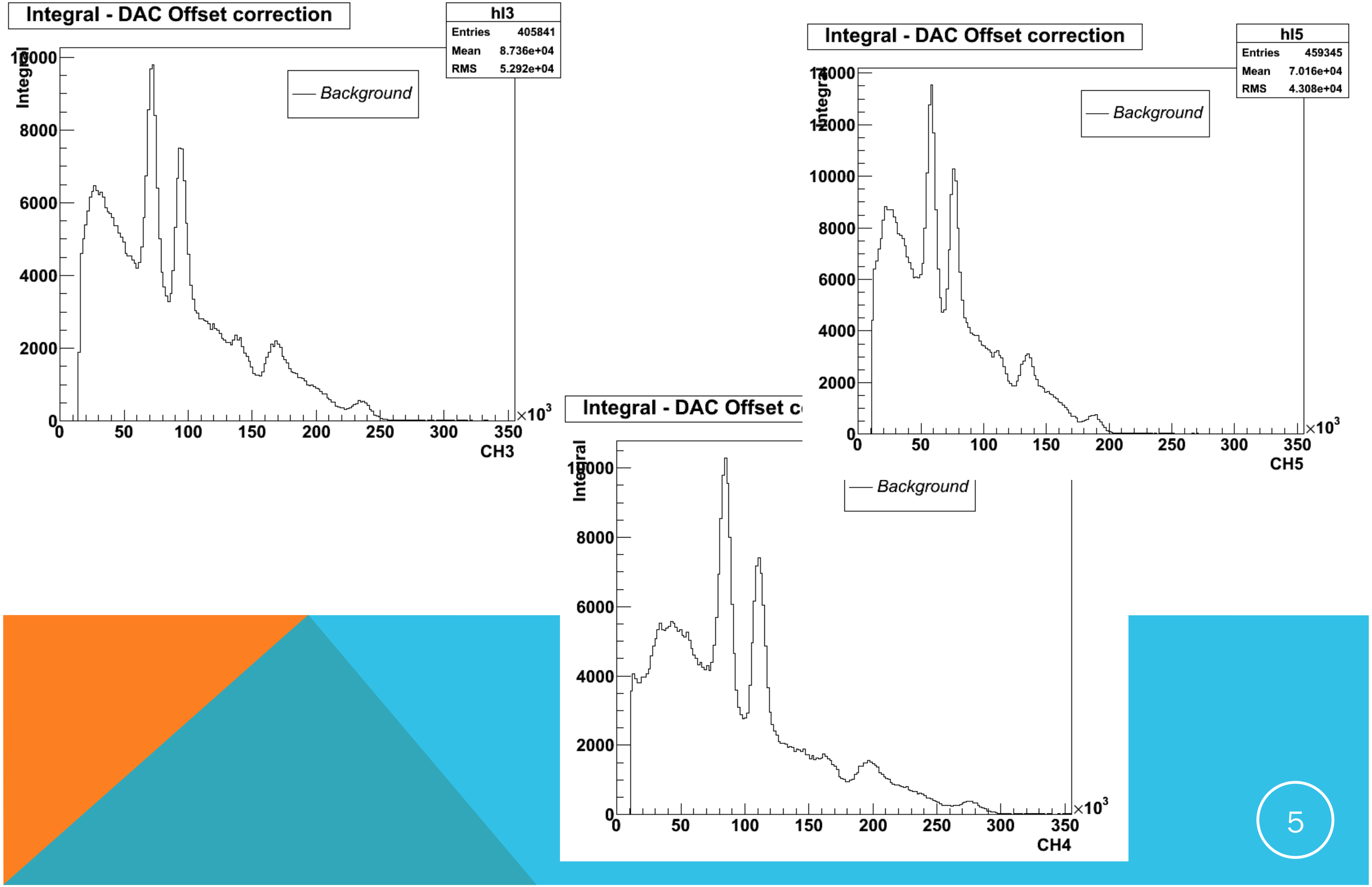


Nice “unknown” peaks!
Always present!

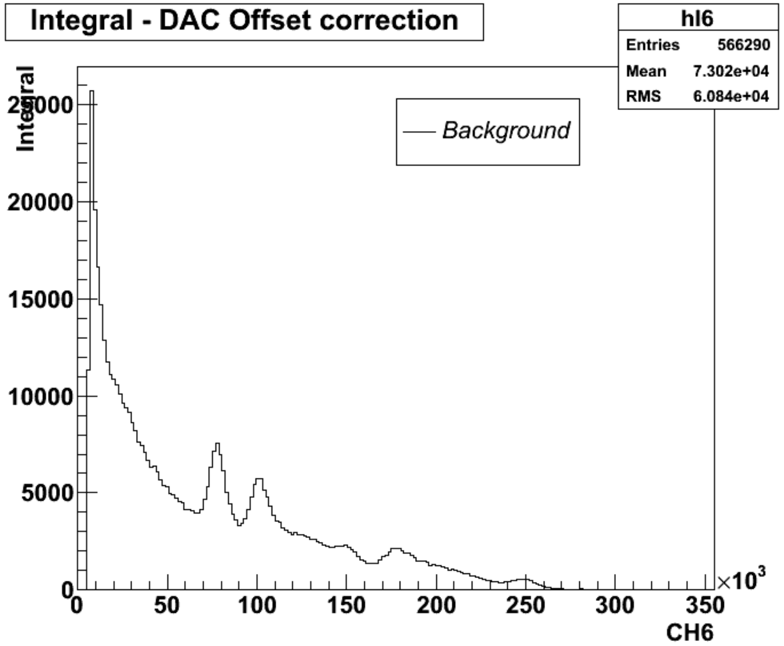
- We think are intrinsic to the crystals.

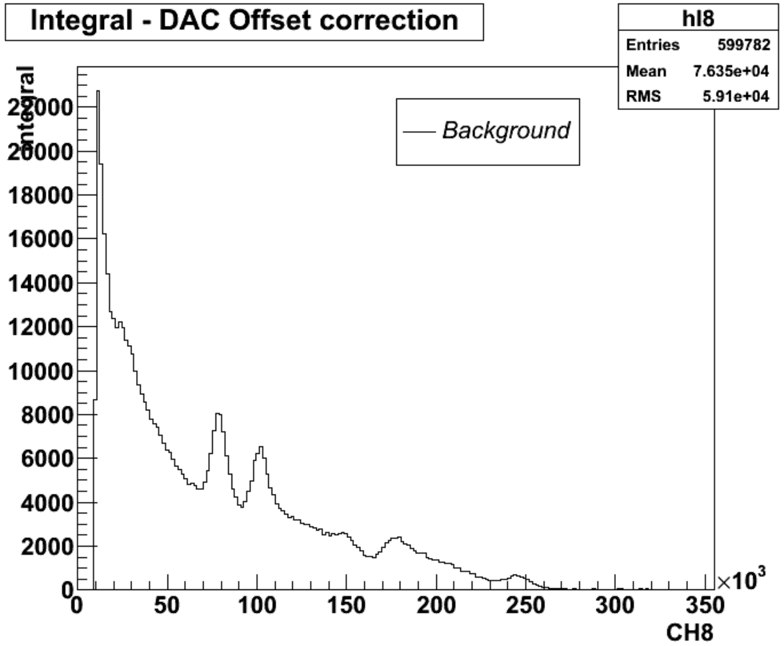
Decay of the Cs to be confirmed

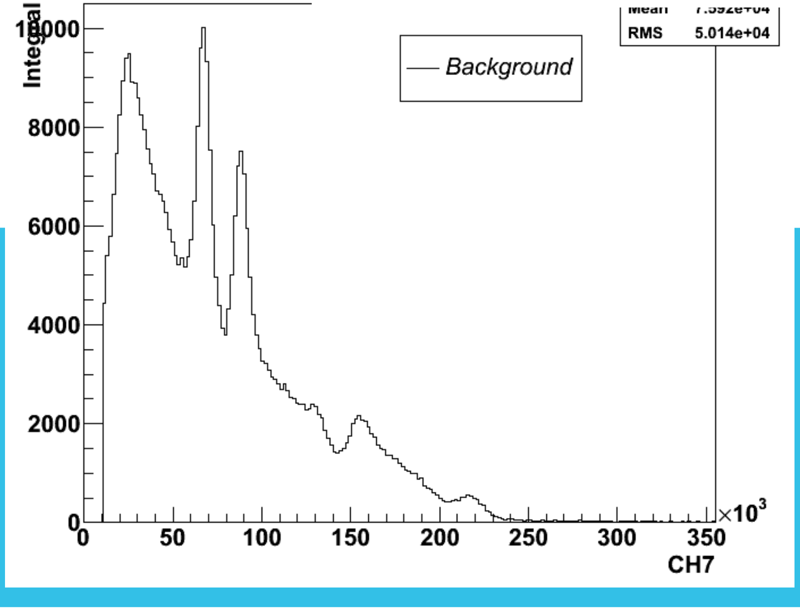
BACKGROUND RUNS (CH = 3, 4 & 5)



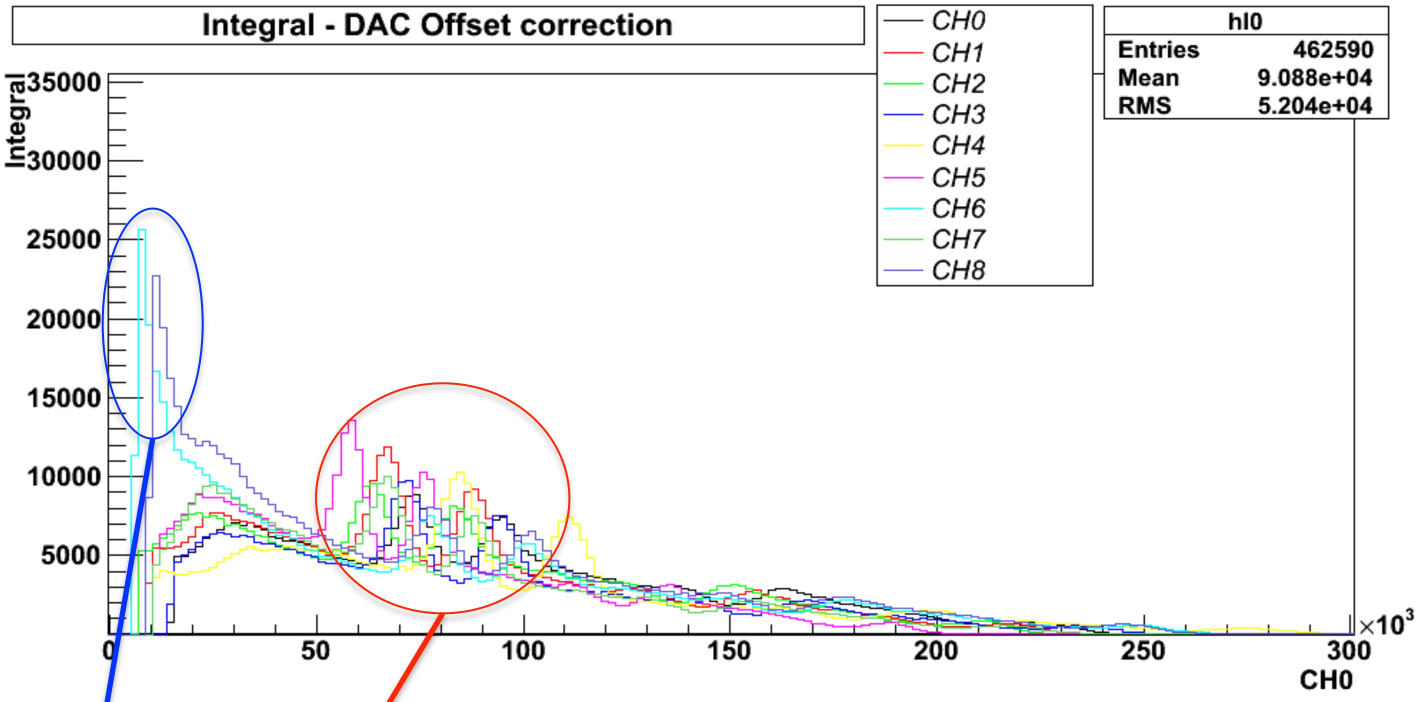
BACKGROUND RUNS (CH = 6, 7 & 8)







BACKGROUND RUNS



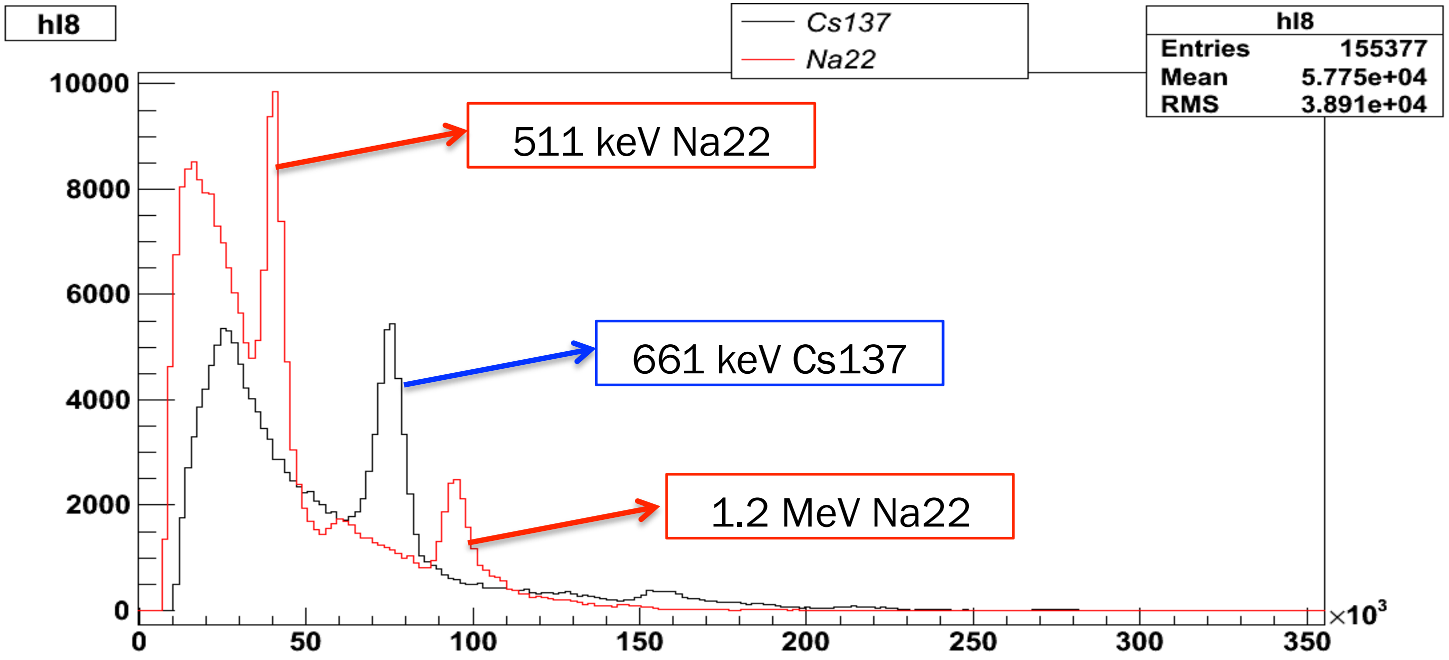
This plot is used ONLY to show that there are some issues to be solved.

All the peaks are not yet aligned. Few adjustments to do:

1. Optimization of the HV
2. DAC offset “optimization”
3. Optimization of the analysis thresholds

SOURCE RUNS ^{22}Na VS ^{137}Cs

Looking at all the source data we want to show a couple of very interesting plots…



- Sources in front of the crystals for both measurements
- Na22 not collimated
- SAME HV voltages for both runs for this channel
- Different DAC offsets for the 2 runs

Inconsistent measurements

SOURCE RUNS ^{22}Na VS ^{137}Cs

As the previous case, the source was in front at the crystal 5 for both runs

HV changed between measurements => This is the reason of the peak shift BUT,

What’s happening?

FURTHER CONSIDERATIONS

The are some issues to resolve.

From the background study:

- Understanding of the 2 peaks, they are always there for all the crystals. If we can understand them we can use them for a self energy calibration
- In any case we want to use them to align the PMTs

From the radioactive analysis:

- The 2 examples are not 2 isolated cases

These features drive us to a single fact:

we don’t have yet an useful energy calibration for the calorimeter

We have to REDO, as soon as possible, radioactive measurements with, at least 2 sources, and in the same conditions