Calibration for comissionning

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(discussions with L. Manzanillas, C. Buck, and calibration meetings)

12/10/16

Goals

1. PSD: tune Qtail time window wrt Qtot
2. Energy scale: accurate reference point near acquisition thresholds
3. Start tuning MC

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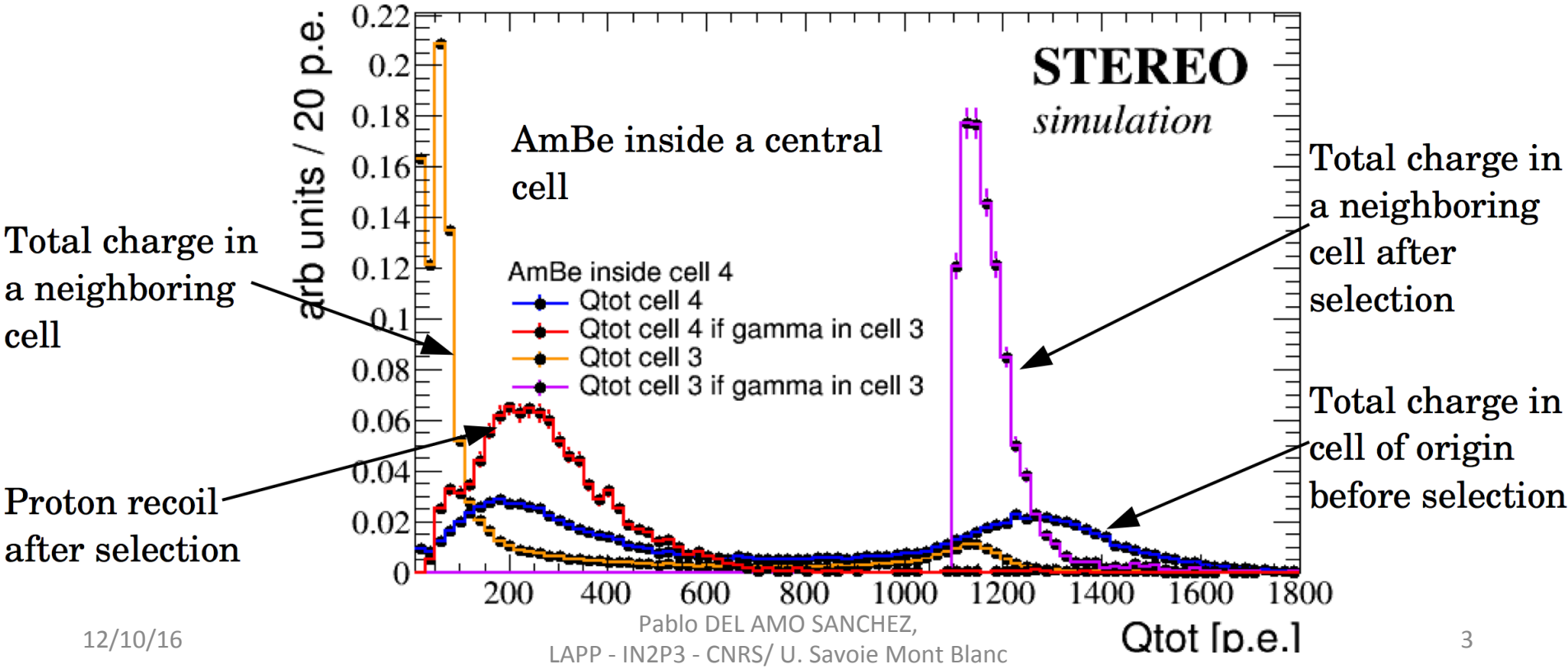
PSD

- AmBe inside calibration tube
- Request big charge in neighbouring cell -> 4.4 MeV gamma. In calibration cell, fast neutron -> proton recoil (+ light leak ~ 200 keV



DAQ thresholds

- Mn54 (0.85 MeV) or Co60 in calibration tubes
- Npe for Co60 -> 2.5 MeV visible but Npe/2 -> 1.25 MeV (if electronics non-linearity negligible), or can request 1 gamma in calibration cell + 1 gamma in neighbouring cell
- Remember: ~10s of kHz when source inside, ~1 min per source per calibration point enough!

MC tuning

- Topic of Calibration group meetings so far (2)
- Goal: There are many parameters to tune in MC. How to disentangle dependencies?

-> Which ones do we know well enough* to fix their value in the MC simulation?

(*well enough = negligible errors or negligible impact according to simulation)

So far, excellent discussion of LS parameters by C. Buck

Still many parameters left to discuss (PMTs, wall properties, etc)

(send Doodle, reconvene Calibration meetings again)

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MC tuning: reminders

- Check delta t distribution with AmBe data
- Light yield: from gamma calibration peaks width
- QE x light yield: from gamma calibration peaks mean
- AmBe vs lower energy (Mn54 or Co60): first indications on quenching
- Z dependence: for Latt > 5 m, essentially depends only on reflectivity
- Some geometrical dependence for light leaks -> can we use mapping over Z to disentangle light leaks and (small) transparency of walls?

Conclusions

- Use AmBe and Co60 or Mn54 in calibration tubes to get early, quick indications on: PSD, energy scale, MC tuning
- Remember: ~10s of kHz expected, ~1min per source per calibration point enough!
- Make detailed calibration comissionning proposal
- Reconvene Calibration meetings, discuss proposal, present to proposal to Analysis Mtg, write detailed, step-by-step calibration instructions for comissionning…

BACK UP

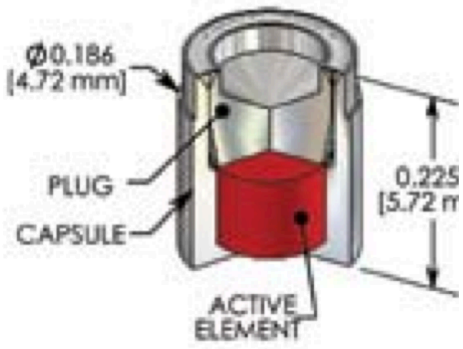
Sources bought

Isotope	Activity	Gamma energy (MeV)	Rate in Target (source inside)	Rate in Target (source outside)	Capsule type
Ge-68	90 kBq	2x0.51	80 kHz	0.25 kHz	3025
Cs-137	37 kBq	0.66	31 kHz	0.5 kHz	3025
Mn-54	90 kBq	0.83	90 kHz	1.1 kHz	3025
Co-60	50 kBq	1.17 & 1.33	50 kHz	2 kHz	3015
AmBe	250 MBq	4.4	15 kHz n, 10 kHz gamma	0.5 kHz gam	N02
Cf-252	50 kBq	?	5.5 kHz n, 1.1 kHz gam		3024

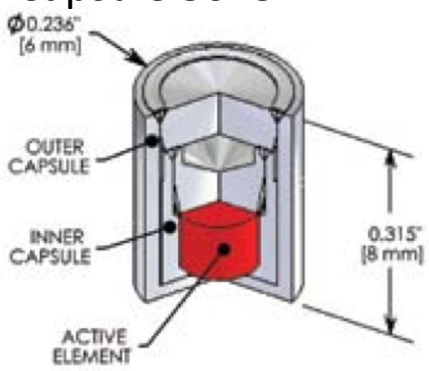
Sources: geometry, delivery

- Problems with IRSN licence obtention at ILL during summer -> delivery of sources has been delayed a few weeks
- Final delivery dates:
  - Ge68 and Mn54, 10/10/16
  - Cf252, 12/10/16
  - AmBe, Cs137, Co60, next week (17/10 to 23/10/16)
- Capsule geometries:

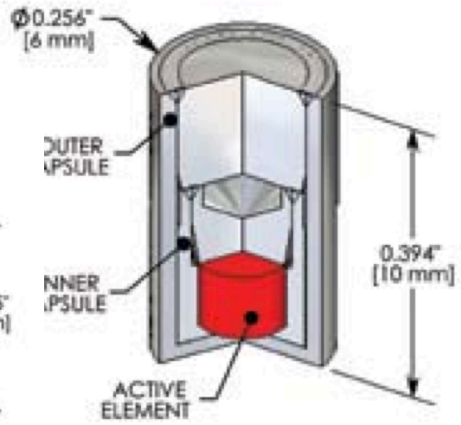
Capsule 3025



Capsule 3015



Capsule 3024



Capsule N02