

SiW ECAL 2017 Beam Test analysis task force

LAL

A. Irles, Orsay 7th July 2017



■ From the doodle list and/or the participation on the beam test

- R. Poeschl, T. Suehara, V. Boudry, A. Lobanov, Y. Miura, V. Balagura, A. Irles
- Someone else ?

■ CERN mailing list ?

- Wiki page: <https://twiki.cern.ch/twiki/bin/view/CALICE/SiWDESY201706> on construction
 - Previous TB page with some detailed information about skiroc can be found in:
<https://twiki.cern.ch/twiki/bin/view/CALICE/SiWEcalBT201511Analysis>
- DESY TB line 24 and 24/1 (PCMAG)
- June 2017 (2 weeks)
- Elog: <https://lrelog.in2p3.fr/calice/>

■ Beam spot seen minutes after the beam was switched on.

■ Smooth run for the 2 weeks with stable configuration

- Dedicated commissioning of the slabs with Passport production at LAL

<https://twiki.cern.ch/twiki/bin/view/CALICE/SiWDESY201706Commissioning>

- This lead to a minimal remasking of few channels during the MIP runs → needs automatization.
- Spill settings: 5 Hz, 3.7 ms width (0.9 start acq + 0.5 val evt + 2.3 ms)

Overrunning BCID (bcid step = 0.4 us) → but with desy high rates, it overruns only (if it does) in chips far from the beam spot

- Gain: PA = 1.2pF, CC=6pF (cc does not affect to the gain)
- Threshold \geq 225/230 DAC (chip based)

Extracted from the scurves as the maximum between 225 and 5 times the deviation from the error function mean value.
During the commissioning, we started with 230 as minimum but we end with 225.

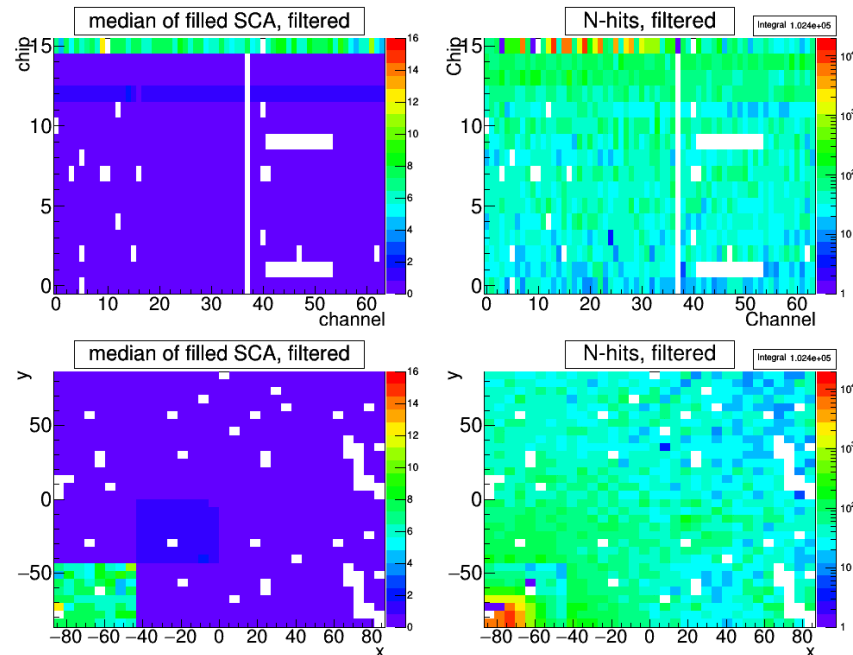
■ We even had some time for analysis during the shifts (Artur, Bokyeom, Izumi, Kostia, Younes, Yuand myself) and to have a BBQ :)

	A	B	C	D	E	F	G	H
	<i>Layer</i>	<i>SLAB</i>	<i>LV cables/connectors</i>	<i>LV PS</i>	<i>HV cables/connectors</i>	<i>GDCC_port</i>	<i>Name</i>	<i>Position</i>
1	1	21	1	1	5	1_1	<u>dif_1_1_1</u>	1
2	2	16	2	1	5	1_2	<u>dif_1_1_2</u>	2
3	3	17	3	1	6	1_3	<u>dif_1_1_3</u>	3
4	4	18	4	1	6	1_4	<u>dif_1_1_4</u>	4
5	5	19	5	1	6	1_5	<u>dif_1_1_5</u>	5
6	6	20	6	2	7	2_1	<u>dif_1_2_1</u>	6
7	7	22	7	2	7	2_2	<u>dif_1_2_2</u>	10
8								
9								

MIP scan

- Positrons of 3 GeV (~ 2 kHz rate, beam spot with slightly irregular shape and size < 2 cm diameter)
- Grid of 9×9 points separated by 2 cm \rightarrow using the CALICE table and the scripts made by Frédéric !!
- Single acquisitions of 30 minutes
- Enough statistics (~ 1000 entries) in the corners of the beam spot (to be increased merging several grid points)

■ <https://cernbox.cern.ch/index.php/s/v16dXBpIPeTGyVc?path=%2FMIPscan>

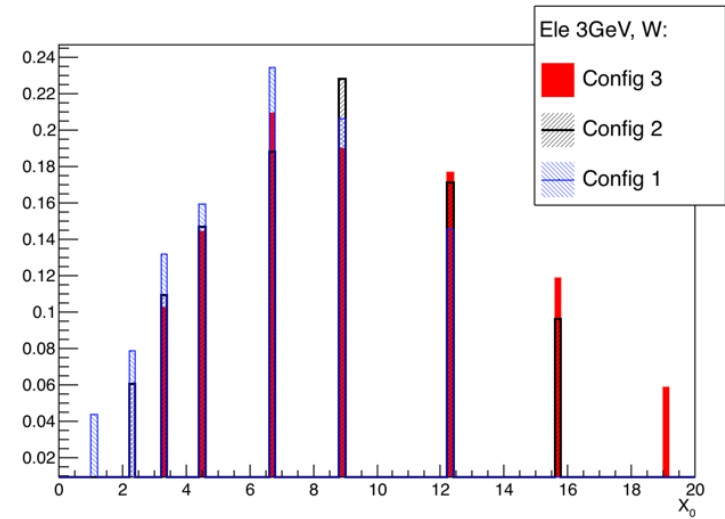


■ Tungsten program

- Scans of various positron energies (from 1-5.8 GeV).
- Rates at 5-5.8 GeV were very low: overnight runs
- Higher rate at 2-3 GeVs → runs of 1h.
- Three different configurations (see figure)

■ <https://cernbox.cern.ch/index.php/s/v16dXBpIPeTGyVc?path=%2F>

- see $W_X\text{GeV}$ folders, where $X = 1, 2, 3, 4, 5, 5.8$

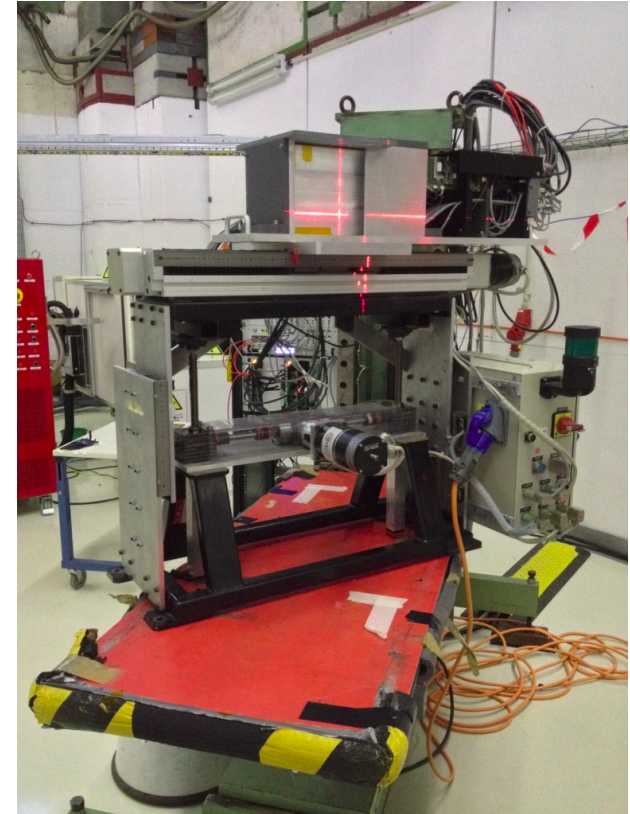


■ MIPs at ~ 43.6 degrees

- 1s layer removed from the run (for magnetic tests preparations)
- Tungsten plates removed.
- 3GeV positrons.

■ <https://cernbox.cern.ch/index.php/s/v16dXBpIPeTGyVc?path=%2F>

- See 3GeV_3GeV folder
- Mistake in the folder naming !!

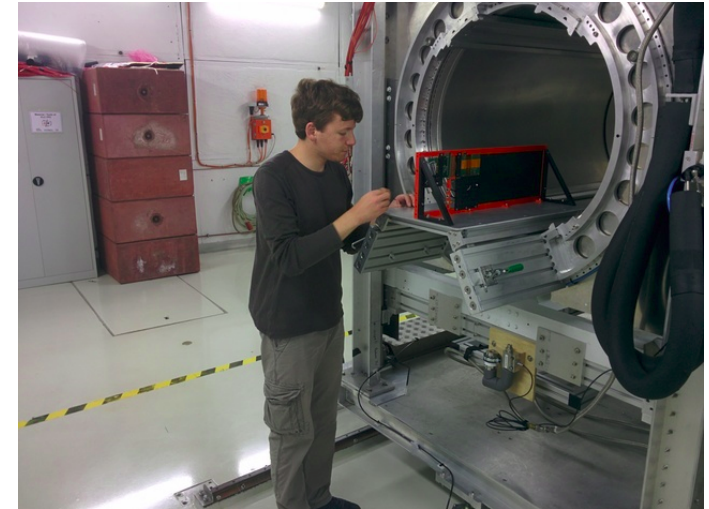


■ Magnetic field tests

- Slab 21
- Magnetic field from 0 to 1 T.
- With and without beam.
- Almost same configuration than in the other beam area.
- <https://lrelog.in2p3.fr/calice/1611>

■ <https://cernbox.cern.ch/index.php/s/v16dXBpIPeTGyVc?path=%2F>

- See XT_YGeV folders



■ Software for Test Beam: commissioning, analysis, semionline monitoring:

<https://github.com/SiWECAL-TestBeam>

- Taikan, Artur and myself as administrators.

■ Two packages:

- SiWECAL-TB-Analysis → for the moment: raw2root converter, single slab analysis (mip calibration, pedestal extraction), merge and event building. **Code in construction. Instructions inside.**
- tpecal → semionline monitoring and quick analysis tools for commissioning (scurves, etc)

■ Fork it to your own github profile and clone it from there.

- Make changes locally and then ask for pull request (to keep track of the changes)

■ “Bug” in the raw2root converter:

- SCAs were tagged as retriggered (or bcid+x) if the previous one had a near bcid. This does not include the SCA=0. Now is fixed but conversion is needed to be done again.

■ Should we do a new iteration and all share same root files ?

- Upload them to the cernbox

■ The data is located in the cernbox under... Vincent user? If yes: should we search for an official SiWECAL folder somewhere accesible to everyone?

- Only reference to simulation code that I have found so far is in <https://indico.in2p3.fr/event/12616/>
 - <https://github.com/apsallid/SiWEcal>
- Who is experienced on this?

■ Short term “deadlines” and possible analysis:

- CHEF 2-6 October (Lyon)
- IEEE 21-28 October (Atlanta, only a poster presentation...)
- MIP/pedestal homogeneity on space and time.
- MIP for the two orientation of the prototype.
- MIP/pedestal stability during magnetic field runs.
- MIP value for the second MIP peak ? $\approx 2 \times \text{MIP}$?
- Proper estimation of bcid+1/retriggers/plane events

these events are easily taggeable and do not affect importantly to the performance of the detector (at least according to analysis and monitoring during the beam test)

■ Long term (~9-12 months)

- Paper publication including simulation studies and comparisons.

■ **Important remark:** many of these analysis have been already performed (more or less naively) during the beam test showing very nice prospects for publication.

- Time availability of each one ?

- Periodicity of the meetings ?