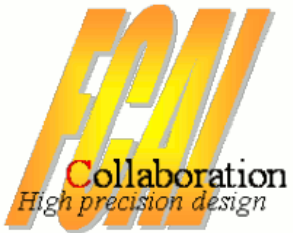


Results from 2010-2011 beam tests campaign.

Itamar Levy

Tel Aviv University



30 April 2013

Introduction

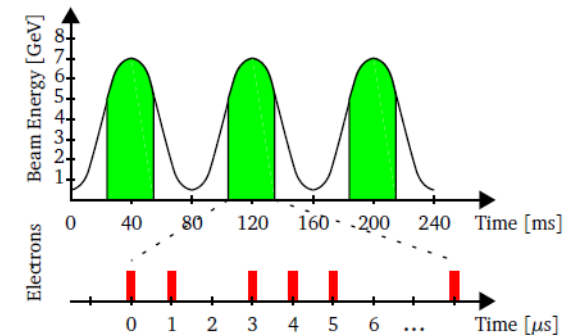
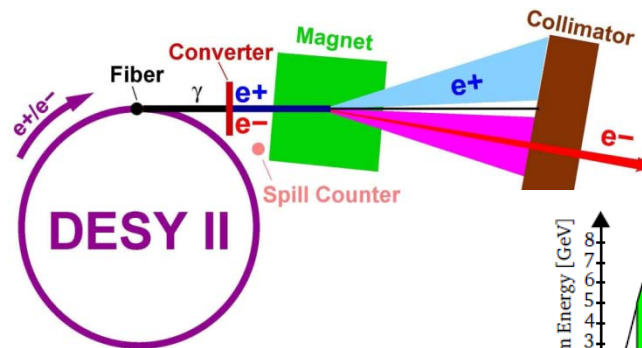
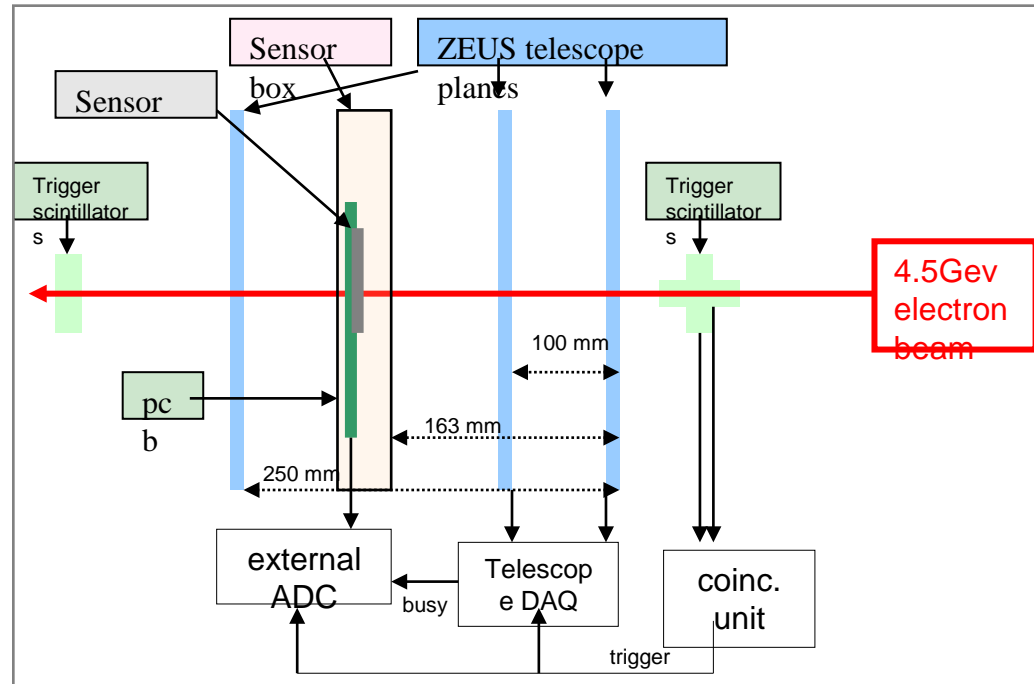
- In 2010 & 2011 the FCAL collaboration held 3 beam tests (one in 2010 and two in 2011).
- The tests were held at DESY, at the DESY-II machine.
- The aim of this presentation is to review the results of the tests for the publication on this subject.

The proposed outline

1. Introduction (W.L.)
2. Forward calorimeters at the ILC (W.L.)
3. Sensors
 1. Silicon sensors (Itamar, Szymon)
 2. GaAs sensors (Olga, Vladimir from JINR)
4. ASICs (Szymon, Marek)
5. Testbeam set-up (Olga)
6. Performance of the silicon plane (Itamar, Szymon)
7. Performance of the GaAs plane (Olga, Titi, Veta, Eliza)
8. Readout with deconvolution (Olga, Szymon)
9. Summary (all)

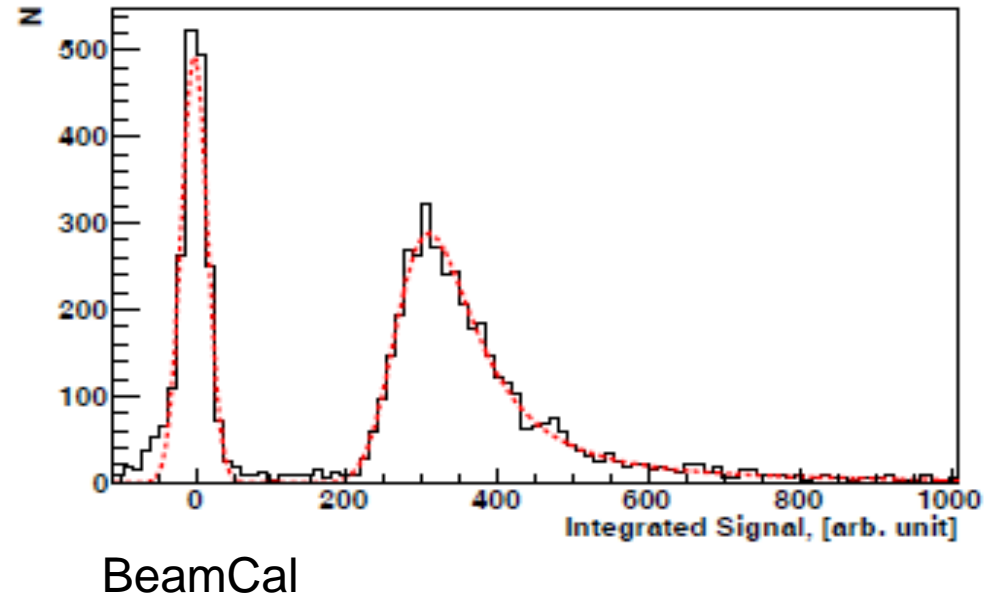
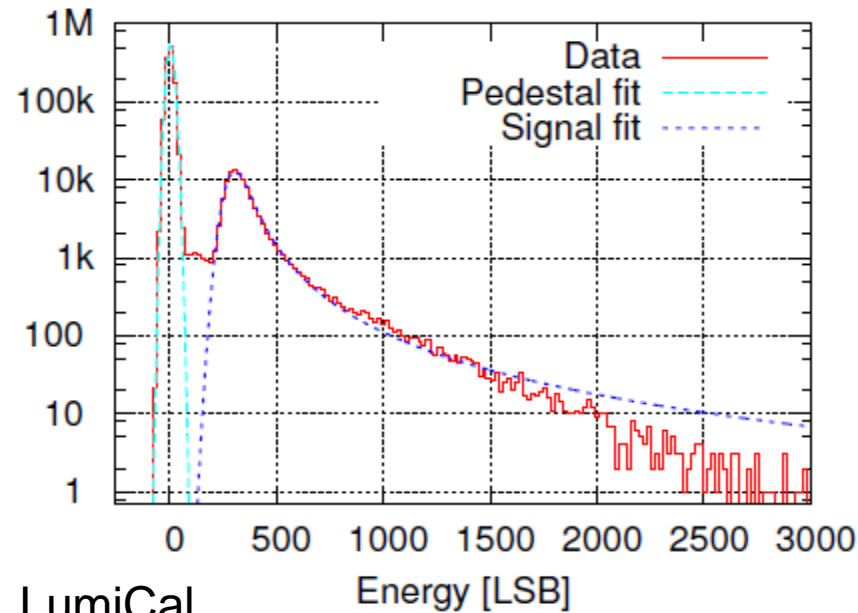
Testbeam set-up

- 2 DAQ
 - 2010 - two systems (BCM1F + Telescope).
 - Veto scam schema.
 - 2011 - EUDAQ.
 - TLU (unique trigger).
- Rate from beam energy.
- Plane alignment .



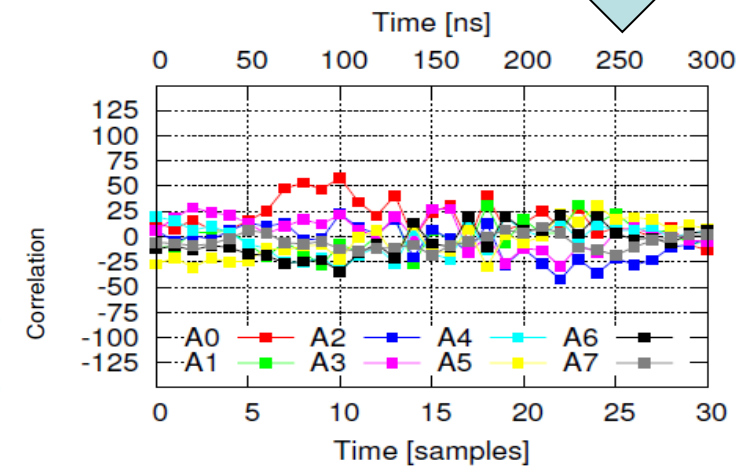
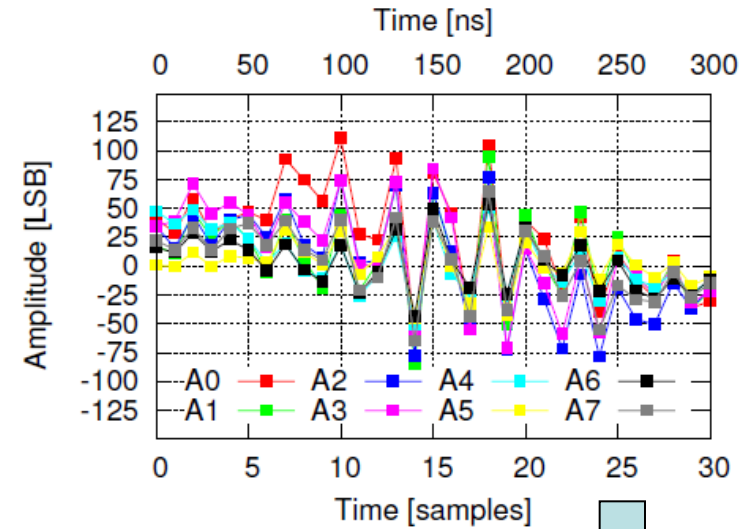
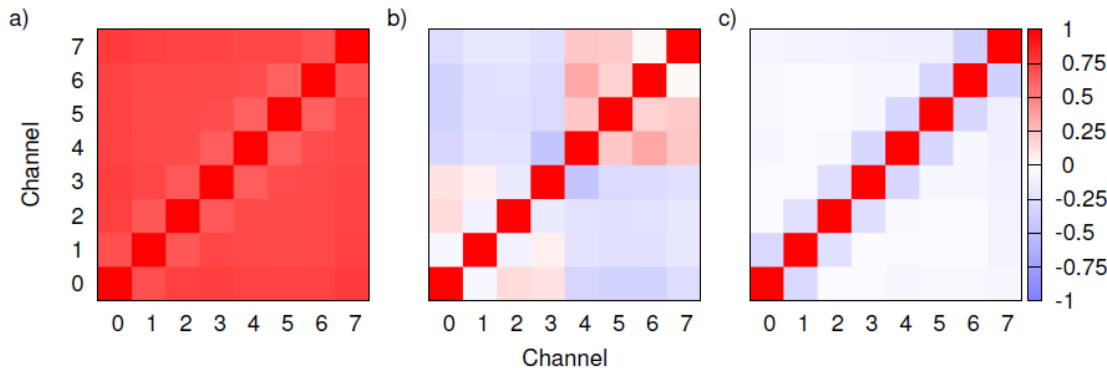
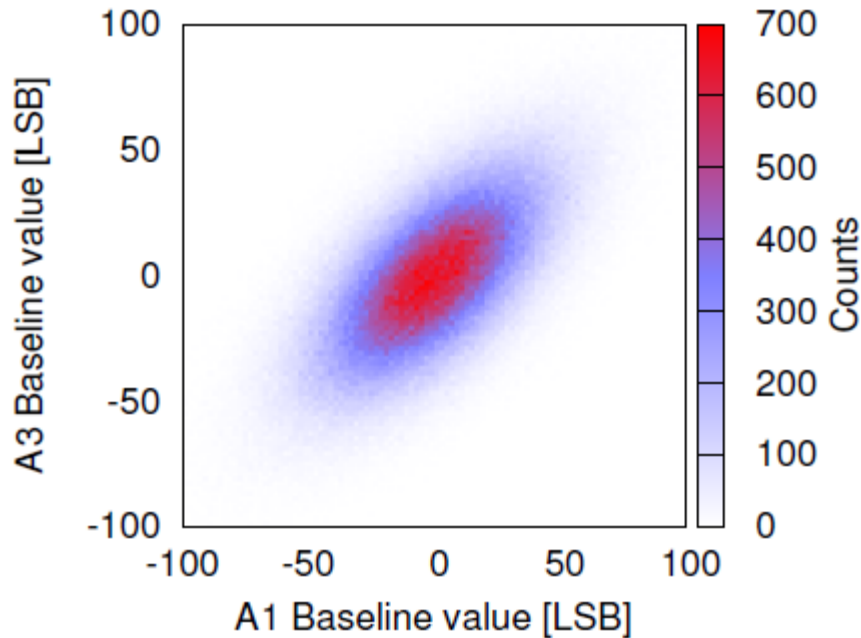
2010 test results

- Energy deposition spectrum.
- Spectra differ in features.
- active feedback (MOS) – passive feedback (R_f)
- Uniform gain (2%).
- SNR
 - LumiCal 16 – 20.
 - BeamCal 17 -25.
- CCE was calculated for BeamCal as 42% (Calibration)



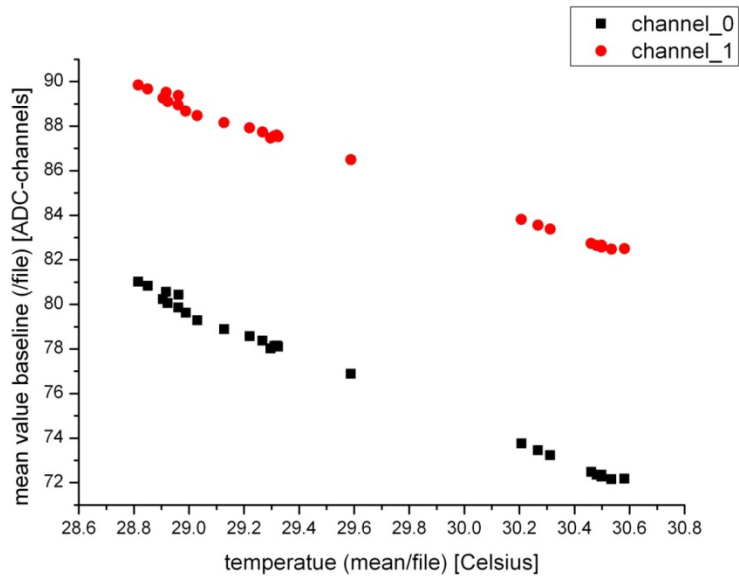
2010 test results

- Channel correlation and CMN subtraction (LumiCal).
- ADC different.

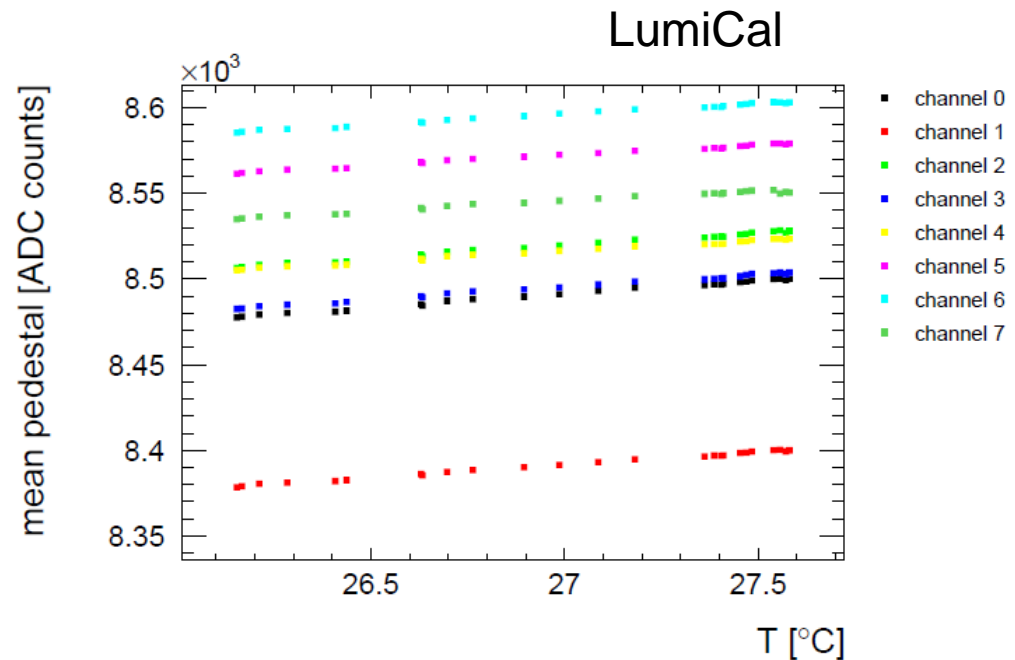


2010 test results

- Temperature dependence :



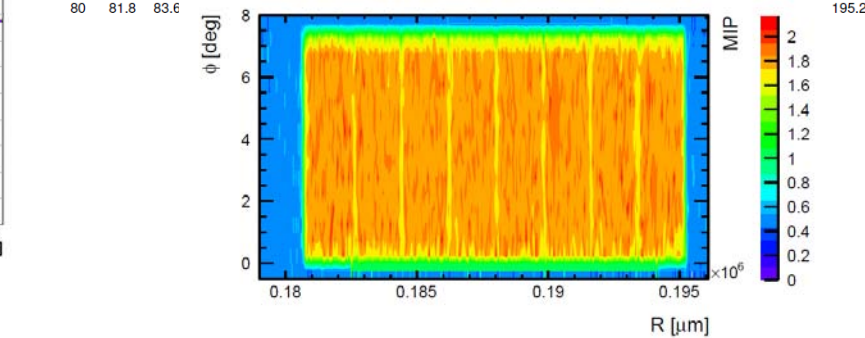
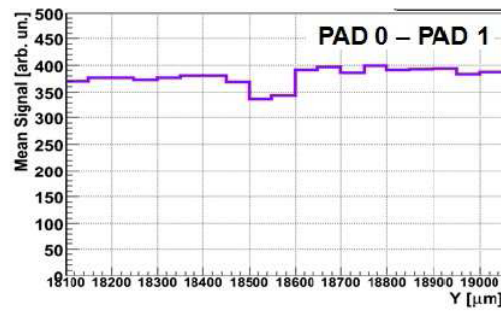
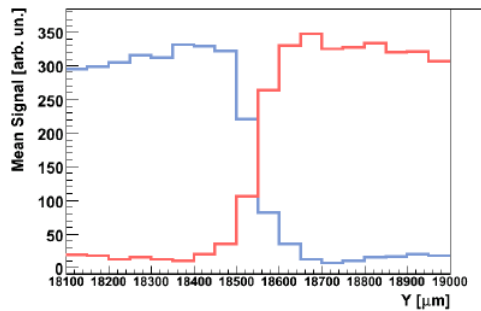
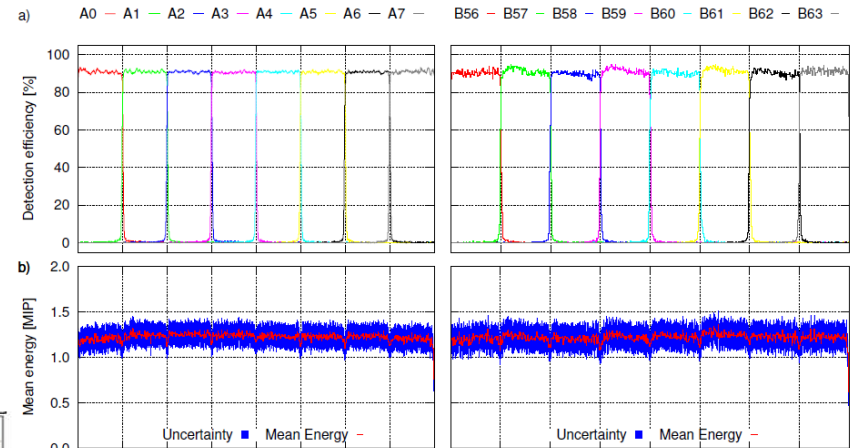
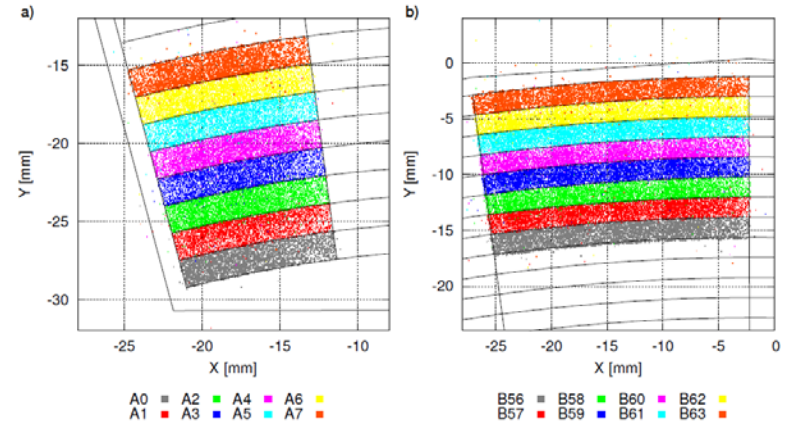
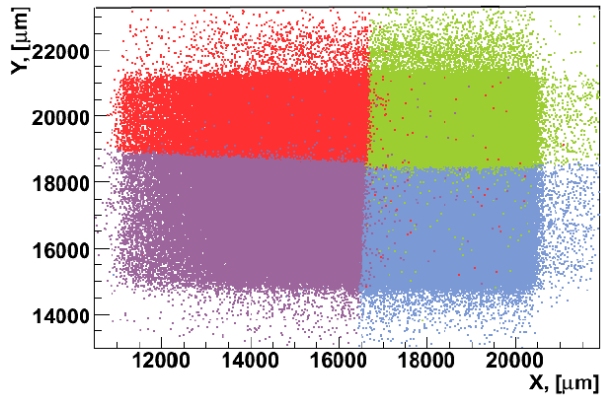
BeamCal



LumiCal

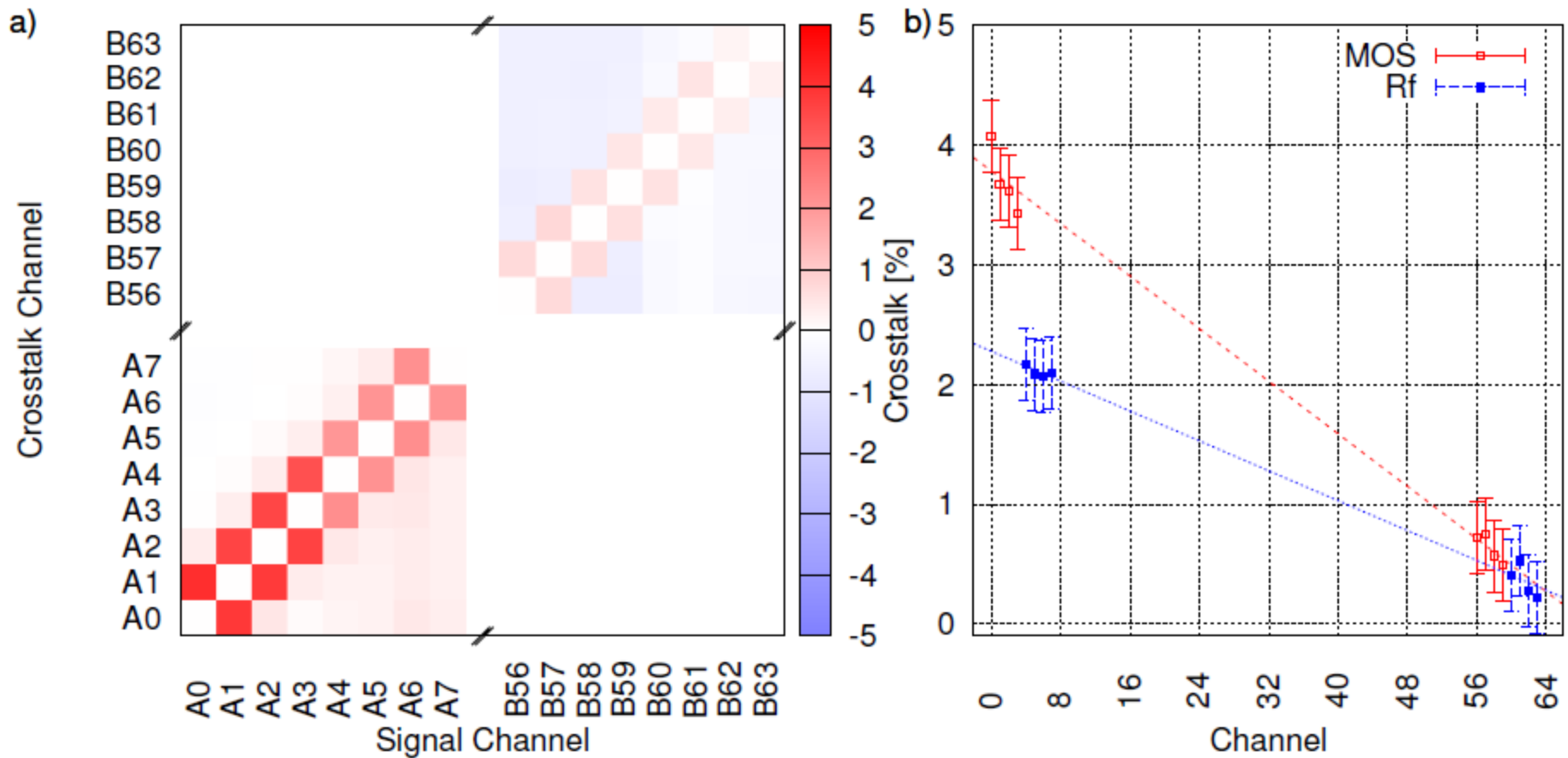
2010 test results

- Position reconstruction.
- Sensor uniformity & Detection efficiency (LumiCal less than 100%) .



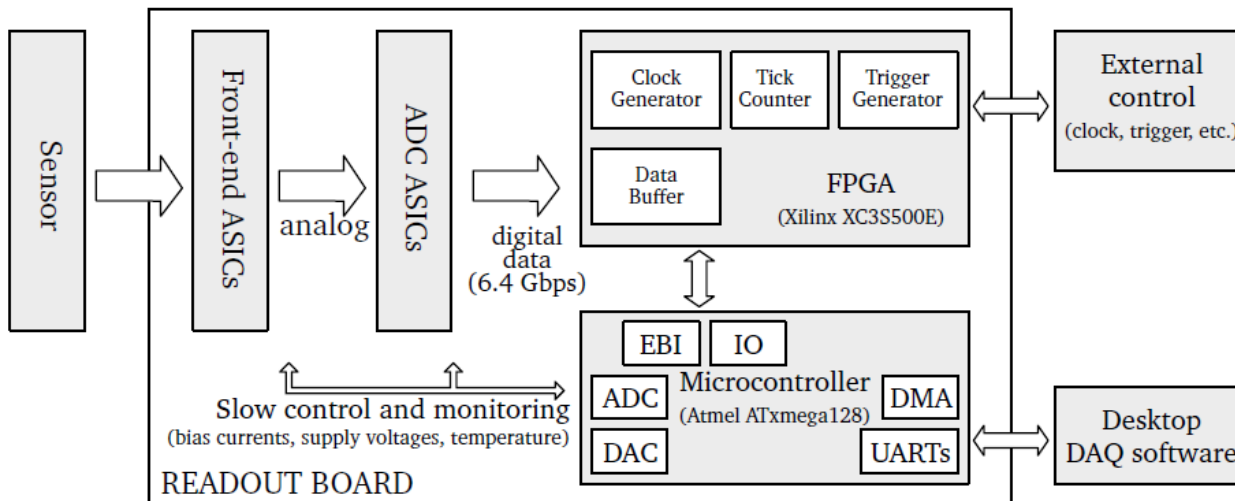
2010 test results

- Cross talk (after position reconstruction).
- BeamCal final result?



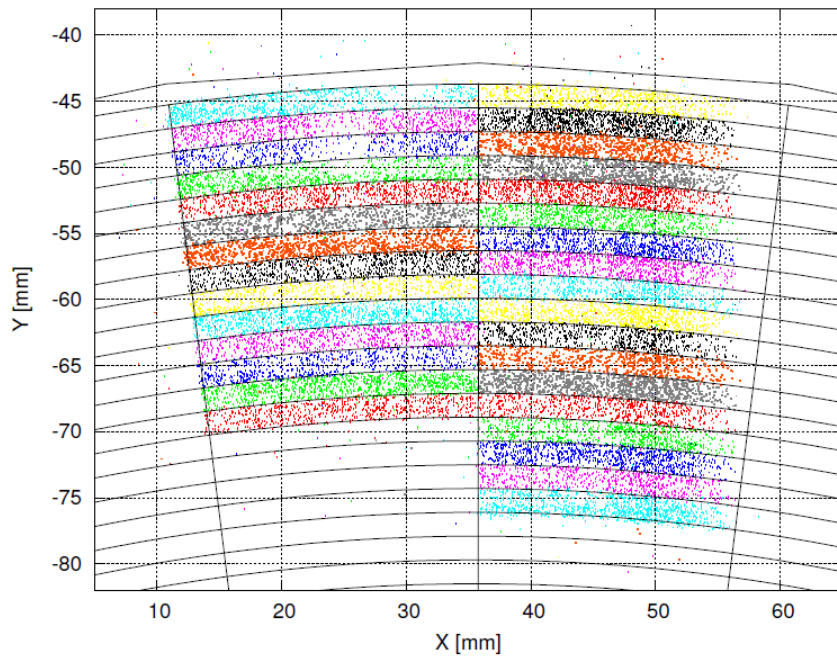
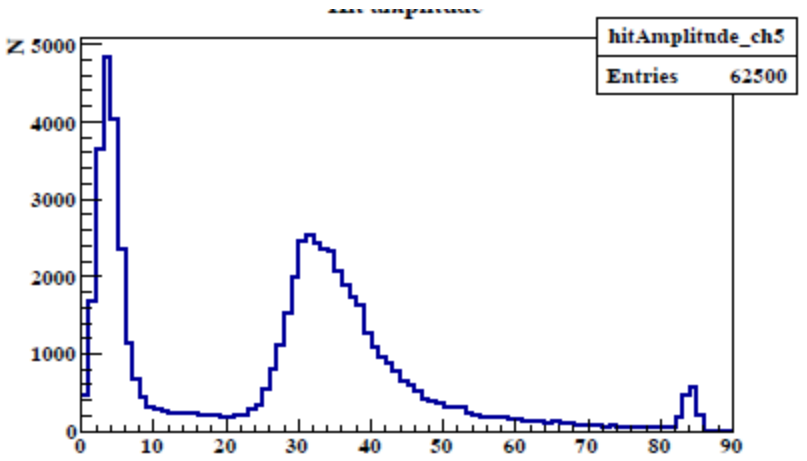
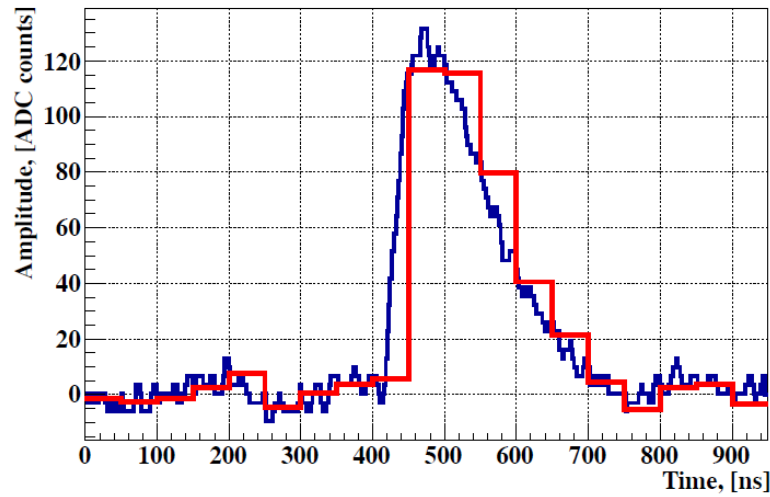
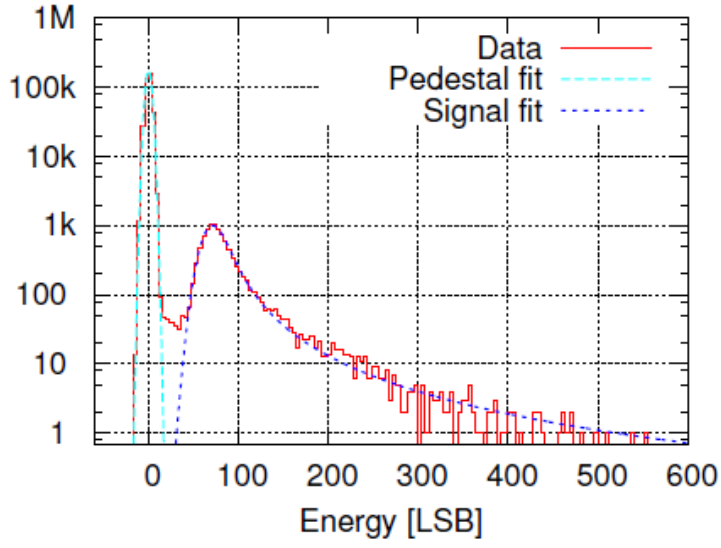
2011 tests

- Complete detector module equipped with first level DAQ .
- Same for both detectors.



2011 tests

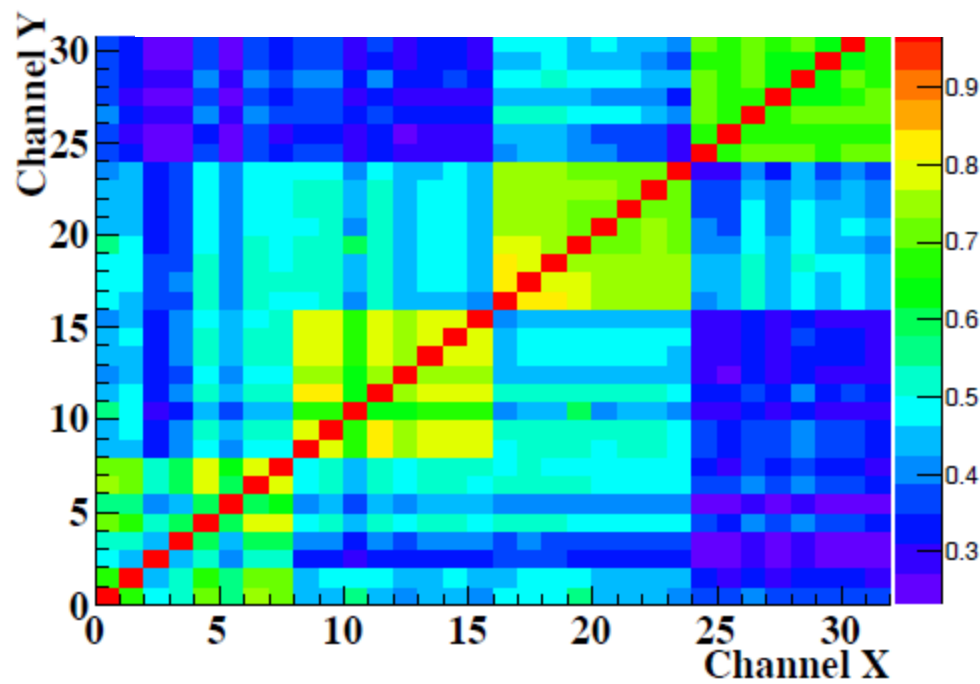
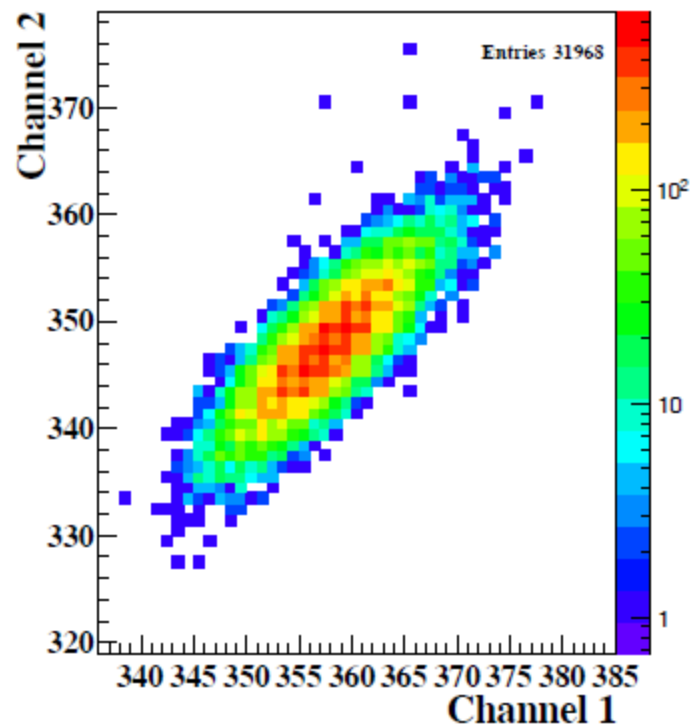
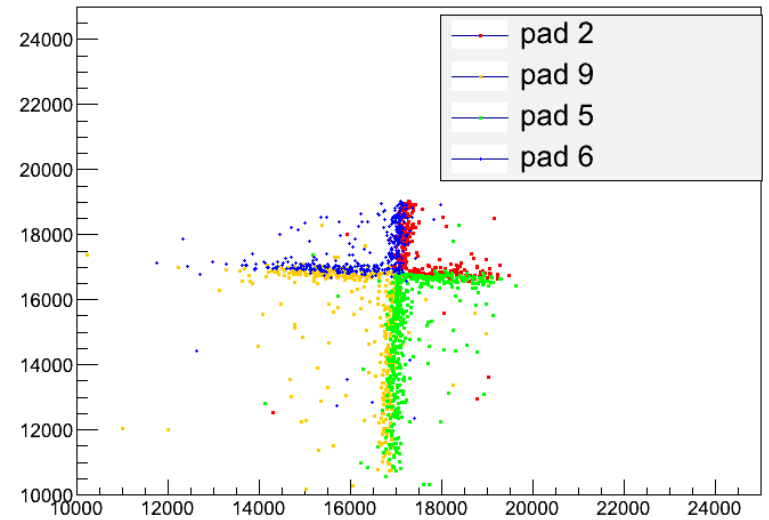
- Energy deposition spectrum - for different methods and in comparison to ext ADC.
- Position reconstruction.



2011 tests

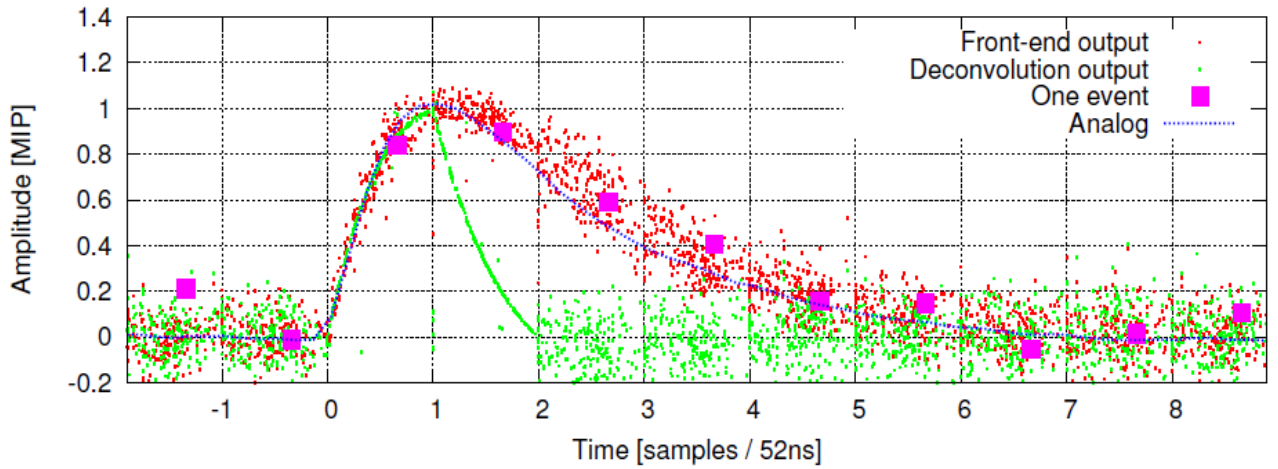
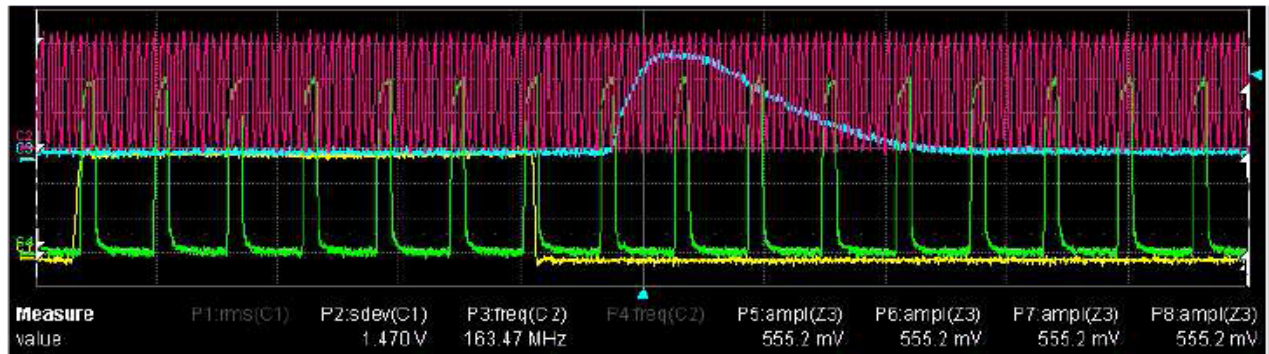
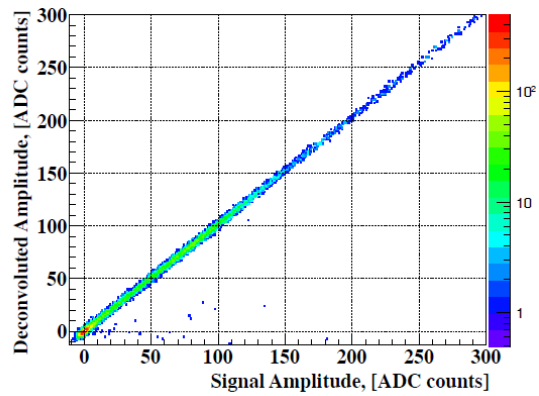
BeamCal : channel correlation,
CMN cross talk, and a detailed
study of edge effects.

Fascicle projection on Sensor



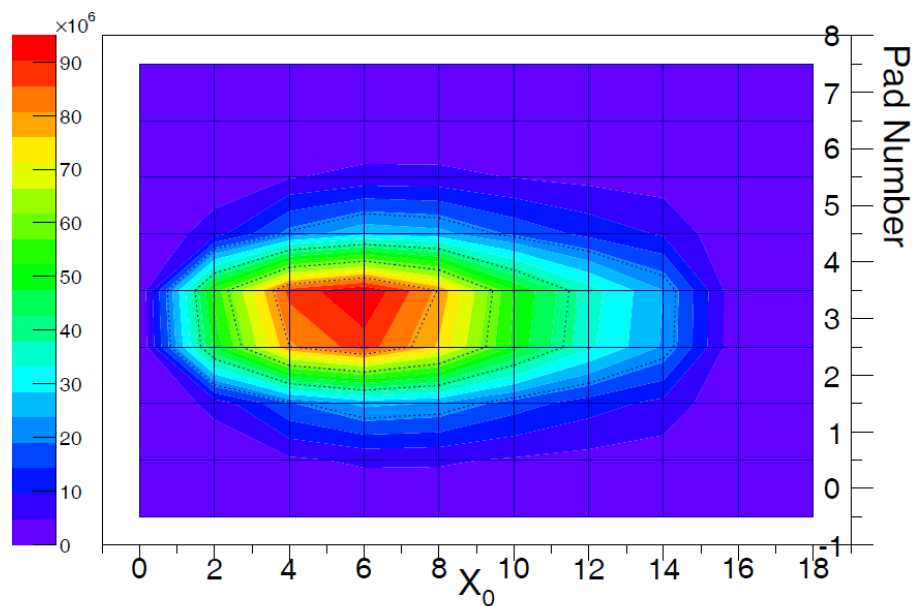
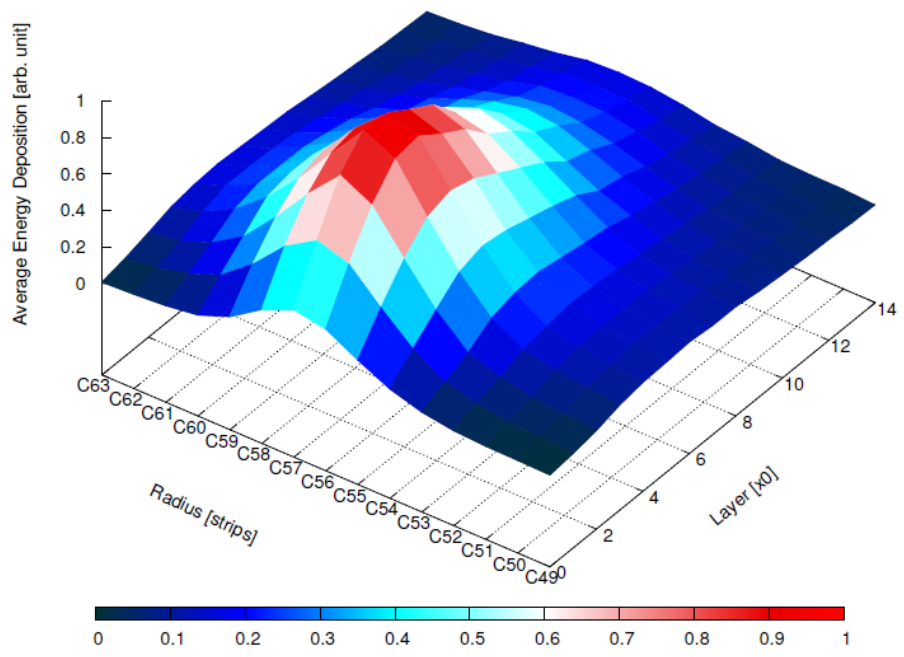
Readout with deconvolution

Synchronized and asynchronous readout.
Tested the deconvolution method.



Shower development

Tungsten absorber plates were added to study the electromagnetic shower and to compare to MC study (for the LumiCal).



Summary

- Results from the three test beams were shown.
- Results have been taken from theses and presentations from the last FCAL meeting.
- Any subject missing?
- There are some differences between results for LumiCal and BeamCal but no deficiency.
- Plots need to be in a single format (CLIC format?) for publication.

Thoughts and plan for the next beam test

- As discussed yesterday we are waiting for a reply on beam time on August and expect to have time after the shutdown in January.
- For August the new telescope study takes precedence
- January : Tungsten structure, Several layer (3-4)
- Eudaq + TLU as the daq
- LuniCal
 - Tel aviv sensor.
 - Lumical high statistic measurement for edge effect.
 - Guard ring edge effect.
 - Different area (bottom pads , middle pads & pads near the edges).
 - Different method of output (in the fen out)
 - Comparison between sensor.
- BeamCal?
- Organization?
- DIF status and DAQ.

