

Report from Technical Board

Katja Krüger
CALICE meeting
Kyushu University
7 March 2016



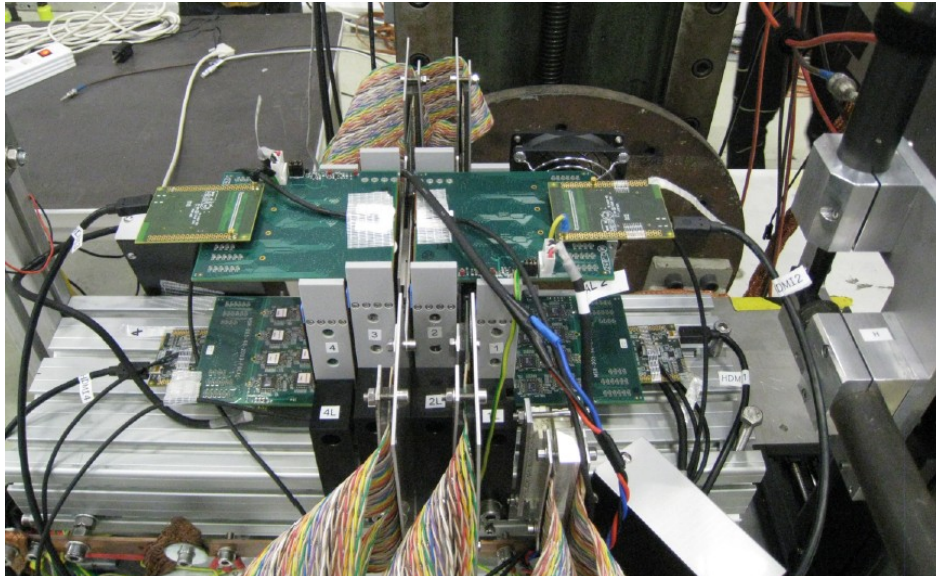
Since Munich CALICE meeting

- > Roman ended his term as TB chair, many thanks for many years of taking care of this task!
- > 5 TB meetings since Munich meeting
- > testbeams
 - at CERN
 - MAPS (ALICE FOCAL): 1 week at PS and + 2 weeks at SPS
 - SDHCAL: ~2 weeks at SPS
 - SiECAL (CMS HGCAL): 2 weeks at SPS
 - at DESY
 - AHCAL: 1 week in November 2015
- > ASIC submission
- > DAQ task force
- > AIDA-2020



MAPS / FoCal testbeam at PS and SPS

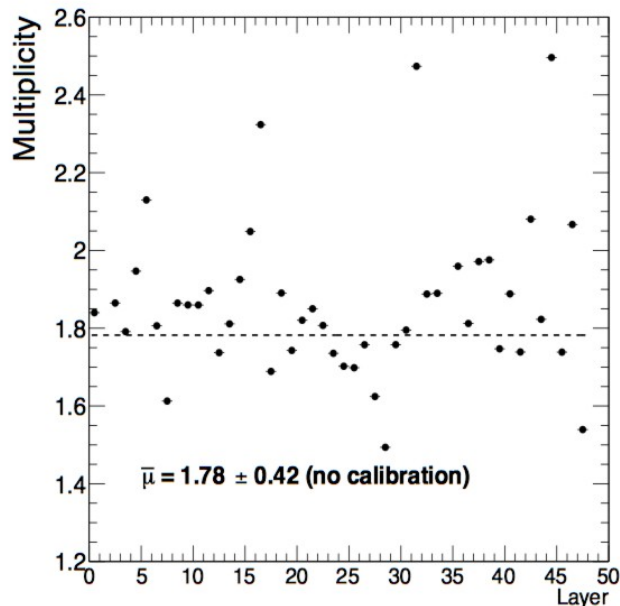
- 1 week at PS in October 2015 and 2 weeks at SPS in November 2015
- hybrid setup as foreseen for ALICE FoCal design
 - 4 segments of 5 layers of $1 \times 1 \text{ cm}^2$ pads (analog sum is read out)
 - 2 layers of 4 MAPS sensors
- unfortunately, independent DAQs for the 2 layer types, so event building has to be done offline
- in addition stand-alone pad detector
- data analysis started



- testbeam plans to be decided when online synchronization of pad and pixel layers solved
- future: move from Mimosa sensors to ALPIDE (as planned for the ALICE ITS upgrade)

SDHCAL testbeam at SPS

- > 1 week at SPS in October 2015 on very short notice, in the end a few days more
- > main goals:
 - add data set with positive pions and useable Cherenkov info
 - test various calibration schemes
- > in addition: first test of gas recycling system, unexpected influence on chamber currents (without recycling!), will need further tests

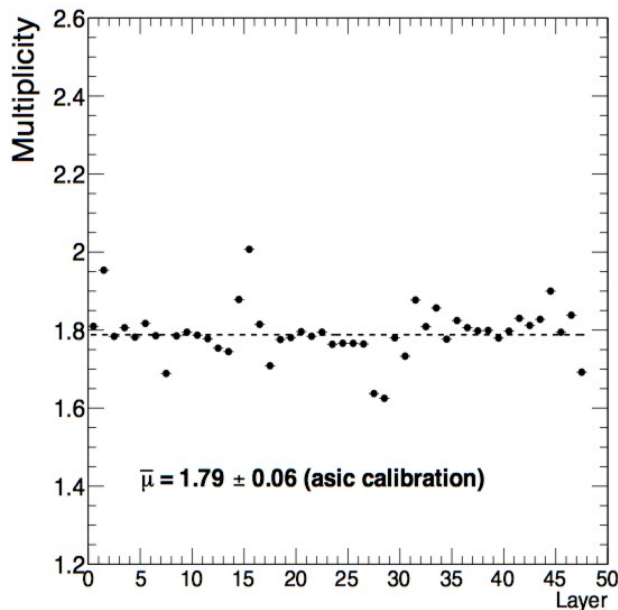


- > measured positive and negative hadron beam with useable Cherenkov info
- > ASIC-by-ASIC tuning of thresholds according to multiplicity looks promising for improving the uniformity of the detector response



SDHCAL testbeam at SPS

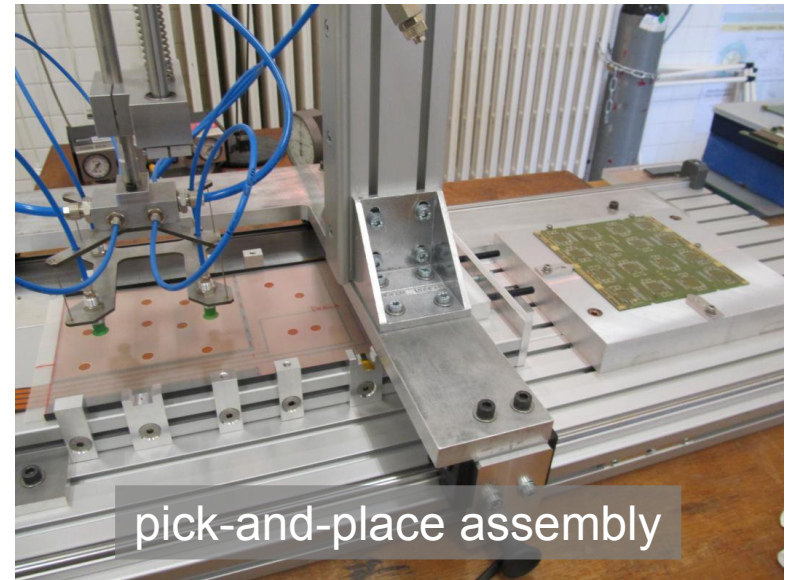
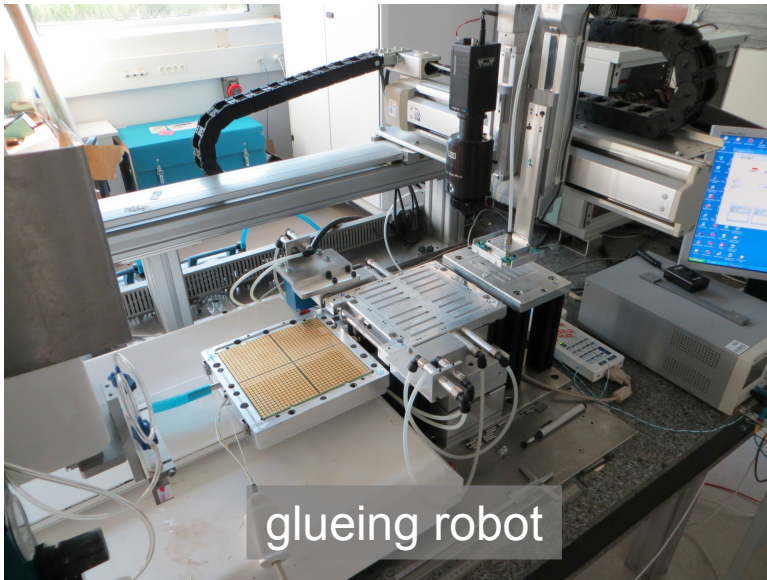
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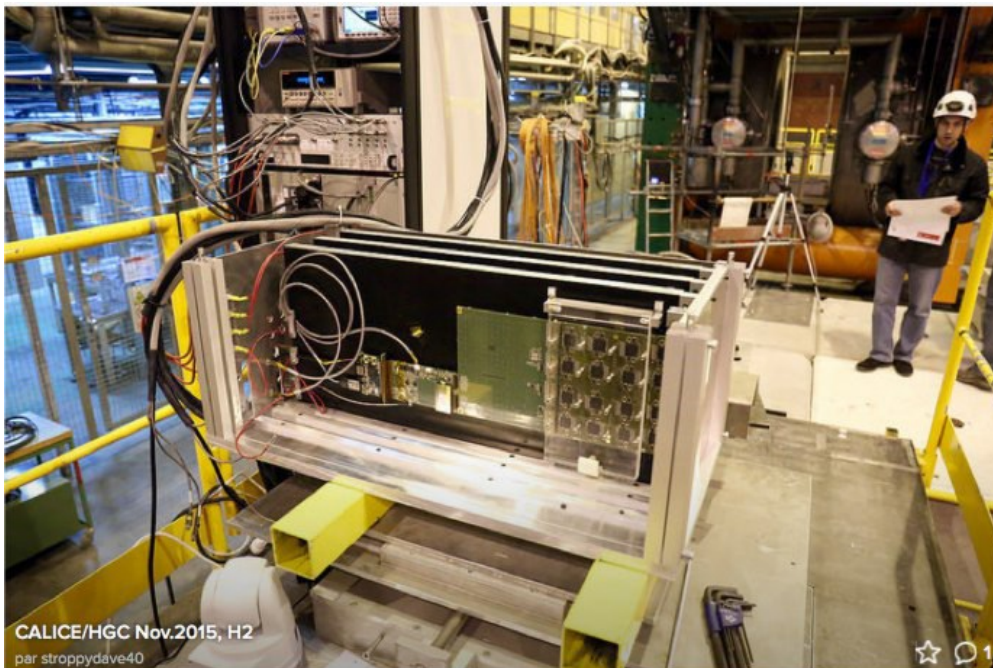
SiECAL: developments and testbeam at SPS

- towards mass production: qualification of assembly procedure
- robot for glueing of silicon sensors to PCBs
 - tested with fake (glass) ASUs, assembly of 7 real ASUs
- assembly robot
 - tested with 3 fake short slabs, real short slabs to come soon
 - goal: assembly of long slabs



SiECAL: developments and testbeam at SPS

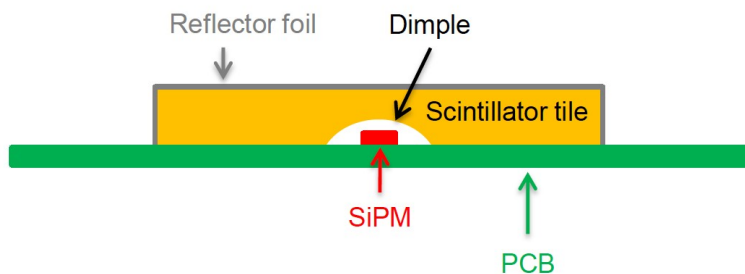
- 2 weeks at SPS in November 2015, foreseen originally for CMS HGCAL
- setup: 4 active layers
 - each layer: FEV11 board with 1024 pixels, 4 Si sensors, 16 SKIROC chips
 - 1 of the 4 layers was too noisy and therefore not useable
 - the layers were fragile: connection from PCB to adapter board not yet soldered, but held together by springs



- much less re-triggering observed than previously
- new “feature”: under high load SKIROC triggers in the next bunch crossing
- additional setup with baby sensors suffered from noise

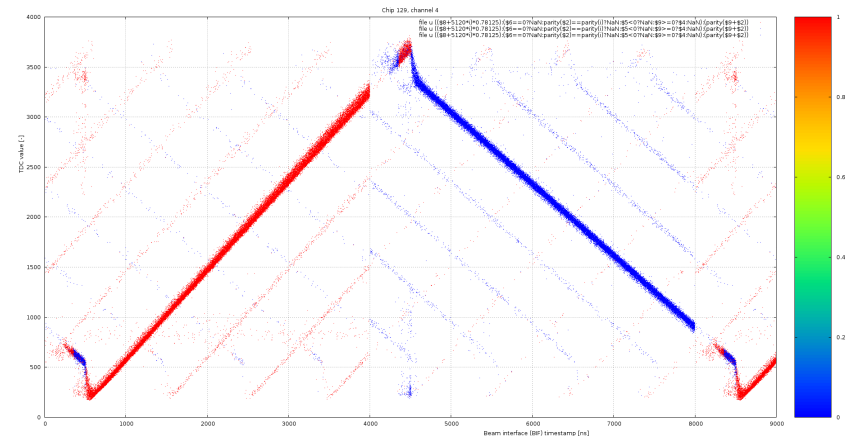
AHCAL: developments and testbeam at DESY

- design with surface-mount SiPMs allows faster and easier assembly with pick-and-place machine
- one HBU assembled in 2015 and successfully operated in AHCAL testbeam in Summer 2015
- 6 surface-mount HBUs with improved design now in production for next small EM prototype



AHCAL: developments and testbeam at DESY

- in the lab: power pulsing tests
- testbeam at DESY in November 2015: test SPIROC2D and new BIF
- **Beam InterFace**: integrate “external” information e.g. from beam triggers or Cherenkov detector, into our DAQ
 - based on AIDA mini-TLU
 - first test in beam: independent data stream, offline correlation with AHCAL hit information
- **SPIROC2D**:
 - bug in trigger logic
 - new TDC ramp structure visible
- **BIF** allows detailed study of TDC ramps, to be repeated with SPIROC2B



- > Engineering run: January 2016
 - SKIROC2CMS (CMS)
 - MAROC3A (JUNO, CLAS12)
 - SPIROC2E (CALICE)
 - CITIROC1A (CTA)
 - GEMROC (WEEROC)
- > Submission 15 Jan 2016
- > Chips expected end of April 2016
- > SKIROC2CMS: many changes compared to SKIROC2 to adapt to CMS needs, driving the schedule
- > SPIROC2E:
 - many improvements that were introduced in SPIROC2C and D
 - correct triggering (modified by mistake in SPIROC2D)
 - introduce reset to avoid empty columns (memory cells) 10 and 14
 - better TDC slow ramp
 - will be packaged in BGA

- > composition:
 - coordinator: Taikan Suehara
 - SiW Ecal: Remi Cornat, Frederic Magniette
 - AHCAL+ScEcal: Mathias Reinecke, Jiri Kvasnicka
 - SDHCAL: Laurent Mirabito, Christophe Combaret

- > EUDAQ as common high-level DAQ
 - improve monitoring: can we use SDHCAL DQM4HEP together with EUDAQ?
 - data format: LCIO, at the moment generic objects, discussions on dedicated LCIO object

- > preparation of combined SiECAL+SDHCAL testbeam in June 2016

- > WP14: Infrastructure for advanced calorimeters
 - test infrastructure for innovative calorimeters with optical readout: includes test stands for AHCAL tiles, SiPMs, HBUs and temperature stabilisation
 - test infrastructure for innovative calorimeters with semiconductor readout: includes assembly line and test stand for SiECAL sensors and PCBs
 - readout systems for innovative calorimeters: includes new DIFs, test stand for ASICs, common running of calo prototypes!
 - mechanical and thermal tools for innovative calorimeters: includes SDHCAL absorber welding and SiECAL and AHCAL cooling
- > WP5: Data acquisition system for beam tests
 - includes central DAQ software and run control, data model and data quality monitoring
 - goal: common running with other detectors (beam telescopes, TPC?)
- > WP3: Advanced software
- > WP4: Micro-electronics and interconnects
- > regular phone and face-2-face work package meetings
- > next annual meeting: 13-17 June 2016 at DESY
- > testbeam support possible!
<http://aida2020.web.cern.ch/content/how-apply-transnational-access>



Testbeams in 2016

> combined SiECAL+SDHCAL run at SPS

SPS user schedule

schedule issue date: 11-Feb-2016

Version: 1.1

LHC Exp.

PS/SPS Exp.

INT

				Apr					Mai					Jun					Jul				
Week	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
Machine																							
T2 - H2		TT20 Setup 7	NA Setup 7	CMS ECAL 9	CREAM 7		CMS GEM / RPC 14		NA61 PSD/SiF/DRS4 14	HERD 7	ALICE ITS 7	Calice (Sdhcal) 14		NA61 VD 7	NA61 FTPC 21				SHiP 14				
T2 - H4		TT20 Setup 7	NA Setup 7		GIF 23			NA63 14	RD51 & GIF 14		CMS ECAL 21			P348 14	PHOTACHANNEL 7				CMS ECAL 14				

> several AHCAL tests at DESY

- 2 weeks beginning of May: calibrate new surface-mount HBUs, test new BIF properly included in DAQ, test new monitoring functionality in EUDAQ
- 1 week end of June: goal: first power pulsing tests in beam
- many free slots at DESY in second half of 2016 → might ask for more beam time



Conclusions

- > steps towards automated assembly for SiECAL and AHCAL engineering prototype designs
- > SDHCAL testbeam added missing dataset of positive pions with Cherenkov detector information
- > growing interest in common testbeams
 - SiECAL + SDHCAL at SPS in June 2016
 - calo + beam telescopes (and TPC?)
 - efforts in CALICE DAQ taskforce and AIDA-2020 WP 5 well aligned

