

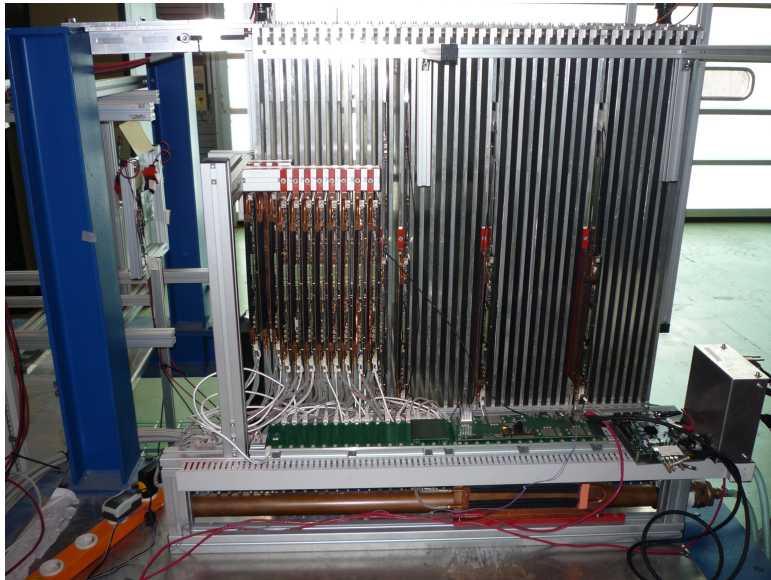
CALICE AHCAL in H6@SPS



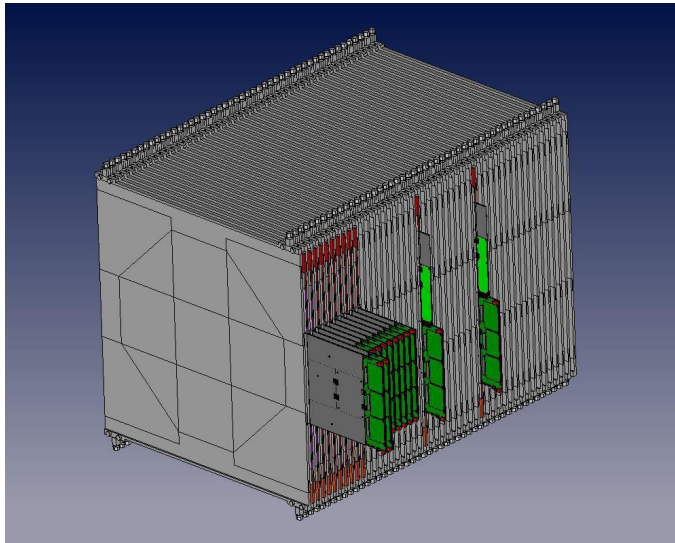
Katja Krüger
PS/SPS User Meeting
27 August 2015



Comparison of steel and tungsten absorber

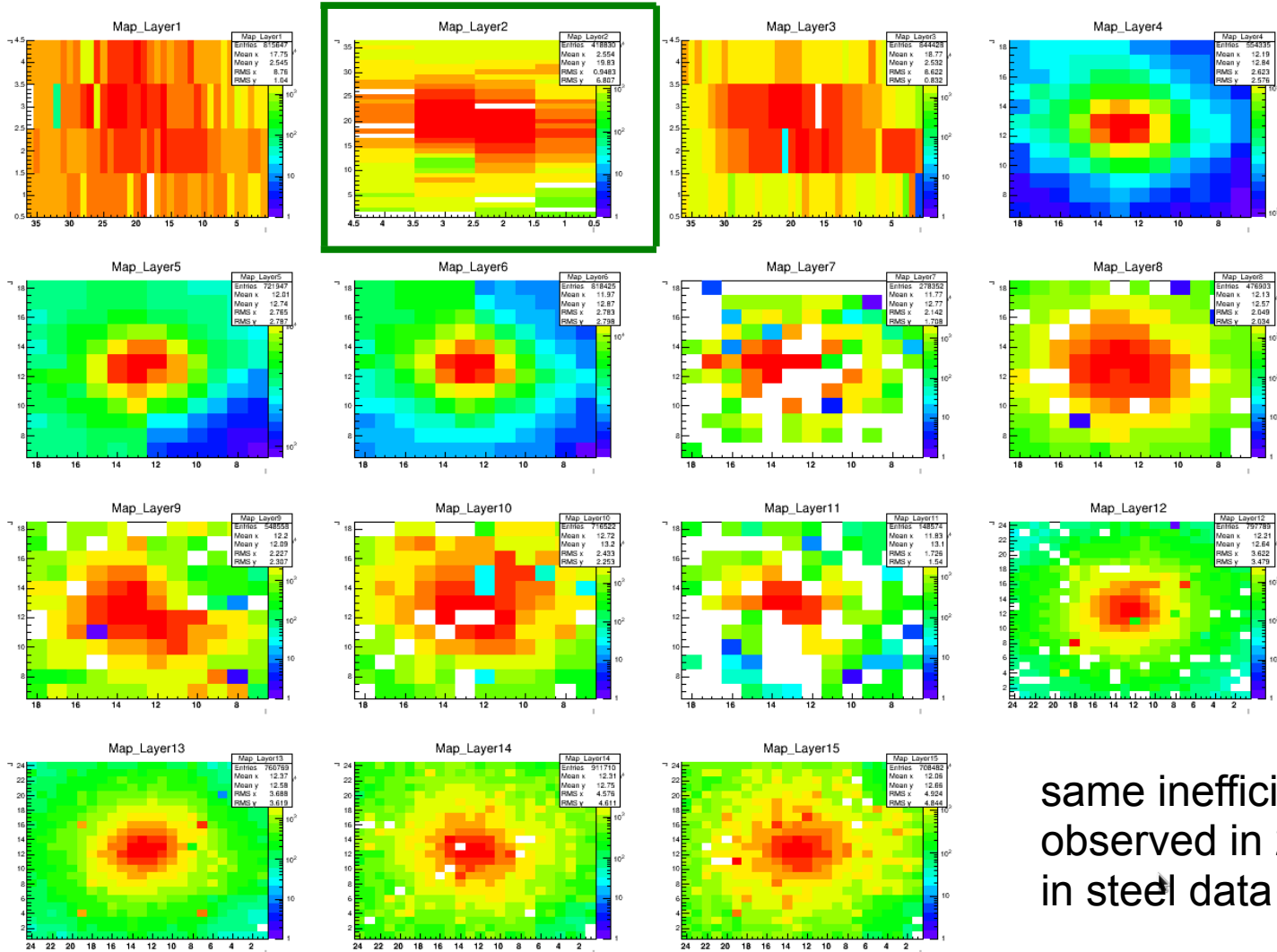


- > (nearly) identical layer configuration
 - 11 (10) small layers (18×18 or 36×36 cm²): shower start finder
 - 4 big layers (72×72 cm²): shower profile, correlation of hit times
- > active layers: scintillator strips (5×45 mm²) or tiles (30×30 mm²)
- > steel absorber structure
 - as planned for ILC detector barrel
 - tested for 2 weeks in July in H2@SPS
- > tungsten absorber structure
 - as already used in previous AHCAL prototype
 - tested for 2 weeks in August in H6@SPS
- > expect more late hits in hadron showers in tungsten than in iron
 - comparison with steel data
 - influence on particle flow reconstruction



Hitmap: tungsten

additional small layer with opposite strip orientation



same inefficiency
observed in 2 layers as
in steel data



first beamtime: 8. – 22. July 2015

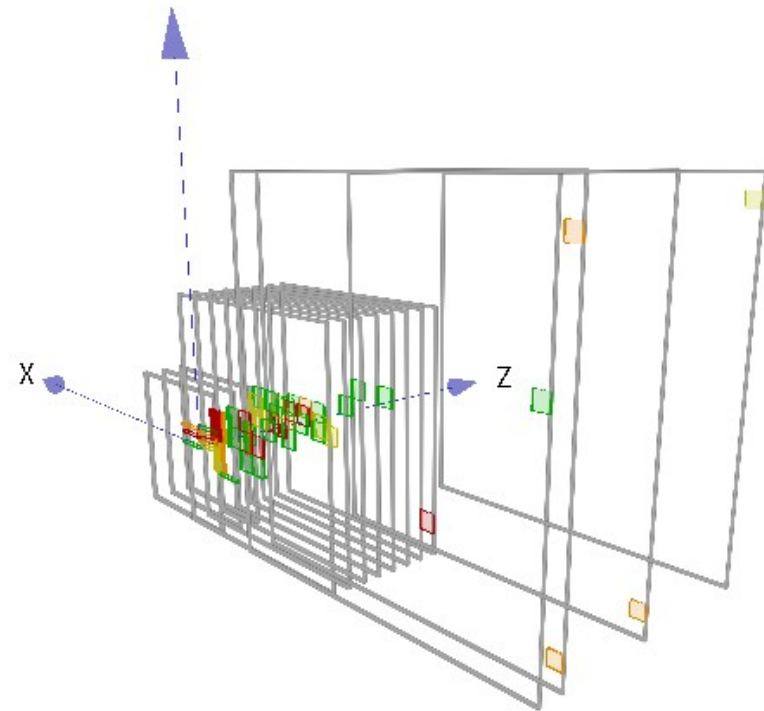
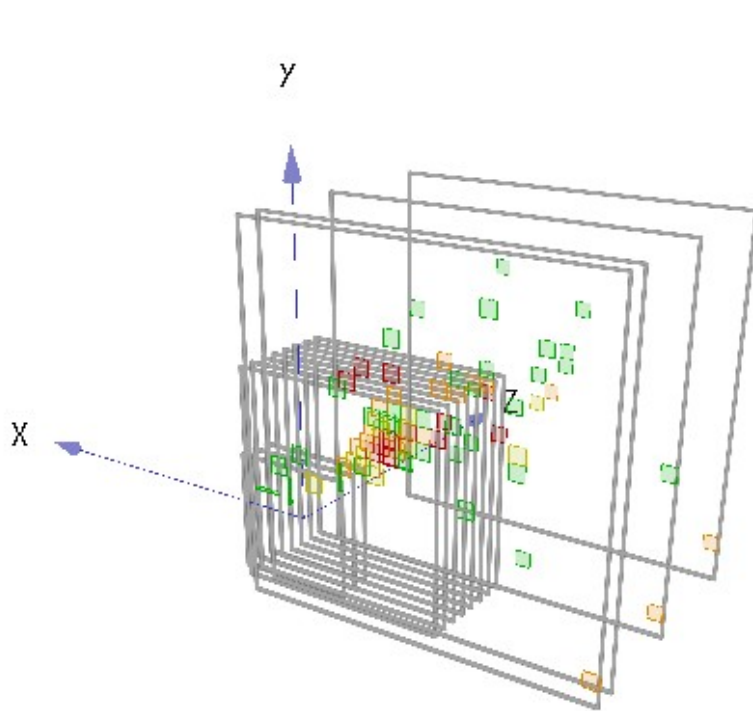
- 2 very successful weeks, running continuously and smoothly
- we got all the data samples we hoped for!

second beam time: 12.–26. August 2015

- detector running fine, but 5 days no beam from SPS
many thanks to CLICpix for letting us stay one day longer!
- data taking:
 - muons for calibration
 - positive pions/protons: energy scan 10 – 90 GeV
 - positrons: skipped except for 20 GeV
 - high statistics pion/proton sample at 50 GeV
 - second muon calibration run
- we got what we need, would have hoped for more positron energies



Data samples: hadrons and positrons in tungsten



- positive pions/protons: energy scan 10, 30, 50, 70, 90 GeV
 - Cerenkov detector to separate pions and protons
 - ~500k pion events per energy
- positrons at 20 GeV
 - cross check of detector simulation
 - ~500k events

Summary

- ~7 weeks (including preparation, installation and de-installation) successful weeks of AHCAL@SPS
- would be impossible without support from many people at CERN, including Henric, Bastien, Adrian, Laza, Nikos, Edda, Michael, the CERN LCD group and the SPS crew

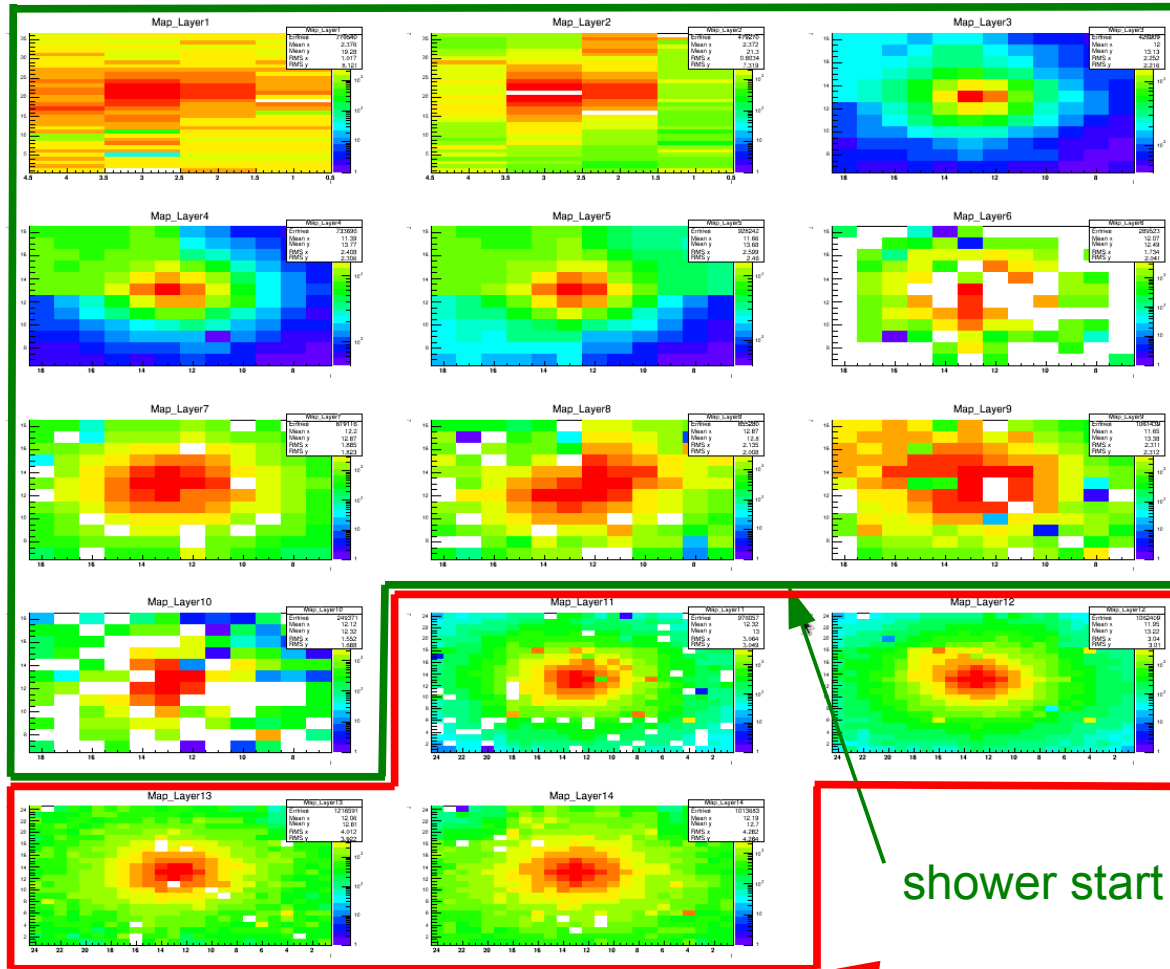


Flying Calos :-)





Hit map: steel



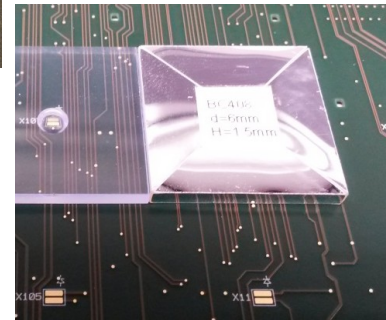
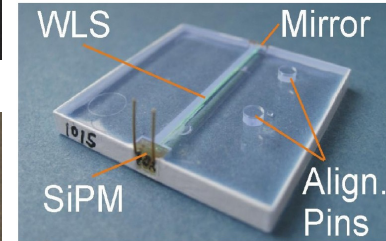
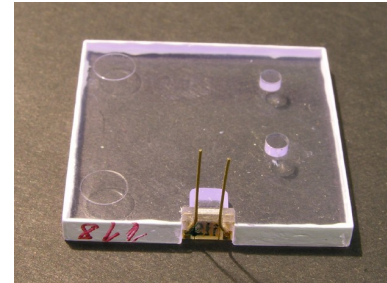
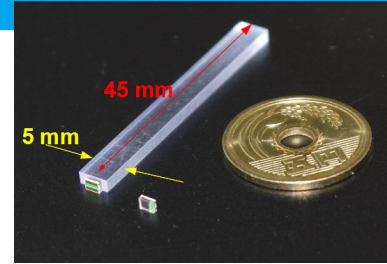
- one pion run
- 2 layers in shower start finder rather inefficient
- all layers with new SiPMs and tiles show good efficiency and uniformity
 - strips
 - tiles without WLS
 - surface-mount SiPMs
 - 4 big layers

shower start finder

big layers

Tiles/Strips and SiPMs

- > 2 (3) layers with strips
 - Hamamatsu MPPCs with 1600 pixels
 - Hamamatsu MPPC with 10000 pixels
- > 5 layers with tiles with wavelength shifting fibre
 - CPTA SiPMs with 800 pixels
- > 2 layers with tiles without WLS
 - Ketek SiPMs with 12000 pixels
- > 1 layer with surface mount SiPMs with individually wrapped tiles
 - Hamamatsu MPPCs with 1600 pixels
- > 4 big layers with individually wrapped tiles
 - Ketek SiPMs with 2300 pixels
 - sensl SiPMs with 1300 pixels



we want to build a fully equipped prototype (40 layers) in the coming years
experience from this testbeam is important input to chose one option