JRA1 Telescope – Experiences off (AND with) the users

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DESY

Introduction

- In 2008 we had three users of the telescope
  - Bonn DEPFET at CERN -> previous talk
  - SiLC collaboration at CERN
  - FCAL collabortation CERN

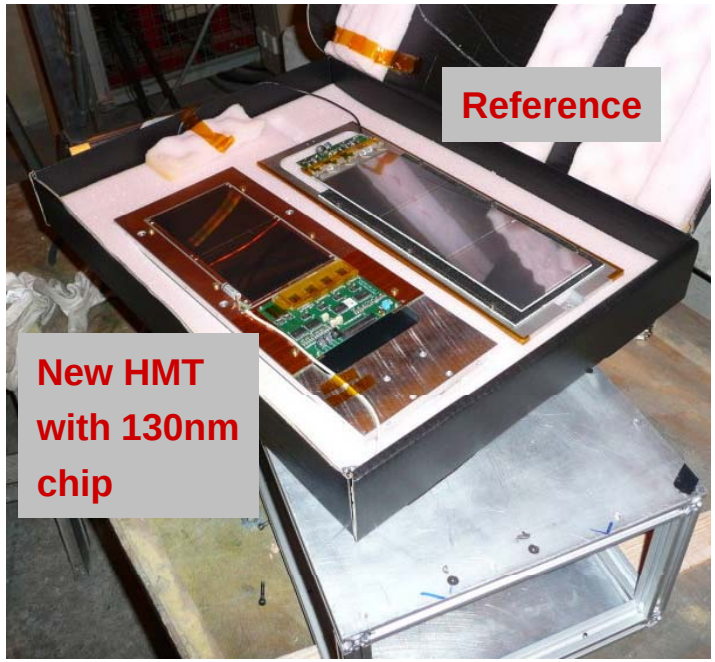
In general:

- Users were happy about use of telescope

SiLC

- After end of our SPS/H8 testbeam -> moved telescope to H6
- Completed the setup
- Geneva helped SiLC to get started

- Test of new Hamamatsu Silicon Microstrip detectors
- Validation of demonstrator readout chips with 130 nm feature size (chip size=100x600 μm^2):
- 16 channels bonded in a module with 2 new sensors
- 8 extra channels in a second module with 3 old CMS sensors (backup module)
- One module with 3 CMS sensors but equipped with known VA chips as reference



SiLC – Data Taking

- Due to the long sampling time of telescopes they had a high (~100 particles/pixel chip) occupancies.
- Philip suggested to decrease hit occupancy by closing aperture collimators and narrowing (as we did during EUDET tests)

Statistics

- Approx. 228k events: 77k ped, 99k SiLC+TLU, 53k SiLC+TLU+Telescope
- 47 SiLC files, 77 telescope files (limited to 890 entries each)
- 25 files with SiLC + TLU+telescope
- 22 files with SiLC alone (TLU in internal trigger mode)
- Hadrons=120 GeV pions
- Runs with different collimator settings to reduce hit multiplicity (detector occupancy)

SiLC No correlations ….

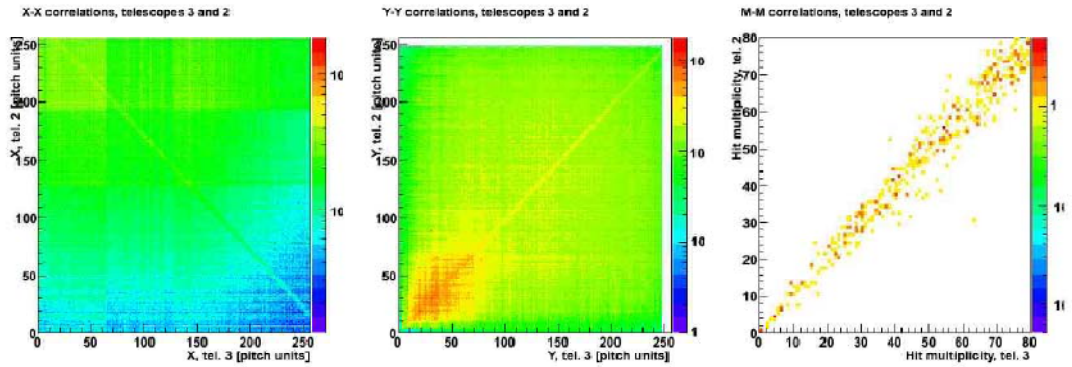


Figure: In spite of background, we clearly see **correlations between telescopes**. The plot on the right shows correlations between hit multiplicities that appear as a result of beam intensity variations.

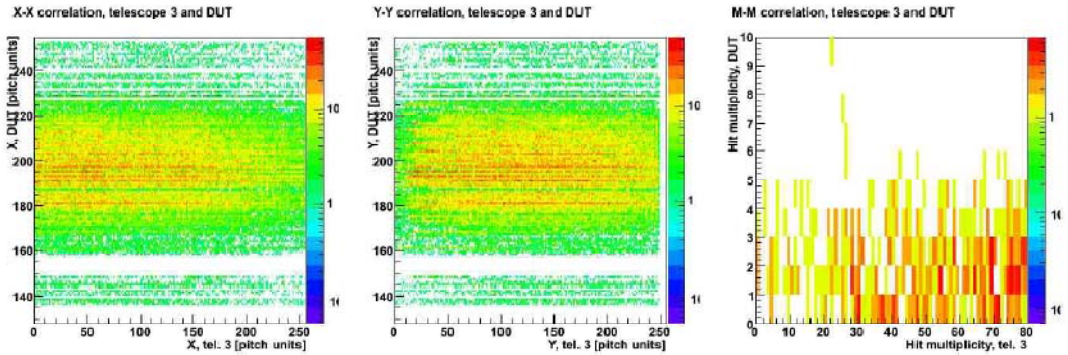


Figure: For correlations with the CMS+4VA1, no lines are visible.

- So far no correlations between DUT and EUDET telescope seen
- Accroding to simulations they should see a correlation
- Implementation of trigger correct?
- Preparation for next testbeam ongoing
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SiLC – Organisational Issues

- 2 weeks of data taking -> seemed to be smooth (no complains)
- Next testbeam: implement TLU in DAQ system (ongoing)

After end of SiLC testbeam

- Geneva helped to pack telescope in an appropriate way to avoid damages
- SiLC promised to send telescope as soon as possible

- BUT – telescope was not send back when we expected
- We reminded them frequently, but somehow it took 6 weeks until the telescope finally was send.
- This was NOT due to CERN transport group.

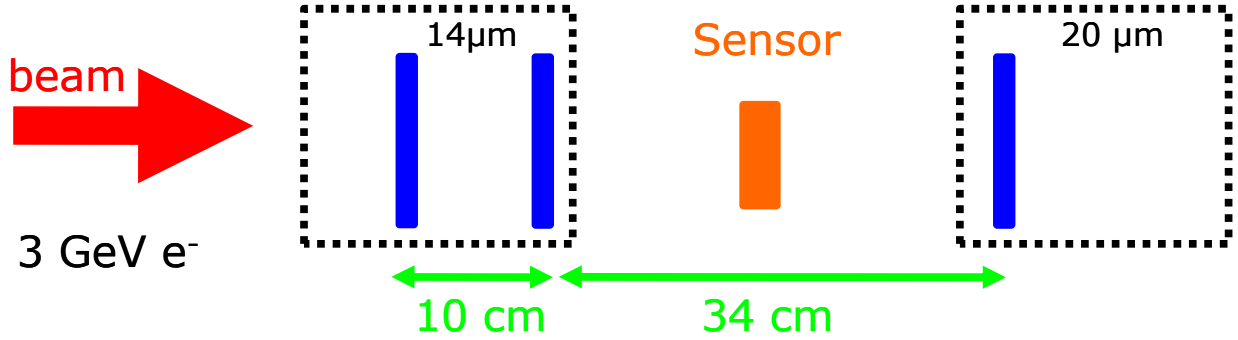
- Consequence: we will not leave the telescope behind… (?)

BeamCal

Scope of test beam

- Measure the charge created by ionisation when HEP particle of known energy passes a single crystal diamond -> energy
- Literature: MIP creates 36 eh pairs per um -> most probable or average energy charge ?
- BeamCal group assumes MPV -> not according to literature….

Measure this number precisely, neglecting edge effects!



"Partial Telescope"

- Only three sensors connected to EUDRBs
- TLU from Bonn group ("our" TLU in Geneva)
- All DAQ SW running on a single Linux PC

Problems….

- Due to delay of telescope arrival time to prepare setup here at DESY was too short
- Philipp succeeded to install DAQ software on Linux PC which were usually used for the TLU
- With help from Emlyn, Daniel, Angelo …. System was running
- Two days before arrival of user: complete test with beam
  - nice hits, good rate

- Runs sometimes started only after a few minutes
- problem with Linux version of the DAQ SW – fixed
- TLU producer crashing (problem of TLU?)
- No trigger busy during switching of the files (runs were stopped by hand before size limit was reached)

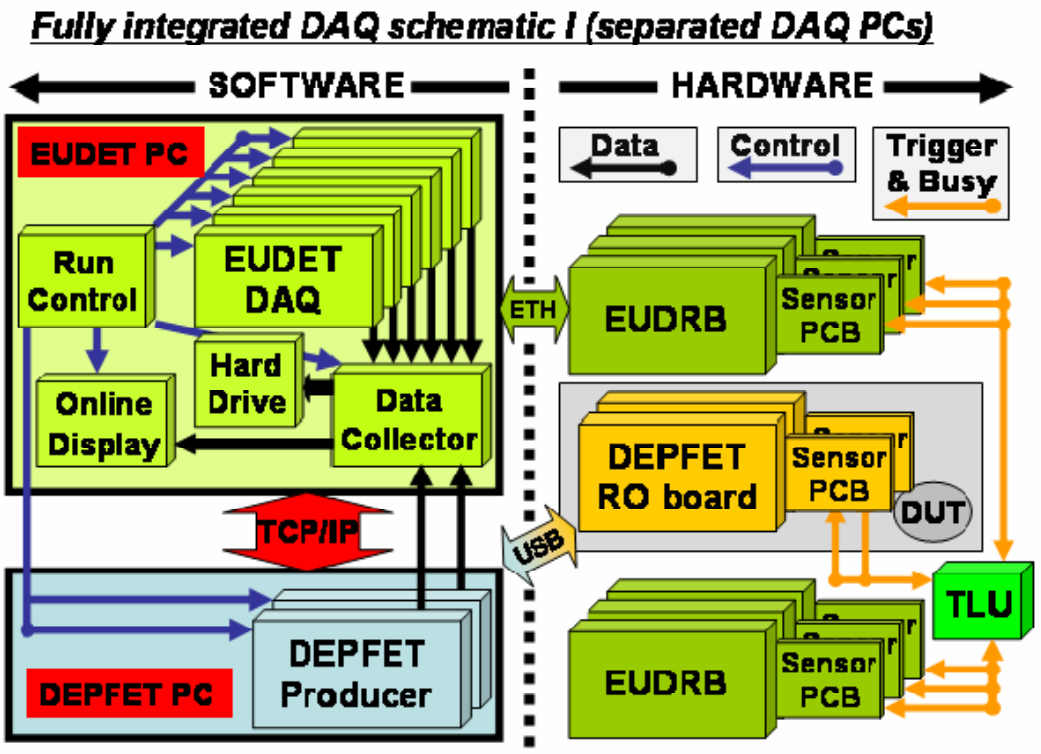
- With a combine effort from EUDET and BeamCAL group reasonable statistics of data was reached

What can we do to improve ?

Trigger and DAQ integration

- Depending on user: integration on trigger level or DAQ level (most users will prefer trigger level)
- Users which use the telescope for longer should do the DAQ level integration

Example: DEPFET



What can we do to improve ?

- We all learned a lot during these test beams
- A lot of information is available for the users
  - But: distributed on a number of Memos

- Write a dedicated Memo which collects all the information necessary for the user
- Include a list of things the users have to do before arrival e.g. implementation of trigger
- Distribute this information very soon to 2008 users -> give them time to prepare

- -> will help the users AND us ☺

Possible users 2008: DEPFET, MimoRoma, LCFI, SiLC, BeamCAL