Münzenberg

PXD DAQ Workshop
June 9 and 10, 2011
Münzenberg (near Gießen)

Goals:

1. bring DAQ people and PXD people (frontend, DHH, ATCA,…) together

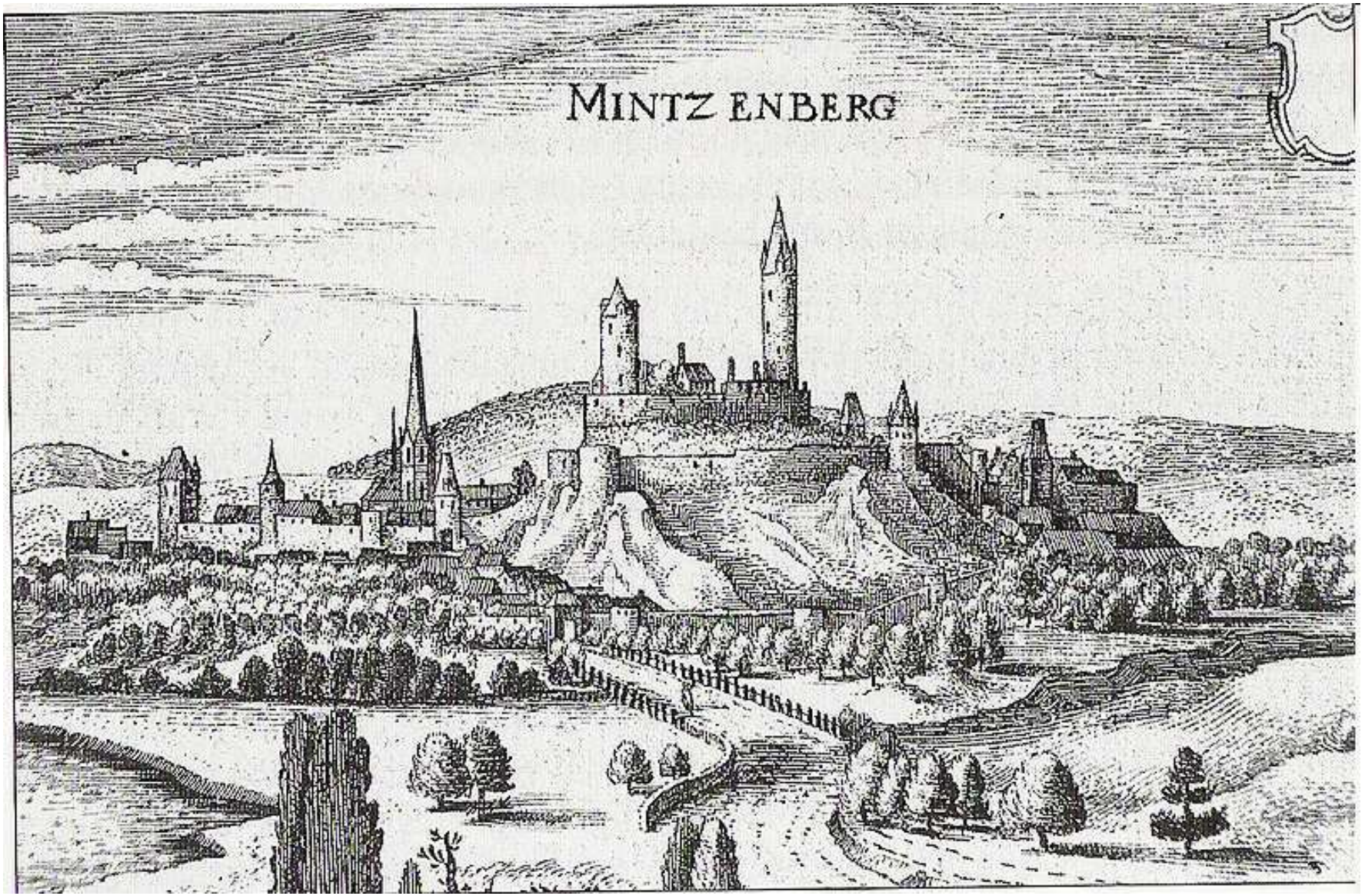
2. view of the „complete“ system
i.e. interfaces: timing distribution, trigger distribution, data formats, protocols, …

http://panda.physik.uni-giessen.de:8080/indico/conferenceDisplay.py?confId=44

Burg Münzenberg

http://de.wikipedia.org/wiki/Burg_Münzenberg
http://www.burghotelmuenzenberg.de/

Mentioned in Documents since 1162.
This drawing by Merian dated 1620.



Münzenberg Agenda

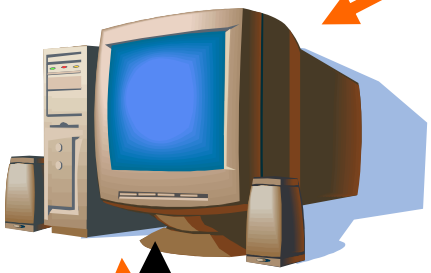
- DAQ issues
  - protocols (AURORA everywhere?)
  - clock generation and distribution (RF*(3/20), DHH?)
  - BUSY handshake?
  - pile-up, multiple triggers in 1 frame
  - run control (start/stop run, e.g. upload pedestals)
  - data formats (unpacking/decoding on FPGA)
- cluster finder for low pT (dedicated session)
- SVD interface
  - SVD sub-event builder, PXD sub-event builder
  - SVD tracklet finder algorithm (dedicated session)
  - SVD only or SVD+PXD
- FPGA sorting algorithms
  - hit sorting
    partially unsorted at DHH input (because of parallel FIFOs)
    order row-by-row required by any FPGA algorithm?
  - event sorting
    for sending PXD data to EVB
- load balancing (Touchek hot spots)
- injection veto
  - pre-trigger
  - pedestal dump?

Münzenberg Agenda
A Concept for PXD Pedestals

Idea from B2GM Nov2011
„system as is“,
just more channels and
move to KEK“

Why PC?

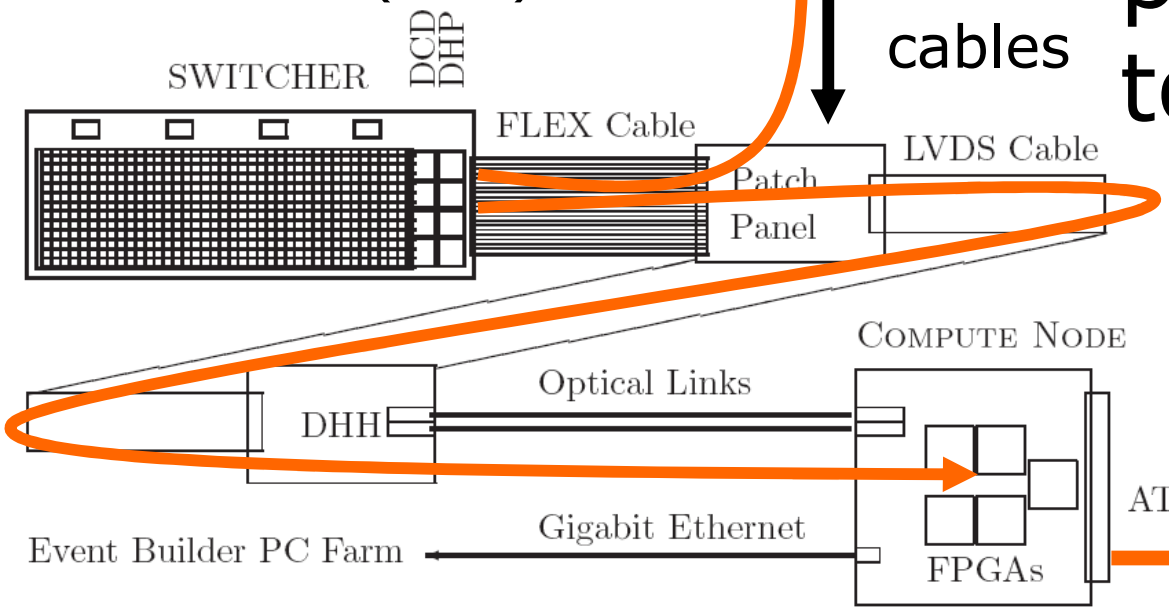
1. **database (postgtresql)**
2. **Interface to slow control e.g. set DACs @ run start**



dump pedestal event by JTAG (slow)

40 JTAG cables

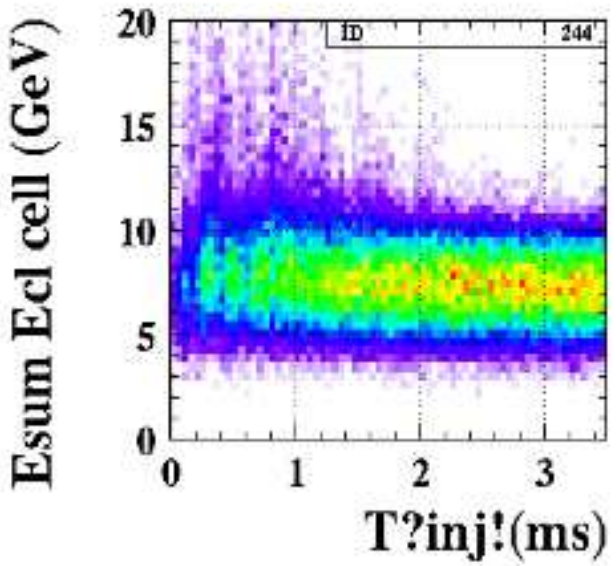
Where to calculate pedestals and send to the PC?



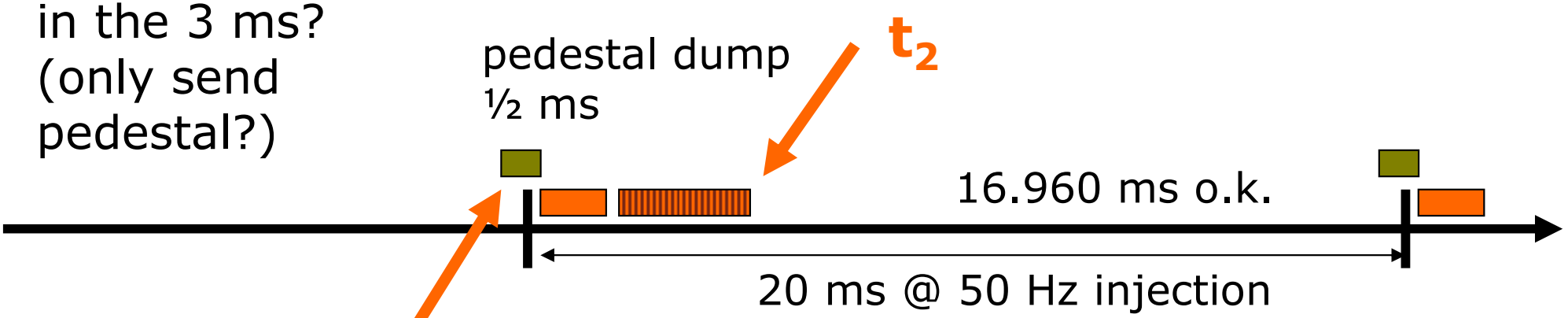
send full frames
during injection
4 x 1.25 Gbps
~1/2 ms

pedestals going where?

Münzenberg Agenda
Pedestals @ Injection Veto ?



- needs pre-trigger at t_1 [-40 us : -20 us] for switching DHP modes
- howto switch back at t_2? needs interface to injection VETO signal
- What can ATCA or DHH do in the 3 ms? (only send pedestal?)



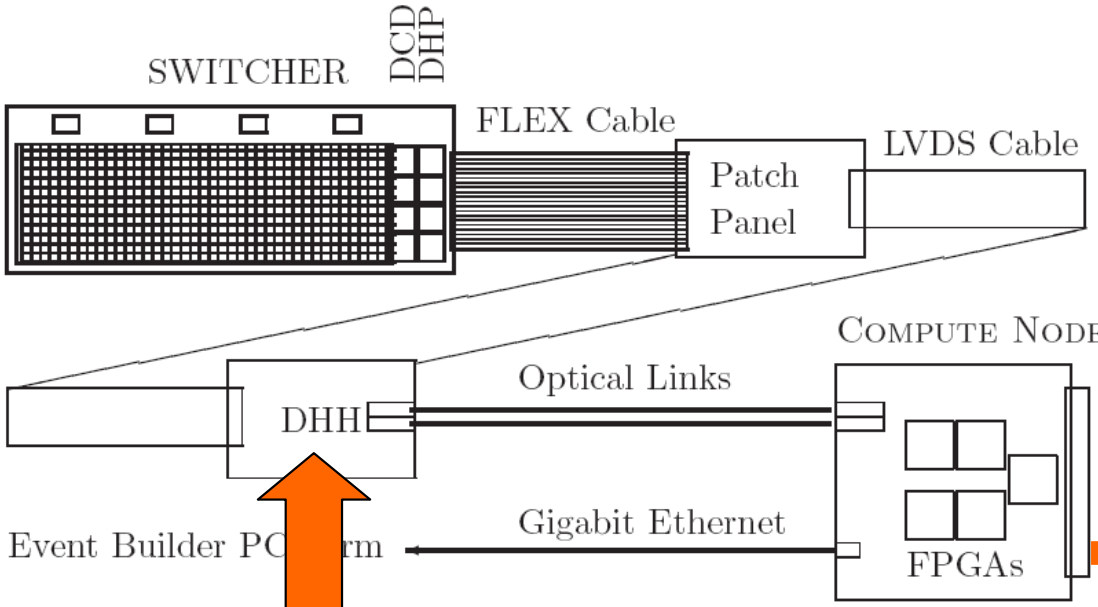
t_1 „tachyon" pre-trigger

1ms	3ms
100 turns	300 turns
(full veto)	(1 us burst, 9 us o.k.)

1 turn = ~10 us @ 99.4 kHz REVO clock

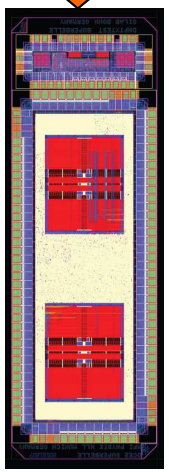
Münzenberg Agenda
A Concept for Cluster Finder

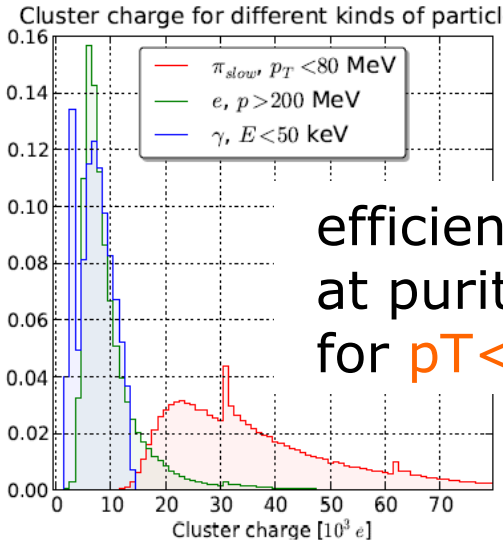
- cluster data
  - all clusters?
  - only high sum ADC?
  - add to data stream?
  - remove hit data? (bandwidth limitation)
- algorithm
  - ASIC? (pin interface to DHH?)
  - FPGA? (>10^5 registers!)



clusters in data stream?

DCE2 (A. Wassatsch)





efficiency >80%
at purity >95%
for pT<80 MeV

- algorithm needs pre-sorting?
- neural network?
- high ADC hit as seed?
- sliding window?

see talk by A. Ritter (Monday)