



# Report on Recent Meetings

---



- Meeting of the Belle Physics Advisory Committee (BPAC) KEK, Feb. 14-15, 2011
- Framework and PXD-DAQ-Meeting MPI Munich, Feb. 21-23, 2011
- News on the preparations for a CO<sub>2</sub>-Cooling Plant within the DEPFET Collaboration



# BPAC Meeting at KEK



Yearly meeting in February with the Advisory Committee

Members:

G. Buchalla, M. Demarteau, M. Golutvin, Y. Kuno,  
T. Nakada (Chair), N. Neufeld, T. Skwarnicki,  
M. Sullivan, W. Trischuk

Task:

Evalute physics programme of Belle and upgrade  
program of SuperKEKB and the Belle II detector

give advice and support to the Belle / Belle II projects

Talk: <http://kds.kek.jp/conferenceDisplay.py?confId=6402>



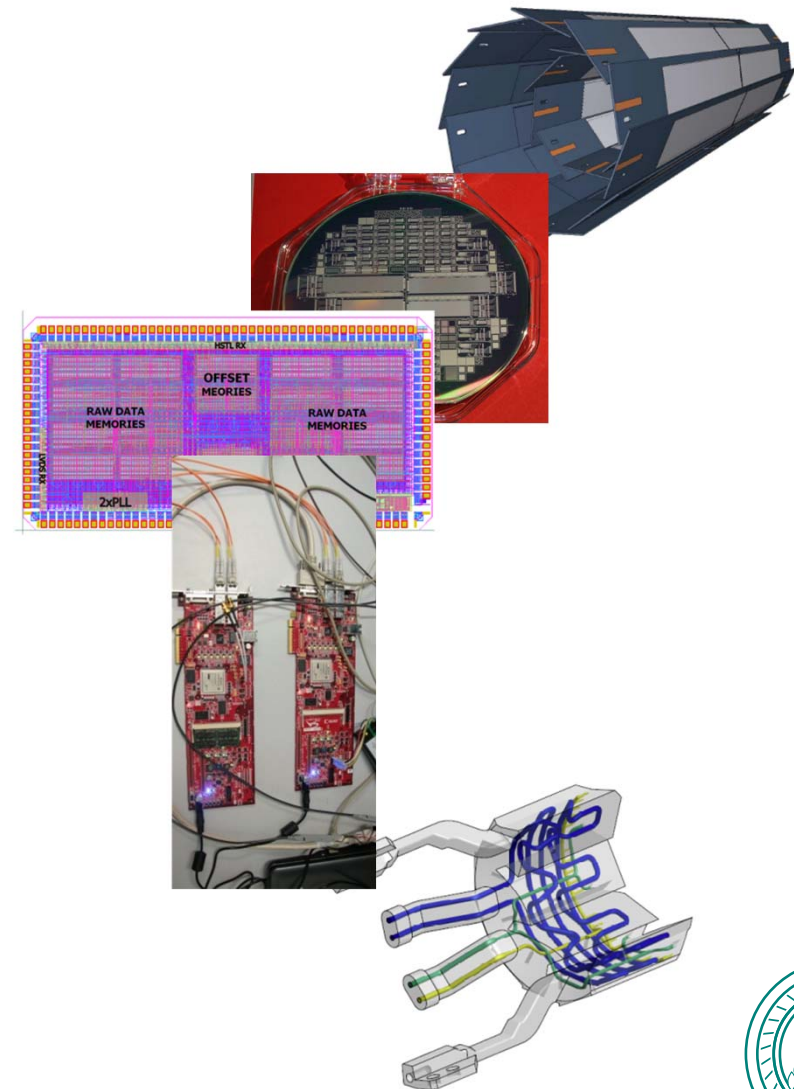
# PXD-Project @ Belle II

## Status and Plans



Title page of BPAC talk

- Short Reminder: PXD@Belle II
- DEPFET Sensors
- Electronics
- DAQ
- Power & Grounding
- Mechanics & Cooling
- Schedule & Summary



Presently known schedule of SuperKEKB and Belle II:  
 PXD must be ready for integration in Tsukuba Hall by **May 2014**

PXD assembly (ladders to structure): 4 months **Nov 2013** - Feb 2014

start Module/ladder assembly: 8 months **Jul 2013** - Feb 2014

Module / ladder assembly: flip-chip bonding, test Kapton-flex, test module glueing, test	}	4 months for 8 adders (20 needed) „staggered“ production total of 8 months, incl. spares
---	---	---

DEPFET production: first DEPFETs ready: **June 2013**  
 experience from PXD6.1:

Thinning	(4 months)
Frontside	(14 months)

slide from BPAC talk

**Start DEPFET Production: November 2011**



# Summary: Milestones



- CO2 Cooling of PXD support works
- First thin DEPFETs have been produced
- DEPFET first time in a (strong) magnetic field
- LVDS signal with pre-emphasis over long lines
- Simulation software ready in the new framework

slide from BPAC talk

- Radiation hardness program on a good way, some finetuning necessary
- electrical mockup of ladder (E-MCM) under design
- DCD „high speed“ test chip (TC1) due very soon
- PXD/SVD mockup being realized (air cooling etc.)
- DAQ (ATCA CN) ready for the April test
- FOS (dummies) available early summer (IFCA Santander provides sensors for monitoring mechanical movements of PXD relative to Belle II)

slide from BPAC talk

- **Sensors:**  
SOI material for main production not yet secured:  
SOITEC: order too small, ICEMOS: bad quality  
Alternatives being investigated:  
VTT (Fin), EVT + ICEMOS + DISCO + Rockwood  
(any other good ideas?)
- **Electronics:**  
ASICs might be too late for start of production  
DHP technology 90nm IBM may stop?
- **CO2 Cooling Plant:**  
apparently need engineering power for development of  
closed (CERN/NIKHEF) system

slide from BPAC talk



(see: <http://indico.mppmu.mpg.de/indico/conferenceDisplay.py?confId=1180>)



## Belle II Framework and PXD DAQ

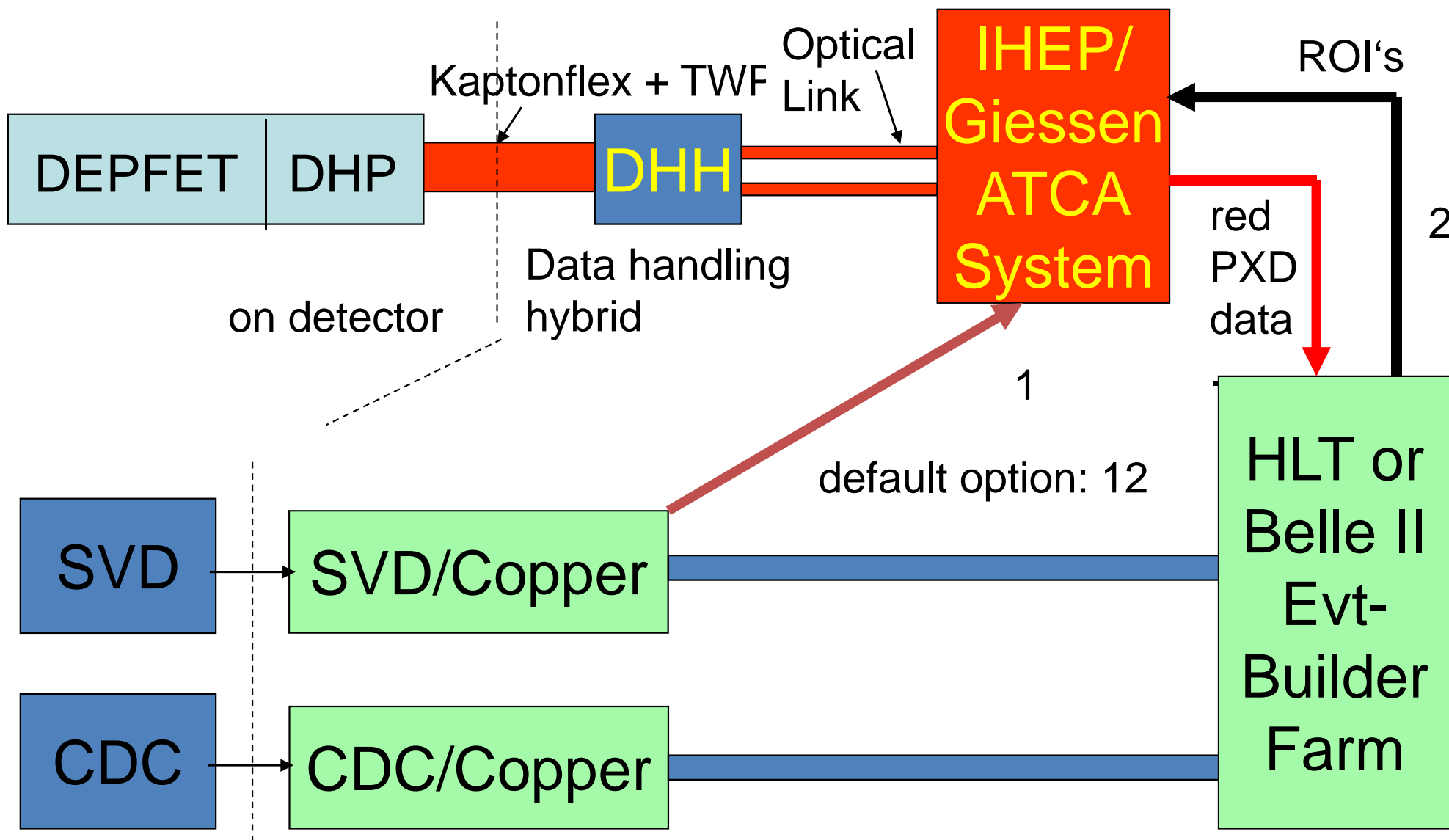


Title page of „Welcome“

### Mission:

- The meeting covers all technical aspects of the Belle II framework:  
from event generation to simulation/digitization.
- The PXD DAQ with its interface to the framework will be discussed in detail
- Decisions and recommendations for future work will be issued





Option 3: No ATCA system, PC for each DHH instead (no SVD data)

## Status of ROI algorithm on ML403 board (XC4VFX12-FF668-10C )

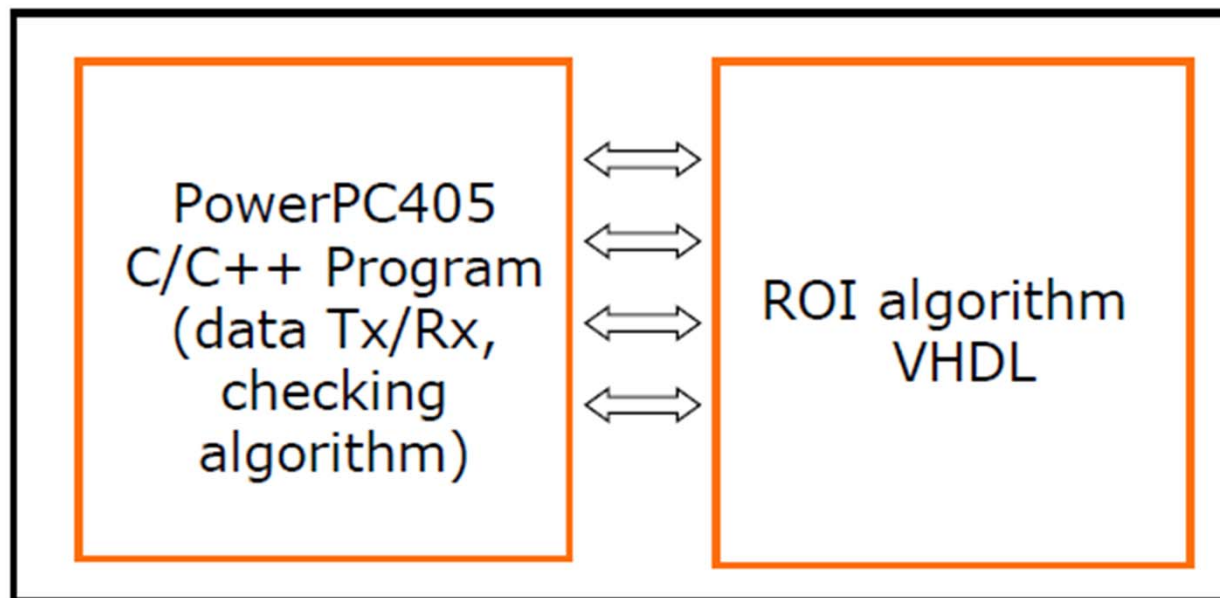


Assumption:

Get ROIs from  
an external  
system,  
e.g. HLT

Setup in  
Gießen  
University

VIRTEX-4, one bitstream



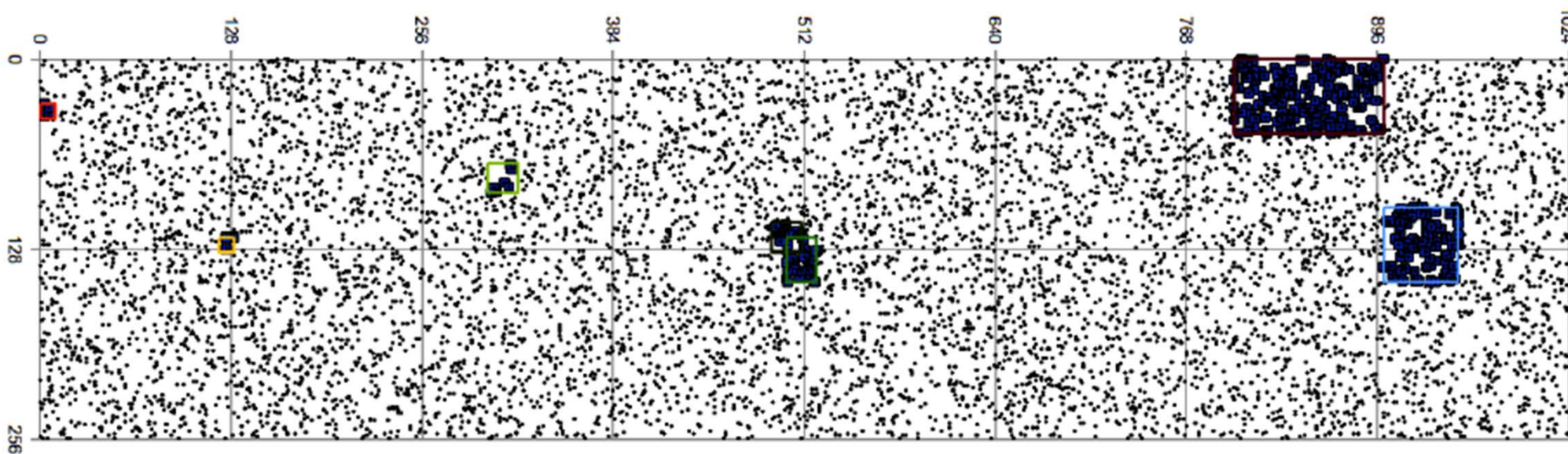
Univ. of  
Gießen

- Handshaking and data Rx/Tx by 4 registers (32-bit)  
**THIS IS THE ONLY INTERFACE.**
- PowerPC is external data source (will be changed later to e.g. optical link core)
- PowerPC runs our self cross-compiled Linux (NFS, C/C++ compiler, etc.)

1024 x 256 space  
 (reality: 768 x 250, but address space  
 needs to be bit aligned anyway,  
 -> 10 bit x 8 bit)

3% occupancy

9 ROIs



speed still to be improved



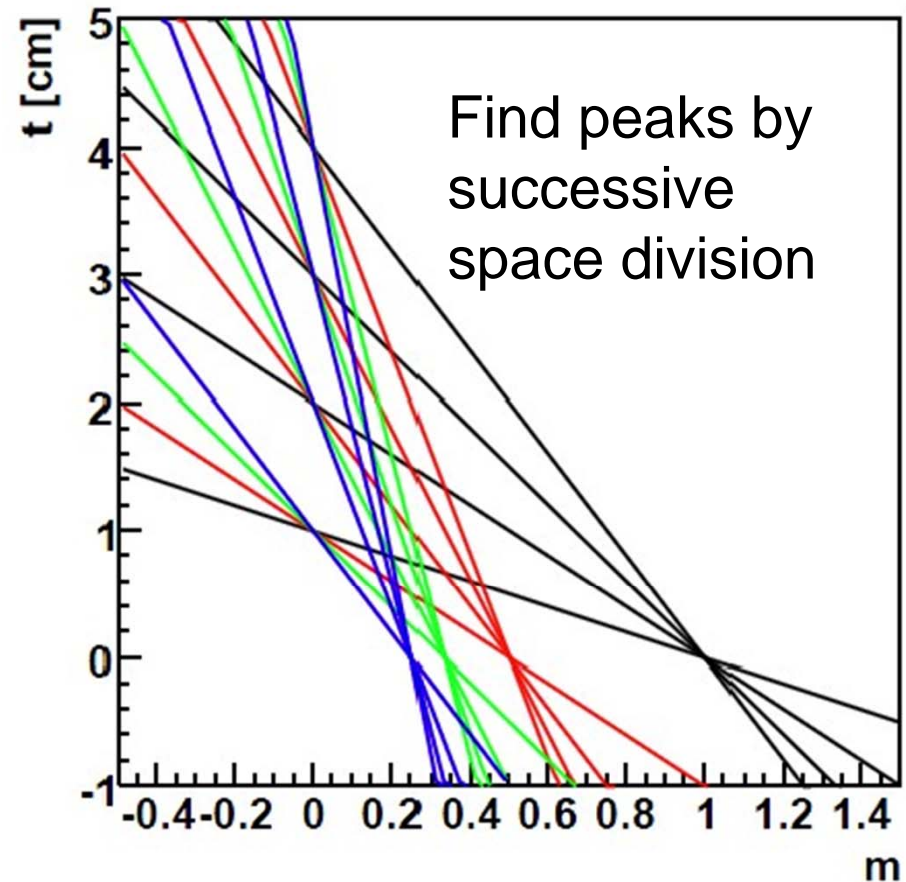
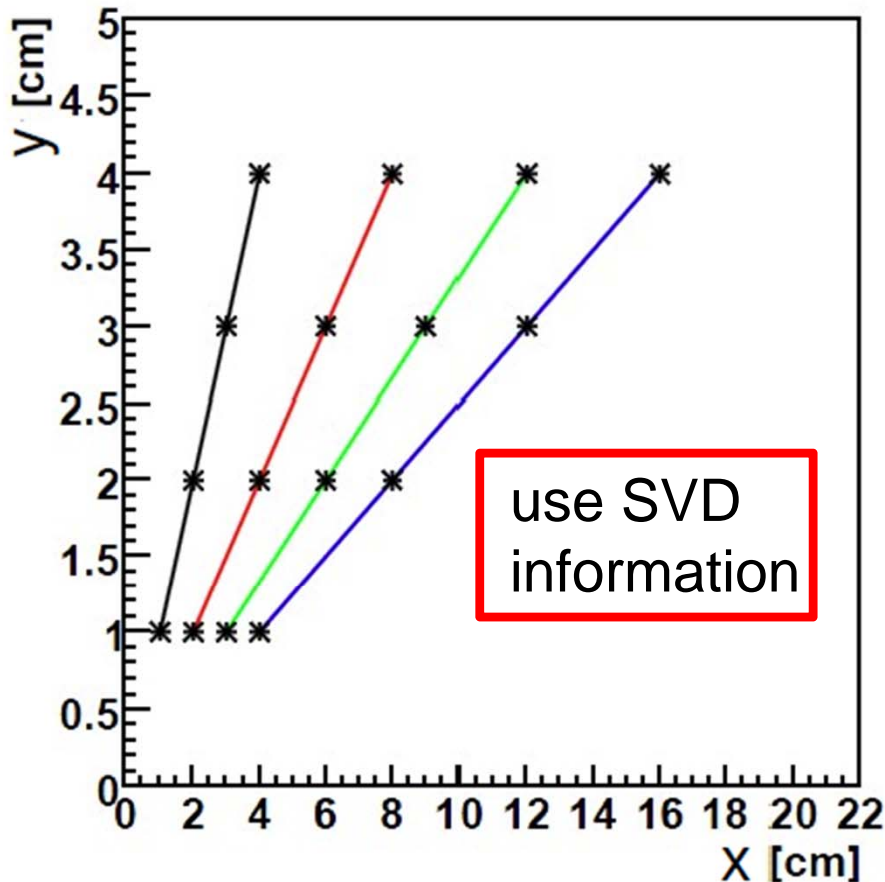
Univ. of Gießen

- Bring Claudio's Hough finder onto the VHDL platform

$$y = mx + t$$

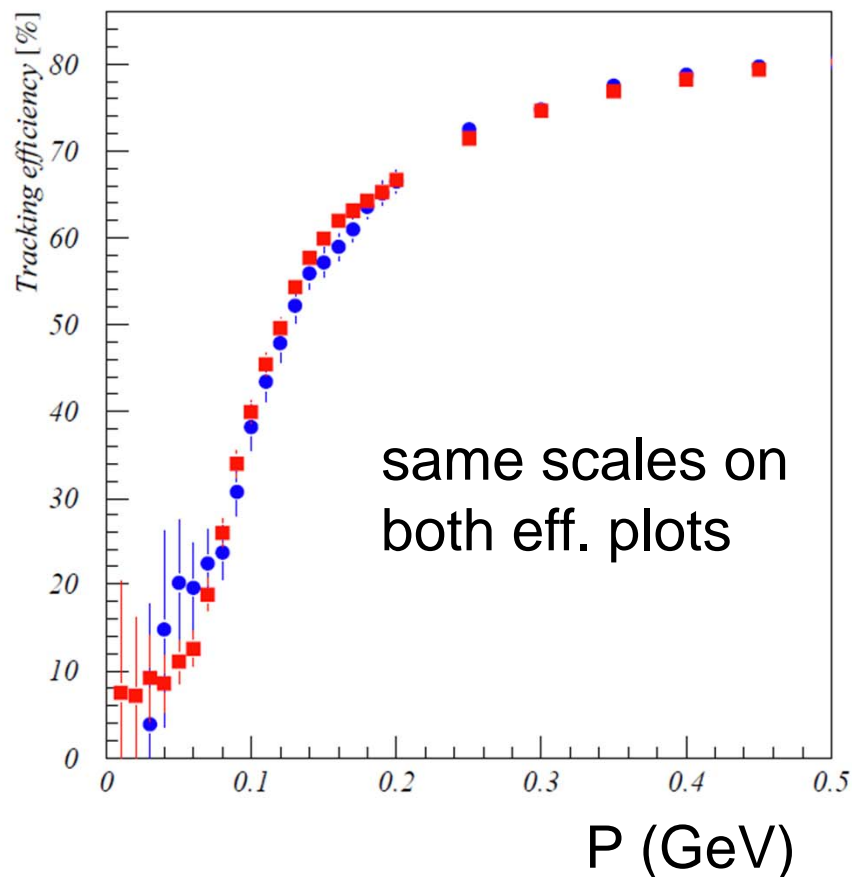


$$t = y_i - x_i \cdot m$$

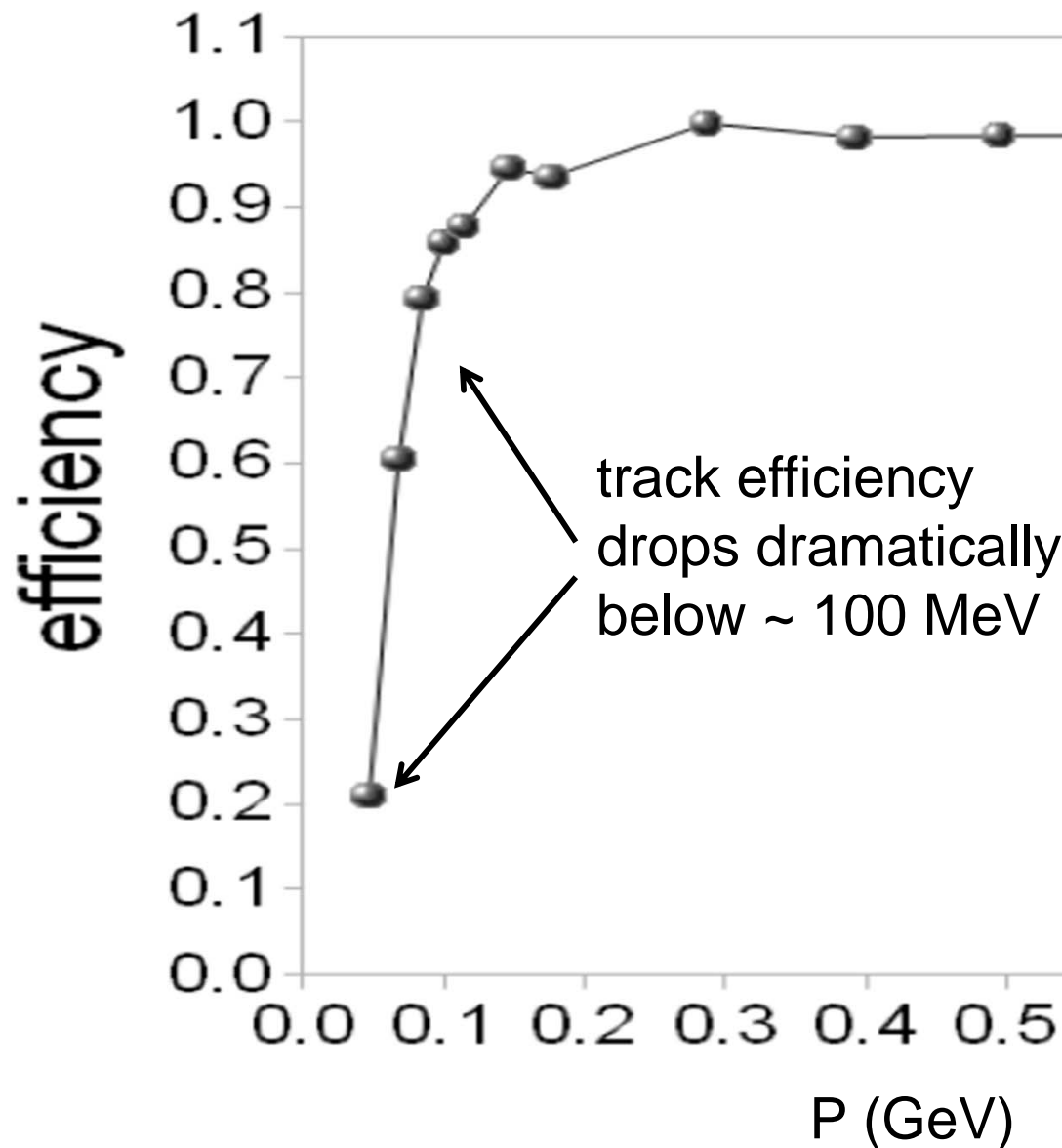


not so easy, and keep in mind ....

Full reconstruction, Belle  
SVD + CDC



Hough with SVD, Belle-II



- ROIs from HLT: OK, but cannot catch all interesting PXD hits!
- Follow the Hough strategy (efficient, can it work sufficiently fast?)
- Use pixel signal to access the very slow pions via  $dE/dx$  (check with electronics crew)

Slow pions with  $p < 80$  MeV will have large pulse heights in PXD ( $>3$  x mip)

„SELF-TRACKING“

(amplitude analysis)

Necessary requirement:

Cluster Algorithm

Where? Decision:

ATCA System (VHDL)

- Excellent progress by the Karlsruhe team with the open CO<sub>2</sub> system: cooling scheme works!
- Next step: repeat tests (with more sophistication) at the CERN closed CO<sub>2</sub> system (mid March)
- Open question:  
How to build a closed system within the DEPFET Coll. ?
- H. Postema et al: present installation at CERN not sufficient, for timely construction additional manpower needed.
- CK contacted T. Haruyama (head cryogenics group KEK) and I. Gfall (Vienna)
- Meeting on March 9 at CERN with reps from Karlsruhe, MPI, Vienna to discuss in detail the scenario towards a PXD/SVD closed CO<sub>2</sub> cooling plant.