

Status of ONSEN and DATCON

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David Münchow, Björn Spruck, Zhen-An Liu, Jingzhou Zhao,
Jochen Dingfelder, Carlos Marinas, Michael Schnell

Bonn, IHEP Beijing, Giessen

6th Belle II VXD Workshop

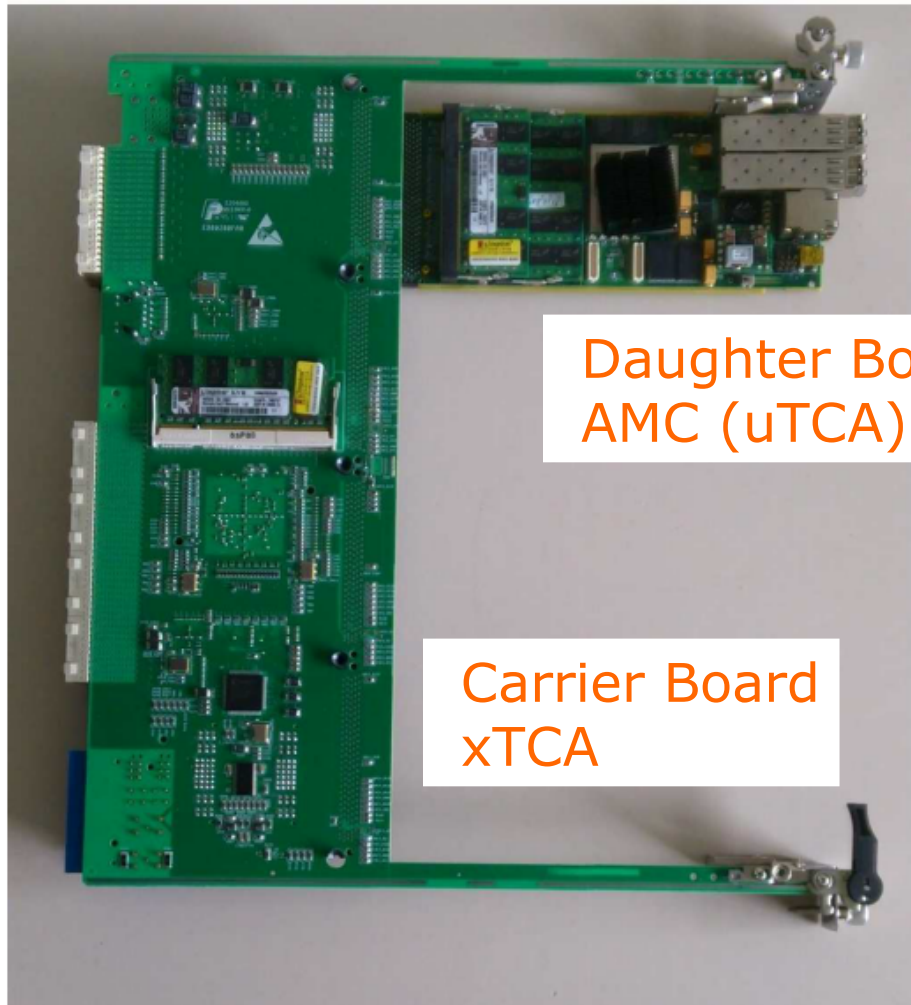
17th International Workshop on DEPFET Detectors and Applications

Pisa, 01.–03.10.2014



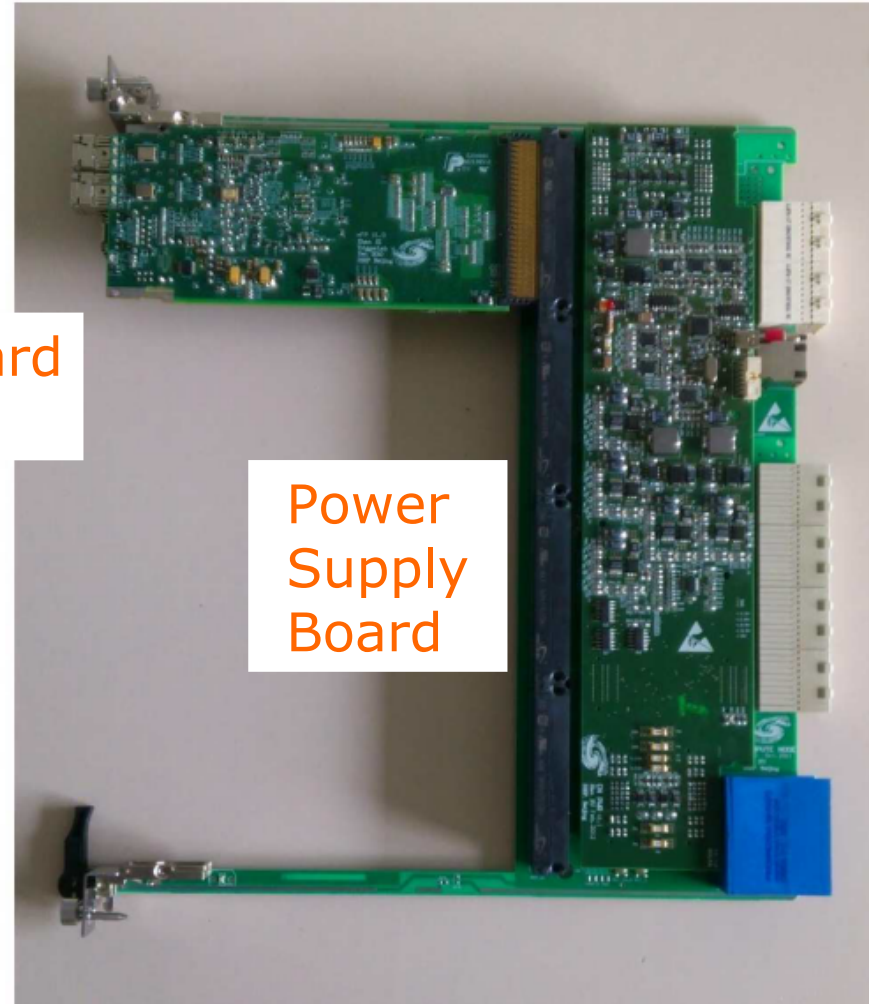
Bundesministerium
für Bildung
und Forschung

Reminder: Compute Node → xTCA carrier board and AMC board
AMC is uTCA formfactor (but partially different pin assignment)
Reminder: only AMC used at DESY tests



Daughter Board
AMC (uTCA)

Carrier Board
xTCA



Power
Supply
Board

Board Production Status

- green light for AMC v3 (final version) was given in 10/2013 design/layout fixed
- 2(8) AMC cards v3 arrived in Giessen in 10(12)/2013
- 2 for Bonn (Belle II), 1 for Bonn (Panda)
- 4 for Giessen o.k., used in DESY Test 01/2014
3 had problems (RAM, Flash)
- returned 3 problem AMC cards in 17.09.2014
- received 6 new, AMC cards arrived 26.09.2014
 - 3 will be given to Shuji for KEK
 - 2 (additional) for Bonn (for test of multiplexing)
 - 2 for Belle II Giessen
 - (2 for Panda Giessen)
- 1 new xTCA carrier board arrived 26.09.2014
- no test results for new boards yet → planned for B2GM (no RAM, no cooling elements, ...)

**Board Production Schedule,
as certified by new MOU (Addendum to DEPFET MOU),
signed by Zhen'An Liu and IHEP Director Yifang Wang,
24.09.2014, brought from China by Wolfgang Kühn**

ONSEN

3 carrier boards + 12 AMC cards by 31.03.2015

5 carrier boards + 20 AMC cards by 1.09.2015

DATCON

15(+3 spare) AMC by 28.02.2015

no carrier board needed

but

- needs another tracking node (DHH under investigation)
- needs custom uTCA backplane

ONSEN Team

- Thomas Geßler and David Münchow,
plan to finish Ph.D. by 28.02.2015
- Thomas is applying for JSPS/Humboldt Fellowship







new students:

- **Dennis Getzkow**
→ master thesis, ROI distribution system
see talk by Björn
- **Klemens Lautenbach**
→ arriving at KEK 8.10. (DAAD Fellowship)
installing „pocket-ONSEN“ at KEK



PXD DAQ Slow Control and QA Monitoring Workshop @ Mainz

<https://indico.uni-giessen.de/indico/conferenceDisplay.py?confId=169>

Wednesday, 30 July 2014

- 11:15 - 11:30 Participants: C. Sfienti, M. Hoek, M. Thiel (Mainz), C. Kiesling, M. Valantan (MPI), T. Röder (TUM), M. Ritzert (Heidelberg), B. Spruck, T. Gessler, D. Getzkow, S. Lange, K. Lautenbach, M. Wagner (Giessen)
- 11:30 - 11:45 Welcome 15'
Speaker: Prof. Concettina Sfienti (Institut für Kernphysik - Johannes Gutenberg-Universität Mainz)
- 11:45 - 12:15 Introduction to PXD 30'
Speaker: Prof. Christian Kiesling (Max-Planck-Institute for Physics)
Material: [Slides](#) 
- 12:15 - 12:30 Introduction to PXD DAQ 15'
Speaker: Soeren Lange (JLU -Giessen)
Material: [Slides](#) 
- 12:30 - 13:00 Questions and discussion 30'
- 13:00 - 14:00 LUNCH
- 14:00 - 14:30 IPMI @ Giessen (boards, microcontroller, ipmitools) 30'
Speaker: Thomas Geßler (Univ. Gießen)
Material: [Slides](#) 
- 14:30 - 15:00 DQM (basf2 DQM, DQM during DESY test) 30'
Speaker: Björn Spruck (II Physik Uni Gießen)
Material: [Slides](#) 
- 15:00 - 16:00 Serviette: what data quality monitoring is where ? 1h0'
Material: [Slides](#) 
- 16:00 - 17:00 Discussion: Physics Analysis Topics 1h0'
- 17:00 - 18:00 Blackboard: what slow control is where ? 1h0'
Material: [Slides](#) 
- 18:00 - 20:00 DINNER

Thursday, 31 July 2014

- 10:15 - 12:30 EPICS @ Belle II (Introduction & Tutorial) 2h15'
Speaker: Michael Ritzert (Heidelberg)
Material: [Slides](#) 
- 12:30 - 13:00 EPICS @ Giessen (Onsen System) 30'
Speaker: Klemens Lautenbach (Giessen)
Material: [Slides](#) 
- 13:00 - 14:00 LUNCH
- 14:00 - 15:00 Contingency 1h0'



PXD DAQ Slow Control and QA Monitoring Workshop @ MPI

<https://indico.mpp.mpg.de/conferenceDisplay.py?confId=3017>

Tuesday, 23 September 2014

- 10:00 - 10:30 Welcome & Coffee
- 10:30 - 11:00 Summary of the Mainz Meeting
convened by Sören Lange
Material: [slides](#) 
- 11:00 - 13:00 SC for PXD Modules
convened by Carlos Marinas
Material: [slides](#) 
- 13:00 - 14:30 Lunch
- 14:30 - 16:00 SC for CO2 System (IBBelle)
convened by Michael Ritzert
Material: [slides](#) 
- 16:00 - 16:30 Coffee Break
- 16:30 - 18:30 SC of DatCon
convened by Jochen Dingfelder
Material: [slides](#) 
- 18:30 - 21:30 Dinner
Schwabing Restaurant or Aumeister

Wednesday, 24 September 2014

- 09:00 - 10:30 SC of Power Supplies
convened by Stefan Rummel
Material: [slides](#) 
- 10:30 - 11:00 Coffee Break
- 11:00 - 12:30 SC of the DHH System
convened by Igor Konorov
Material: [slides](#) 
- 12:30 - 14:00 Lunch
- 14:00 - 15:30 Environmental Control
check temps, humidities, etc. around the PXD
- 15:30 - 16:00 Coffee Break
- 16:00 - 17:30 Contingency

Workpackages discussed with (new) Mainz Group

- **IPMI**

(ATCA slow control.

e.g. reboot a CN, reboot the shelf)

- small hardware project, 4-layer PCB
- ATMEL microcontroller programming
- EPICS integration
(ATCA shelf manager has ethernet)

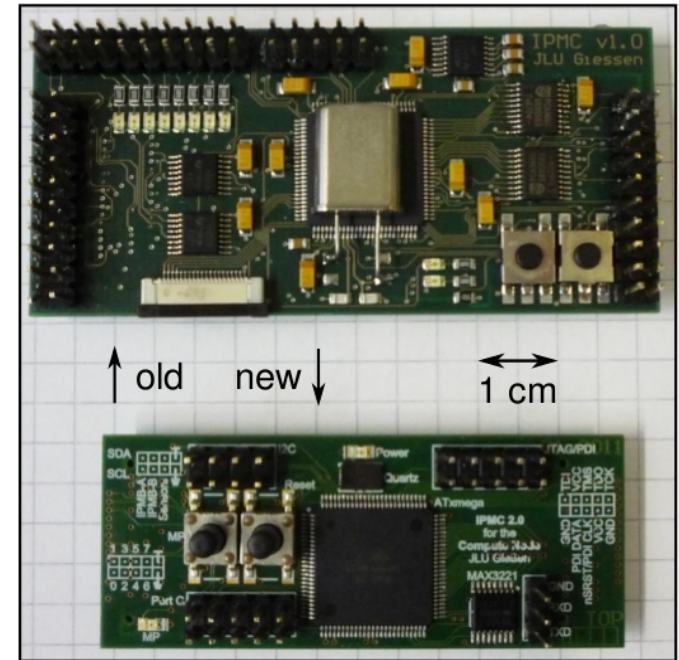
but: ONSEN/DATCON and DHH

→ different solution (different connector pin layout)

- **ONSEN DATA FLOW MONITORING**

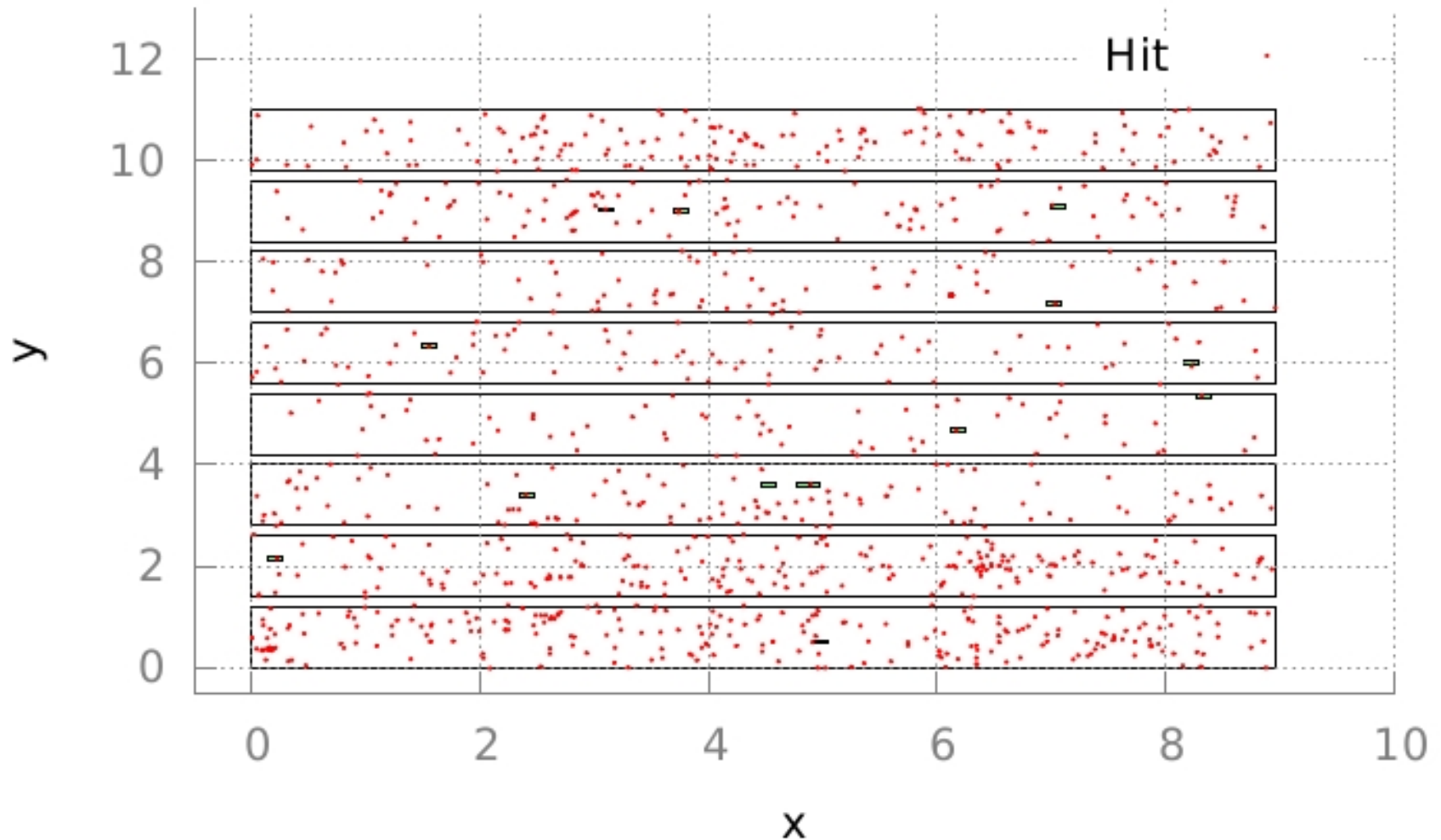
e.g. QA monitoring of data reduction factor

register readout on embedded PPC, and send to EPICS



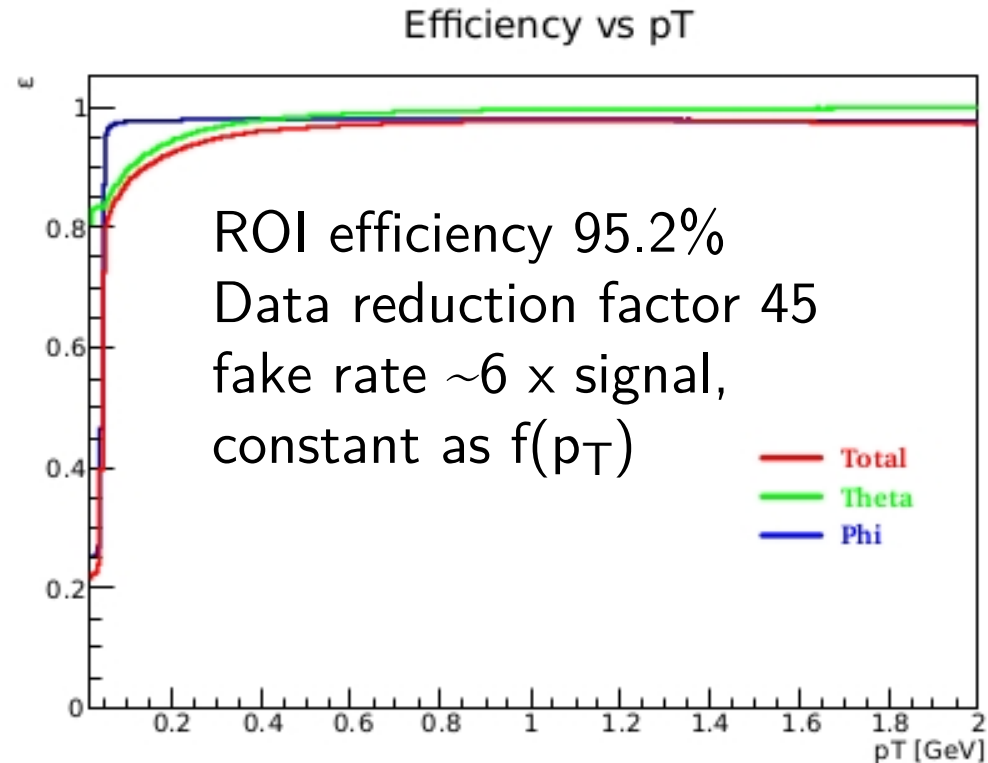
Status of DATCON

- has „SVD data collector and multiplexer nodes“ and 1 „tracking node“
 - FPGA must be more powerful
 - tests ongoing with DHH (Virtex-6 instead of Virtex-5)
- DATCON does not need carrier boards
 - custom uTCA backplane
 - high-speed PCB designer in Bonn not available anymore
 - preliminary contact to Schroff, estimate 20 k€, not fixed yet
- DATCON/ONSEN Test
 - new data format (run # in header), checksum, bit errors, etc.
 - planned for 3rd week in October @ Giessen
- Michael Schnell to finish Ph. D. in 2015



low p_T behaviour in θ
caused by linear fit of
sinus-function in z-direction

will be compensated
by asymmetric ROI shape
(narrow in $r\psi$, long in z)



reminder: not B decays, but flat energy distribution 50 MeV – 3 GeV

K_S rescue

(formerly known as „6-layer online tracking“)

→ see talk at Tracking Workshop, Tuesday

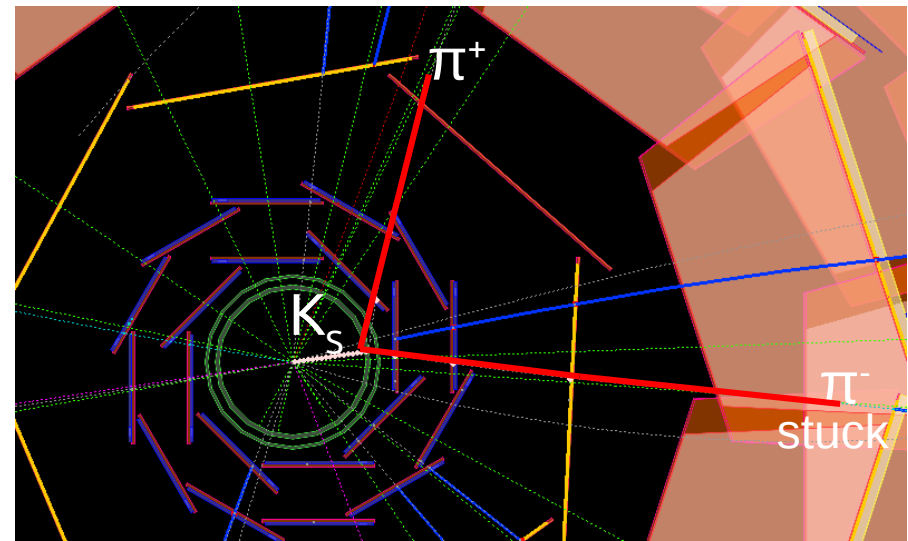
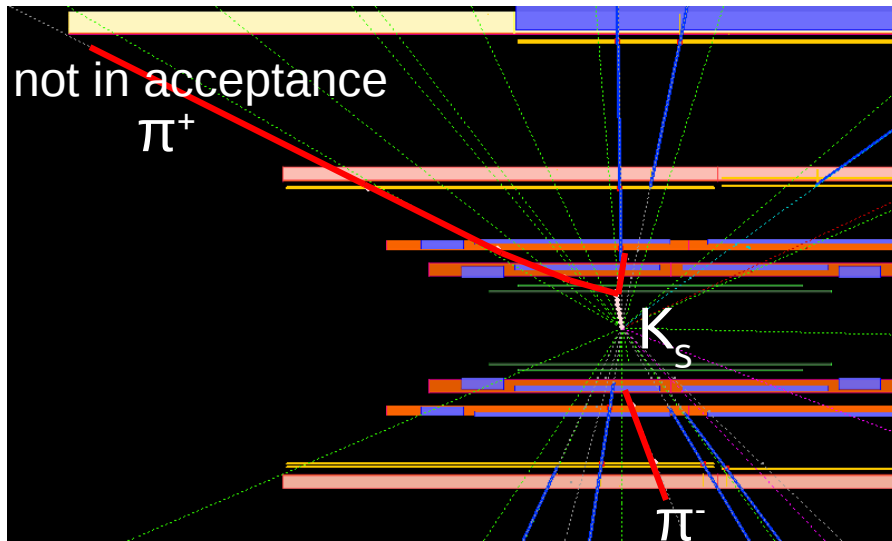
<https://indico.mpp.mpg.de/getFile.py/access?contribId=9&sessionId=5&resId=0&materialId=slides&confId=2966>

Conclusion:

6-layer may save 1.2% of K_S in generic B decays,
which otherwise would be lost PXD data (not on tape)
(below cluster rescue threshold of $1.8 \times dE/dx|_{\min}$)

→ about ~0.5 Mill. K_S rescued per day @ final luminosity
(assuming 100% track finder efficiency)

to be included in BMBF application
(1 Ph. D. student, online and offline study)



π^+ : $p_T=89$ MeV π^- : $p_T=292$ MeV

geometric issue:

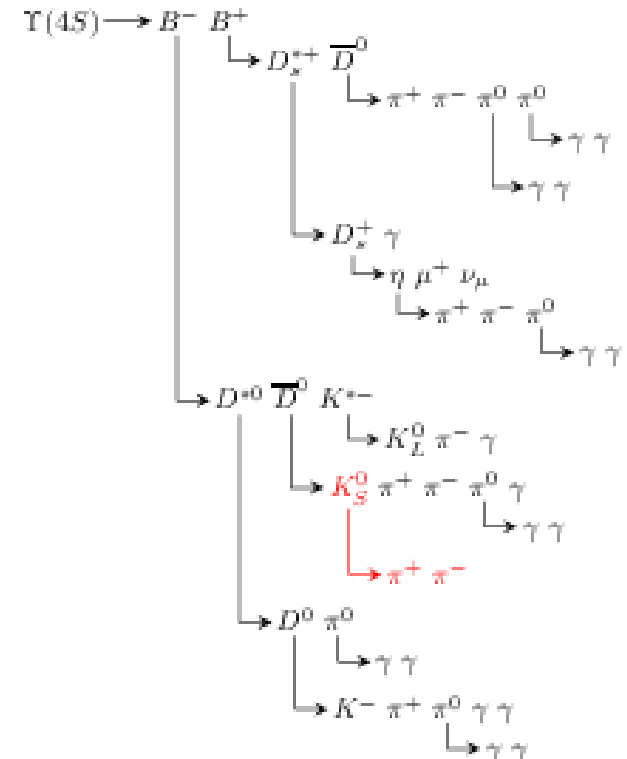
π^+ leaves acceptance after 1st SVD layer

π^- gets stuck in 2nd SVD layer (only 3 hits)

Cluster Rescue (seed charges):

π^+ : 26 and 41 (**both below threshold**)

π^- : 47 and 13 (inner layer rescued by CR)



What is missing?

- carrier board
testing/debugging/maybe new iteration
→ first results by B2GM
- beam test with 30 kHz
(was ≤ 1 kHz at DESY 01/2014)
- subevent building for $\frac{1}{2}$ PXD on 1 CN
→ next funding period
- cluster format decoding/unpacking
→ next funding period

EU RISE Proposal JENNIFER was granted 418 kEuro for Germany (4 institutes)

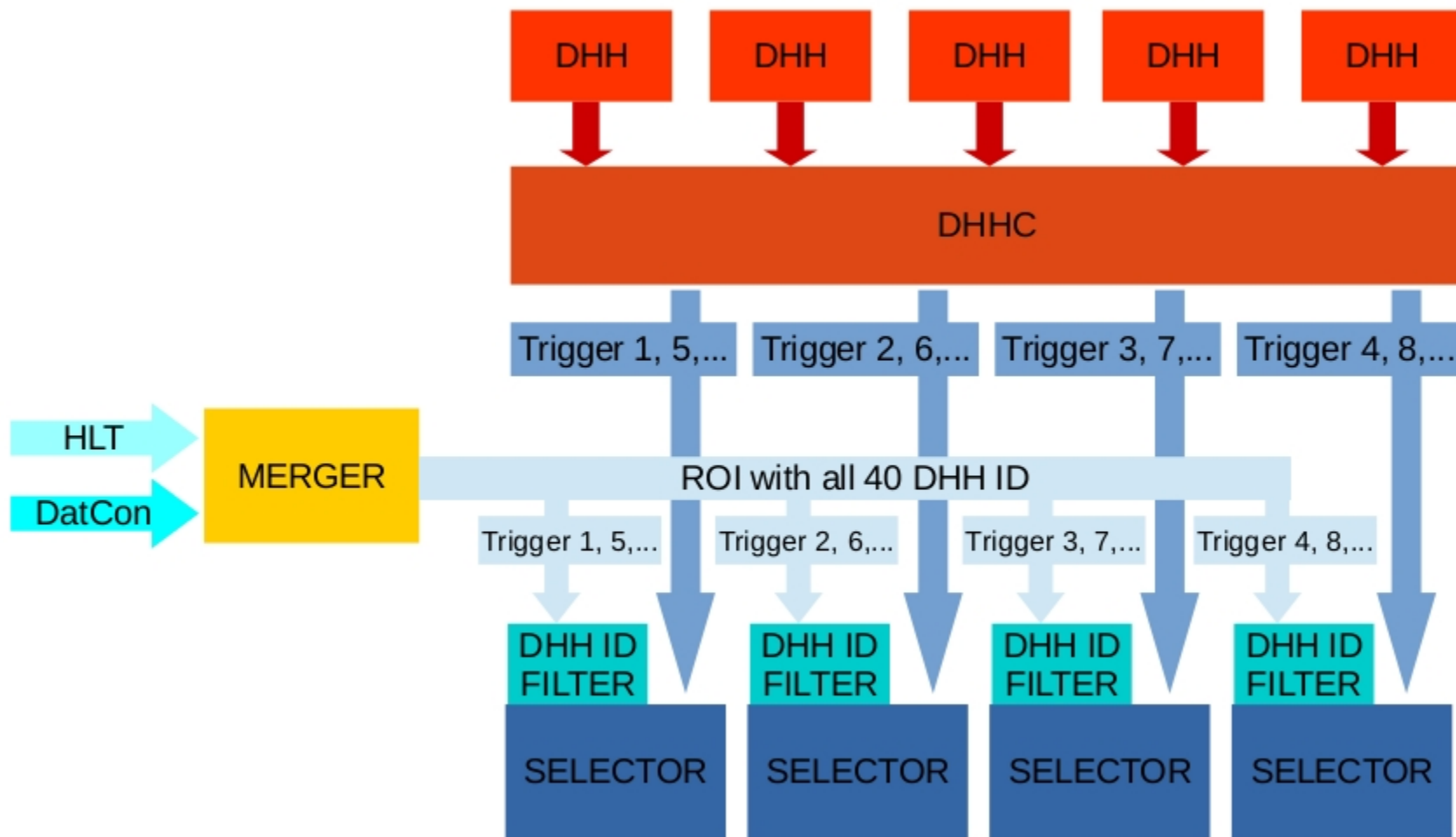
Giessen	ER	NF_Spruck	Integration of PXD+SVD DAQ with Belle II DAQ	01.07.16	2	2	2
	ESR	Lautenbach	commissioning of pocket-PXD-DAQ system at KEK, stability tests/commissioning of event building, EVB interface test	01.01.15	5	5	5
		NF_Gessler	BEAST installation / BEAST data taking, PXD+SVD DAQ integration, cosmic ray data taking	01.01.16	4	4	4
		NF_Münchow	BEAST installation / BEAST data taking, PXD+SVD DAQ integration, cosmic ray data taking	01.01.16	4	4	4
			Belle II DAQ (w/ PXD and SVD) commissioning with beam	01.09.16	3	3	3
	Giessen Ergebnis					5	13

18 months @ KEK for Onsen

Bonn	ER	Germic	DHP ASIC commissioning	01.02.16	3	3	3
		Marinas	BEAST installation / BEAST data taking / background studies	01.01.16	3	3	3
			PXD sensor and system commissioning (parameter tuning, performance studies)	01.10.16	6	6	6
		Schnell	DATCON commissioning	01.02.16	3	3	3
Bonn Ergebnis						15	15

3 months @ KEK for DATCON

Master Thesis by Dennis Getzkow: ROI distribution see talk by Björn Spruck (this session)



THANK YOU.