

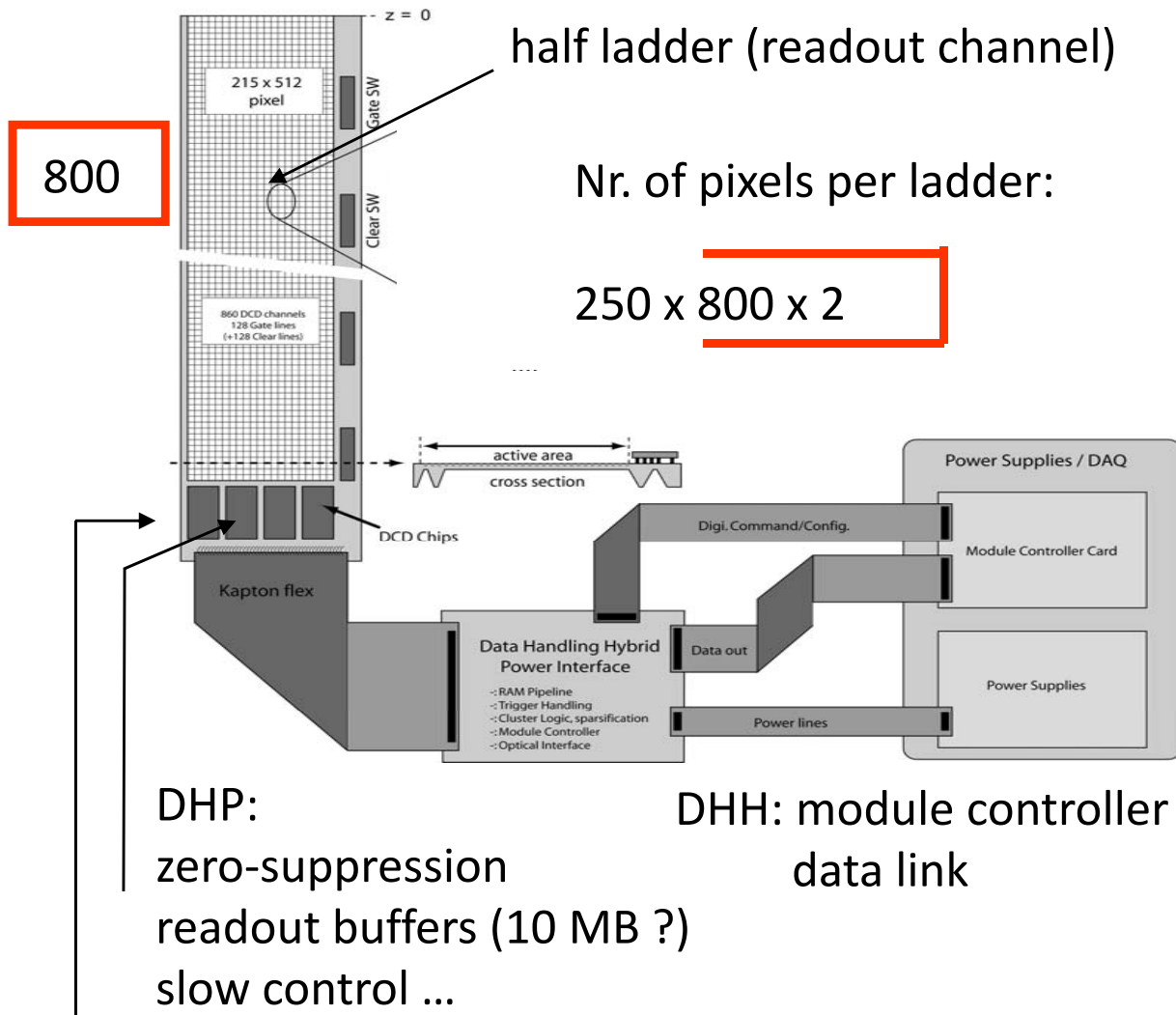
PXD Data Acquisition Workshop

Mission:

- Prepare the material for a decision on the PXD DAQ System
- Data of PXD must be reduced by about a factor of 10
- Method: Use „outer“ detector information (SVD, CDC) to define „ROIs“ for PXD data selection
- At present there are several options (see B2GM at KEK):
 - IHEP/Giessen system:
 - „real-time“: full algorithm on CN
 - „pipeline“: Storage and Event Building
 - fall-back: PC-based solution

Opt. 1
Opt. 2
Opt. 3

250



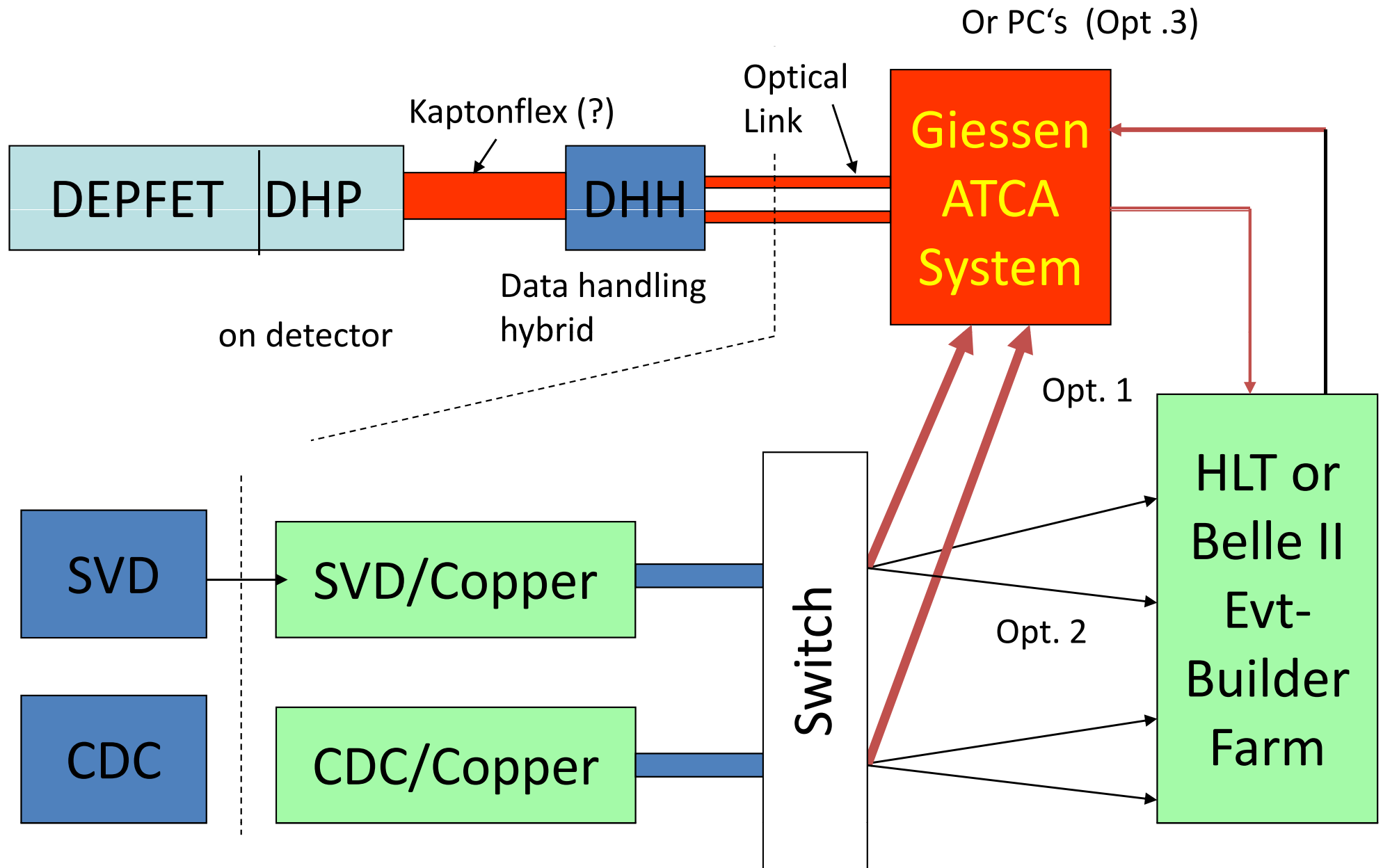
- 40 half ladders:
8 Million pixels (px)
- 1% occupancy:
- 80 kpx on at any time
- $\sim 3 \times 10^5$ px in each event
(safety factor 3)
- Trigger rate: 10-30 KHz
- Total rate: 9×10^9 px/s
- 4 bytes per px (pos + ADC)

Digitization (DCD)

Total rate: 300 GBits/s

6.0 GBits/s
per R/O channel

Options for the PXD DAQ



08:00	Breakfast (45')	
09:00	   Welcome and Introduction (15') ( Slides )	Christian Kiesling
09:15	   Algorithms for PXD Data Reduction (45') ( Slides )	Christian Kiesling
10:00	   Introduction to the DHH System (30') ( Slides )	Igor Konorov
10:30	Coffee break (15')	
10:45	   Overview on SVD and its DAQ System (30') ( Slides )	Markus Friedl
11:15	   The IHEP/Giessen ATCA System (45') ( Slides)	Sören Lange
12:00	   The PC Readout Option (30') ( Slides)	Takeo Higuchi
12:30	   Multi-Core Processors for PXD Data Reduction Algorithms (20') ( Slides )	Kolja Prothmann
13:00	Lunch break (1h00')	
14:00	   Trigger Timing Distribution (30') ( Slides )	Mikihiko Nakao
14:30	   The High Level Trigger Framework (30') ( Slides )	Ryosuke Itoh
15:00	   Integration of the PXD Data Acquisition (30') ( Slides )	Takeo Higuchi

- 15:30    Proposal for PXD-DAQ Document (15') ( Slides ) Takeo Higuchi
- 15:45 Coffee break (15')
- 16:00    Injection Veto (20') ( Slides ) Shoji Uno
- 16:20    Discussion on Protocol between DHP/DHH and Trigger (1h30')
- 18:30 Dinner (1h30')

Friday 23 April 2010

[top](#) 

- 08:00 Breakfast (45')
- 09:00    Pick-up and Discussion of "Left Overs" from Day One (45')
- 09:45    Relation between PXD DAQ and the HLT (1h30')
- 11:15 Coffee break (15')
- 11:30    Possible Scenarios for the ATCA System (I) (1h30')
- 13:00 Lunch (1h00')
- 14:00    Possible Scenarios for the ATCA System (II) (1h00')
- 15:00    Summary and Conclusions (20')
- 15:30 Coffee and Departure (30')



DT Problems due to Injection Scheme



Current condition

10Hz injection, 3.5msec veto time

3.5% dead time

SuperKEKB case

50Hz injection to compensate shorter life time

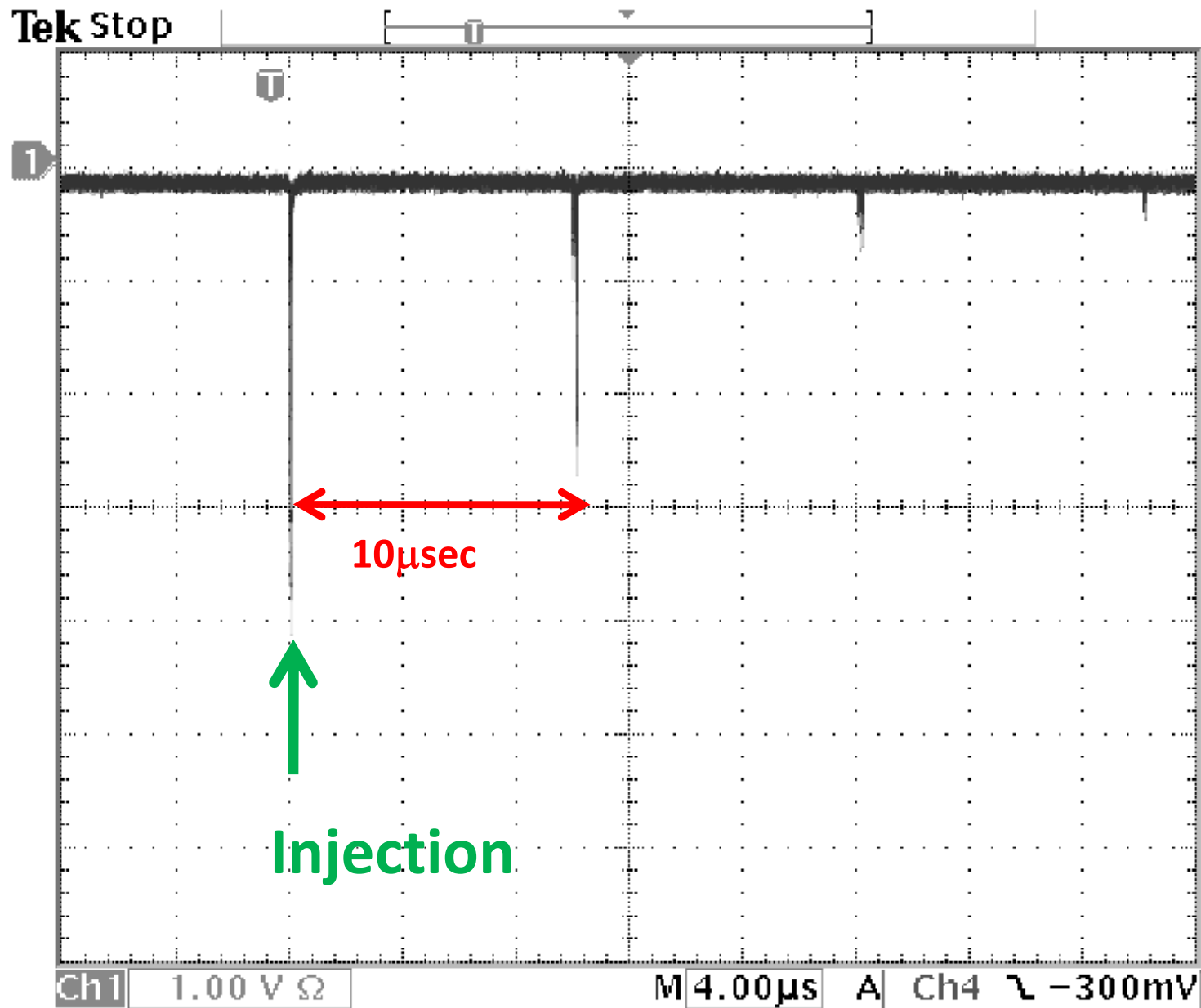
Dead time : 17.5% for the same veto time

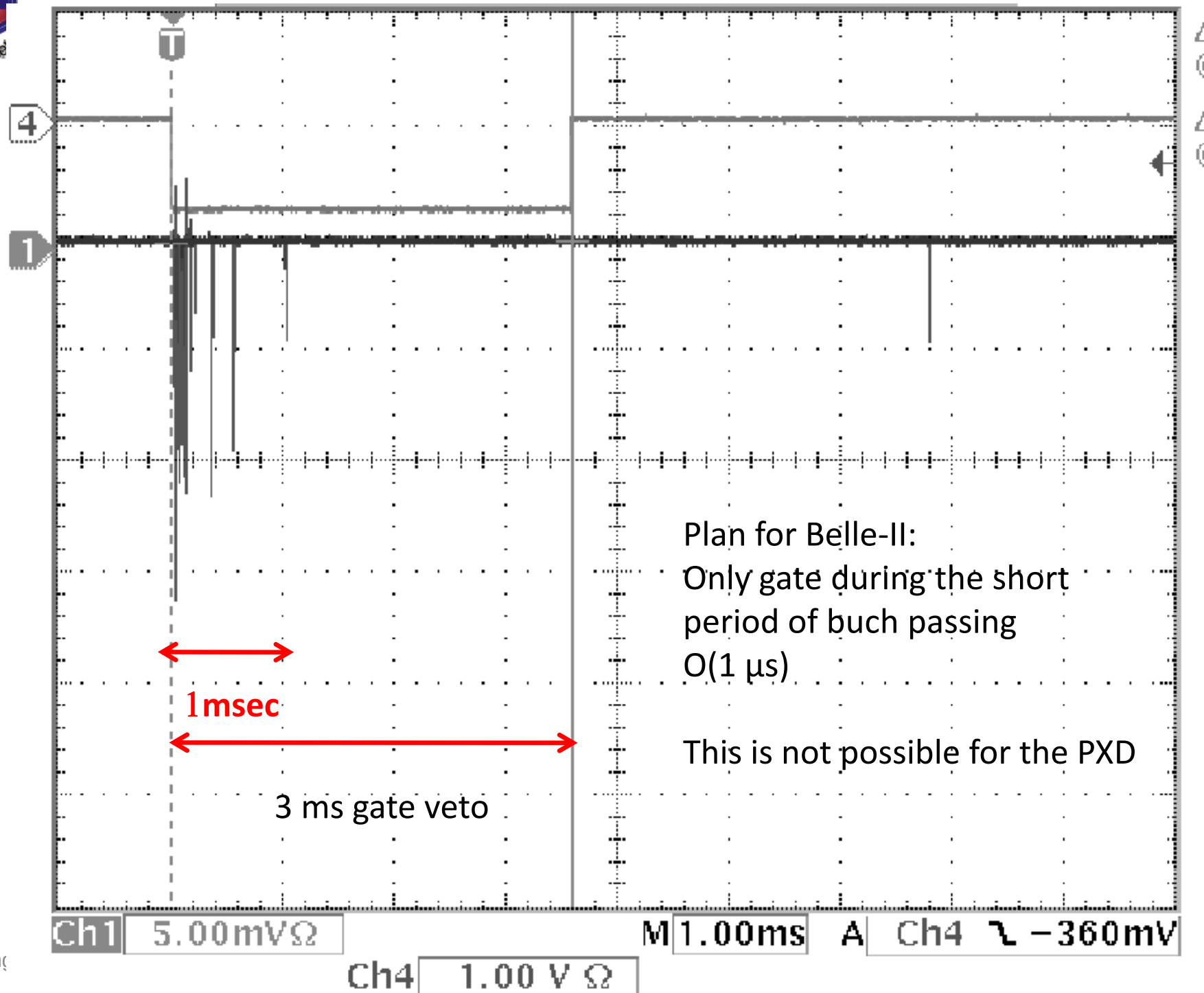
Better way is necessary.

Phase veto scheme

Injection Scheme:

only two bunches at a time, 100 ns apart







Main Conclusions of the Meeting



PXD DAQ recognized as an important and non-trivial task

Need a long-term planning for the PXD DAQ, involving experts from DHP, DHH and DAQ system

Three Options (still) under consideration

Opt 1: Stand-alone algorithms using SVD data only (no CDC)

Opt. 2,3: Use full reconstruction (need large buffer, O(several 100 GB))

Decision will be based on performance (mainly efficiency): algorithms !

For the ATCA system a flexible mezzanine board will be pursued (IHEP Peking)

Decision („Point of no return“) aimed within one year from now

Documentation will be prepared (made public on Twiki)

Regular Meetings (1 per month), next „big“ meeting near Gießen, Sep 25/26, 2010