Report on Recent Meetings

- Slow Control Meeting at CERN, 7. 9. 2011
- Mockup Meeting at MPI, 8. 9. 2011
- CO2 Meeting at CERN, 13. 9. 2011
- Revised Schedule for SuperKEKB and Belle II

Slow Control Meeting

Present:
A. Knoll, C. Buckl (both TUM/fortiss), J. Schieck, S. Rummel (both LMU), S. Nishida (KEK), C. Kiesling (MPI)

Program:
Tour through detector slow control (DCS) of ATLAS (Stefan Schlenker) and LHCb (Clara Gaspar).

The ATLAS DSC as well as LHCb (DCS plus run control) are using PVSS II (commercial product).
On top, both projects use SMI++ and a CERN-specific middleware to specify and execute hierarchical state machines.
A typical reaction time about 1 second.

At CERN, a PVSS support group exists, courses on PVSS are routinely organized. There is broad experience at CERN concerning programming in PVSS.

Slow Control Meeting (cont.)

Conclusions:

Belle II Slow Control System needs to be established from scratch.
Using the commercial PVSS system seems a very economical solution.

Next Steps:

- MPI enquires about the cost of the system if used at KEK
- TUM will contact PVSS representatives:
  technical questions like interfaces, scalability and performance.
- For the coming B2GM at KEK it is planned to invite a presentation on PVSS & SMI++ by a slow control expert from an LHC experiment.
- Representatives of TUM will join the B2GM, inquire about possible interests of KEK to get assistance in the Belle II slow control by TUM.
- If encouraged by Belle II, TUM will engage itself in the Belle II Slow Control Project and take the necessary steps to procure funding through the German BMBF for the manpower to start the software development.

New Collaborators in the PXD Project

- DESY Hamburg

Group leader: Carsten Niebuhr

Members: Karsten Gadow (engineer, 50 %)
Robert Volkenborn (engineer, 100 %)
NN (PostDoc) ?
NN (Phd students)
+ Klaus Kleinwort (staff , interested in alignment)

WP's: mechnical and thermal mockup
of PXD, SVD

installation procedure

+ ?

Work Package Distribution (cont.)

Nr.	Work Package	Lead Institution	Collab. Institutions
2.0	**Test Facilities**		
2.1.1	Test beam setup	IFV	KAR, BON, VIE, IFV, IFC
2.1.2	Test beam analysis	PRA	GOE, HEI, IFB, MPI
2.1.3	Lab test procedures	MPI	(all)
2.2	Setups for thermal tests	KAR	IFV, MPI, VIE
2.3	Mechanical / thermal mockups		DES, FV, KRA, MPI, VIE
2.4	Irradiation Tests	MPI	BON; KAR

DES = DESY

Work Package Distribution (cont.)

Nr.	Work Package	Lead Institution	Collab. Institutions
3.0	**Integration and running-in scenario**		
3.1	Radiation monitor during machine commissioning (“ BEAST II”)	MPI (?)	?

Nr.	Work Package	Lead Institution	Collab. Institutions
4.0	**Operation Issues**		
4.1	Belle II Slow Control	TUM (?)	

WP associations subject to change

Mockup Meeting

Present:
K. Gadow, C. Niebuhr, R. Volkenborn (DESY), K. Ackermann, C. Kiesling, H-G Moser, M. Ritter (MPI), A. Bozek, J. Kotula (Krakow), I. Gfall (Vienna), S.Tanaka, Y. Ushiroda (KEK, via EVO)

Agenda:
get an overview over the activities concerning the various types of mockups necessary

Mechanical Mockup
study the available space for the various services (high precision)

Thermal Mockup
test the cooling scheme (low mechanical precision). Materials for the PXD should be correct (thinned dummies).

Installation Mockup
scrutinize present procedure, are there alternatives ?

Mockup Meeting (cont.)

KEK Activities:

concentrate on the installation procedure of the VXD as preferred by the machine group (VXD mounted on QCS), no mockups from PXD/SVD

DESY activities in the near future:

access very soon to a closed CO2 system for XFEL
studies are considered: Tightness tests of the CO2 cooling blocks
Mechanical stability simulations for the inner CFRP cone of SVD, to be extended to simulate the outer CFK cylinder.

access to a powerful workshop, able to produce low bending radii in stainless steel pipes, experience in producing air-tight volumes.

expressed the wish for a common design repository for Belle II.

Mockup Meeting (cont.)

Krakow activities:

For the moment (until the end of this year) only limited access to mechanical workshop. Want to participate in the production of the SVD thermal mockup.
bending of low diameter steel pipes for CO2 cooling cannot be done and should be executed at DESY.

MPI Activities:

provide thinned down silicon dummies for the thermal mockup.

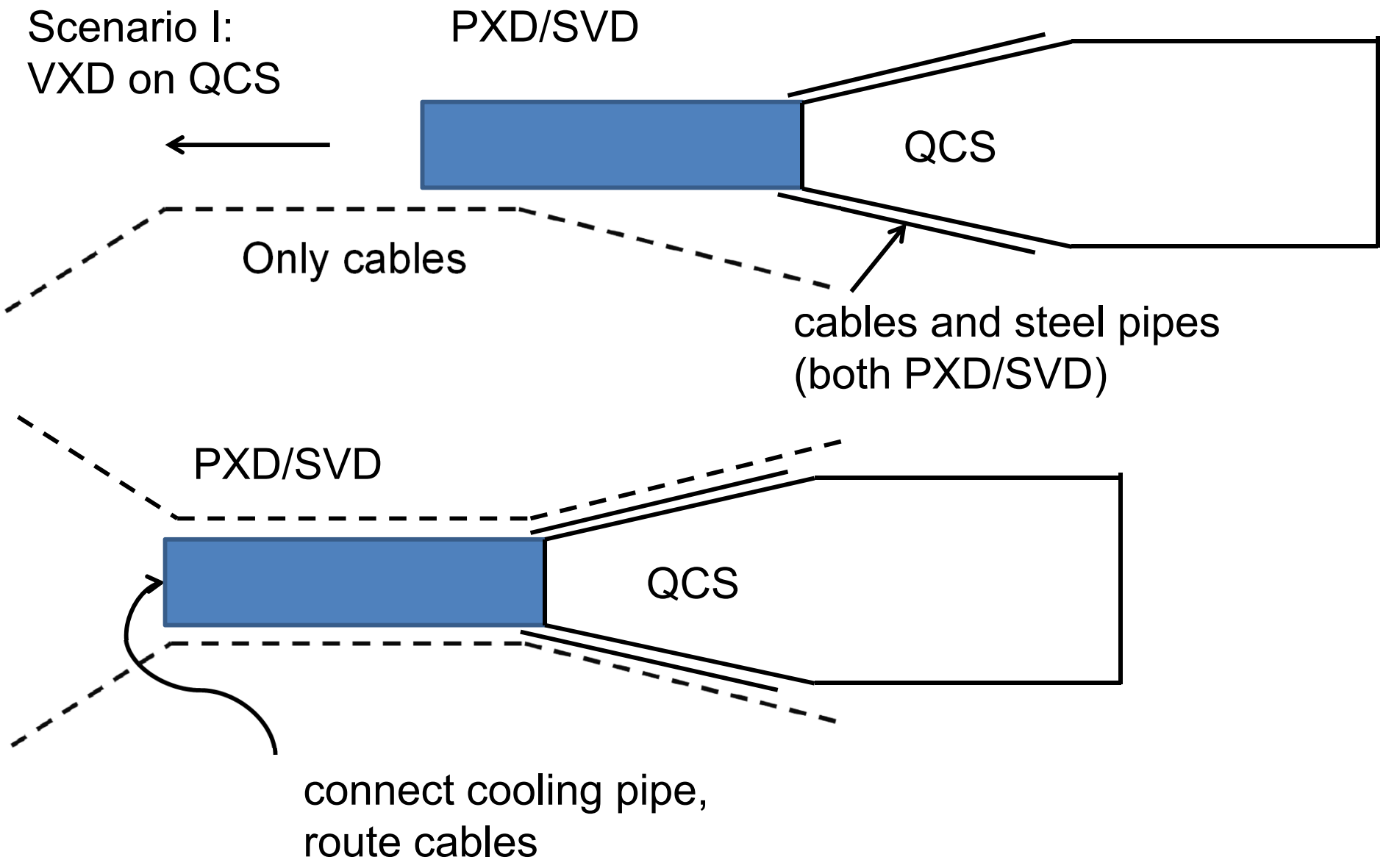
CO2 Cooling Meeting

- Concrete plans to build a closed CO2 System for PXD and SVD at MPI with the help of Nikhef/CERN, Vienna and Karlsruhe
- MARCO (Multipurpose Apparatus for Research on CO2)
- IBBELLE (ATLAS IBL and Belle II)
  - ordering of all parts for MARCO done
  - frame done at CERN by MPI technician
  - first parts from Swagelok have arrived
  - design of MARCO being finalized (K. Ackermann)
  - frame to be equipped by all parts except pipes by end of October

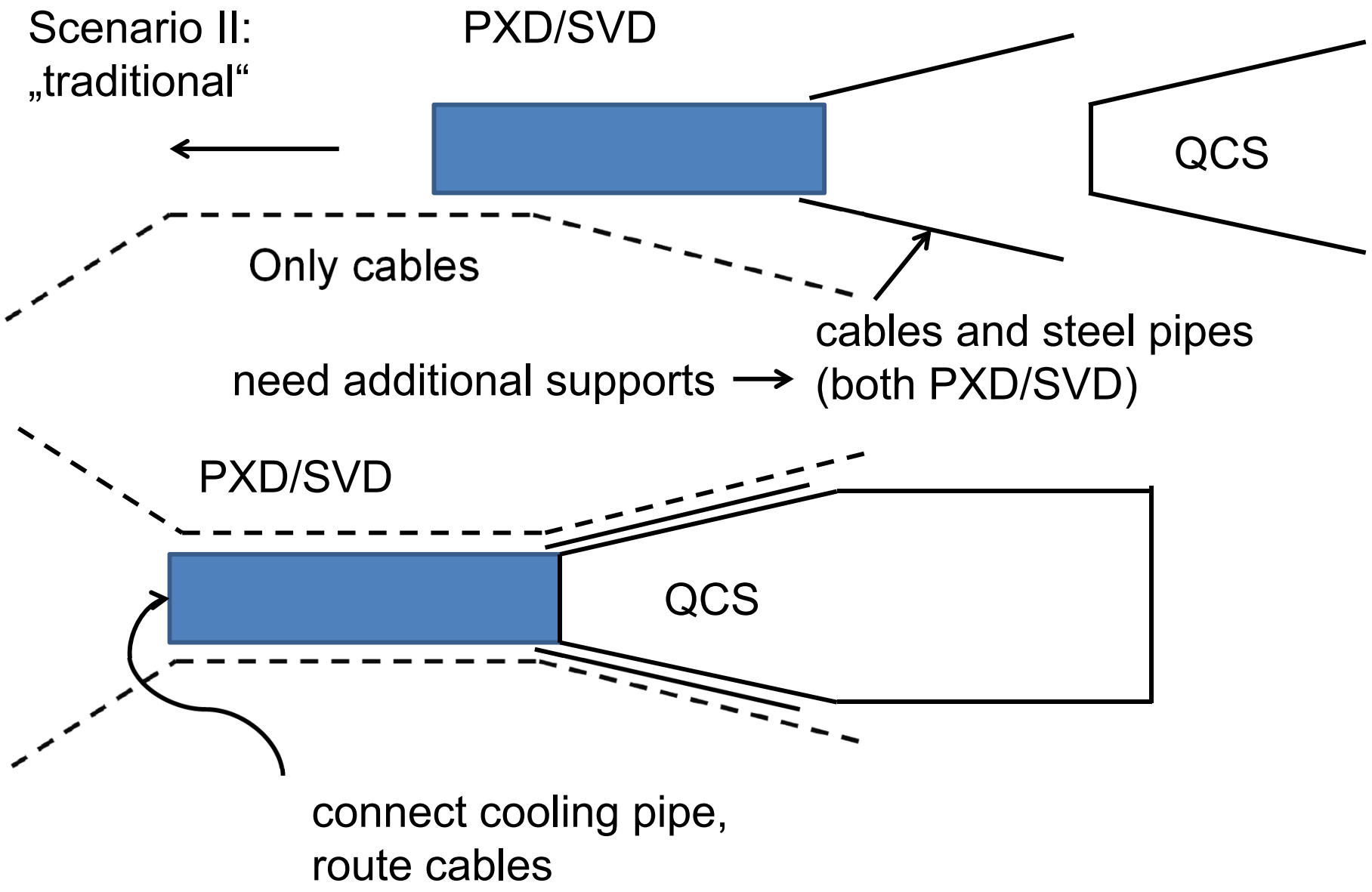
CO2 Cooling Meeting (cont.)

- Piping job done at MPI (new orbital welding eqipment) + pressure / leakage tests finished by November 2011
- Transport to CERN for installation of controls
- Electronic control system (PLC + PVSS) being ordered through CERN
- Electrical installation supported by technician from MPI
- Commissioning starts in April 2012
- MARCO ready for transport to MPI by end of June

VXD Installation in Belle II



VXD Installation in Belle II



Schedule for Installation

2014			2015								
10	11	12	1	2	3	4	5	6	7	8	9
						BEAST 1		Summer Shutdown			
machine ready w/o QCS										PXD ready	QCS ready
Detector Installation (except for PXD/SVD)									Roll-In	GCR Contract over	COMP ready by Oct. 1

2015			2016								
10	11	12	1	2	3	4	5	6	7	8	9
BEAST 2			Winter Shutdown		Physics Run				Summer Shutdown		
			VXD inst.	GCR							

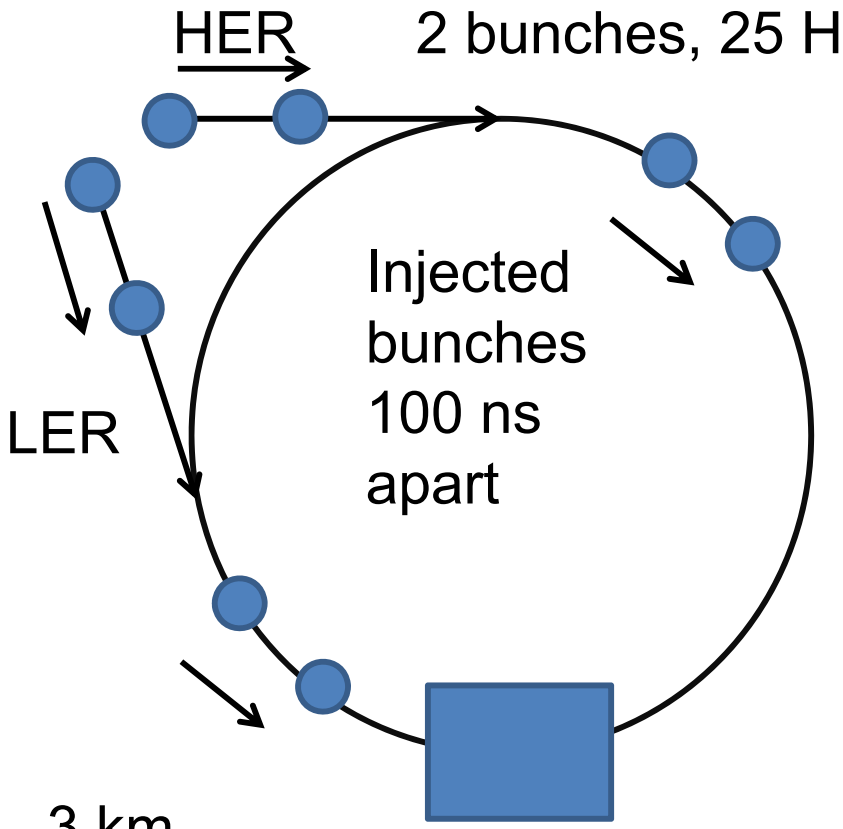
Schedule for Installation: New (preliminary)

2014			2015								
10	11	12	1	2	3	4	5	6	7	8	9
	BEAST 2							Summer Shutdown			
machine ready **with** QCS					Belle Roll-out					PXD ready	VXD Integration
Belle roll-in (no TOP/A-RICH/PXD/SVD/CDC)									Roll-In	GCR	
July 2014						install				Contract over	COMP ready by Oct. 1
						TOP/RICH/CDC					

2015			2016								
10	11	12	1	2	3	4	5	6	7	8	9
VXD Comm.									Summer Shutdown		
	VXD inst.	Physics Run									

Backup

Machine: Injection Noise



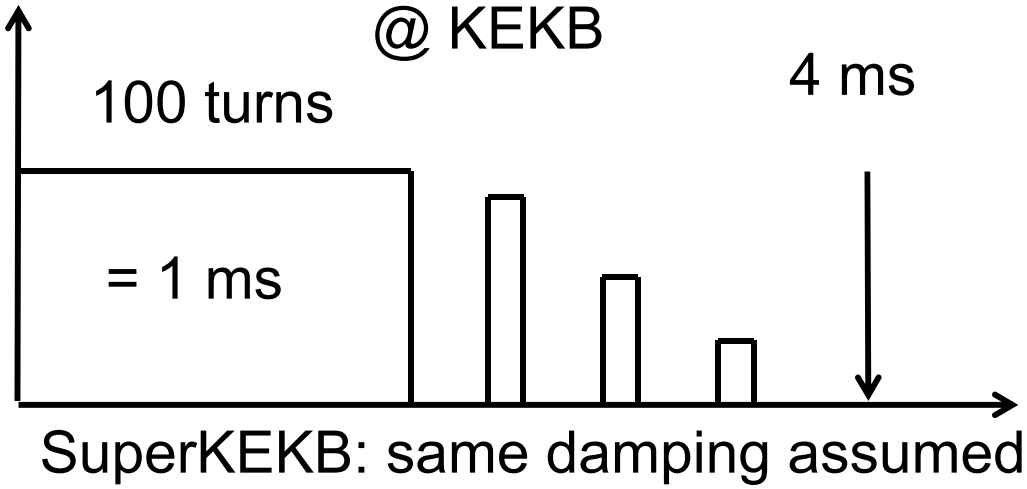
revolution time
= 10 µs

Total rate: 50 Hz

Principle:

continuous injection, developed by KEKB machine physicists

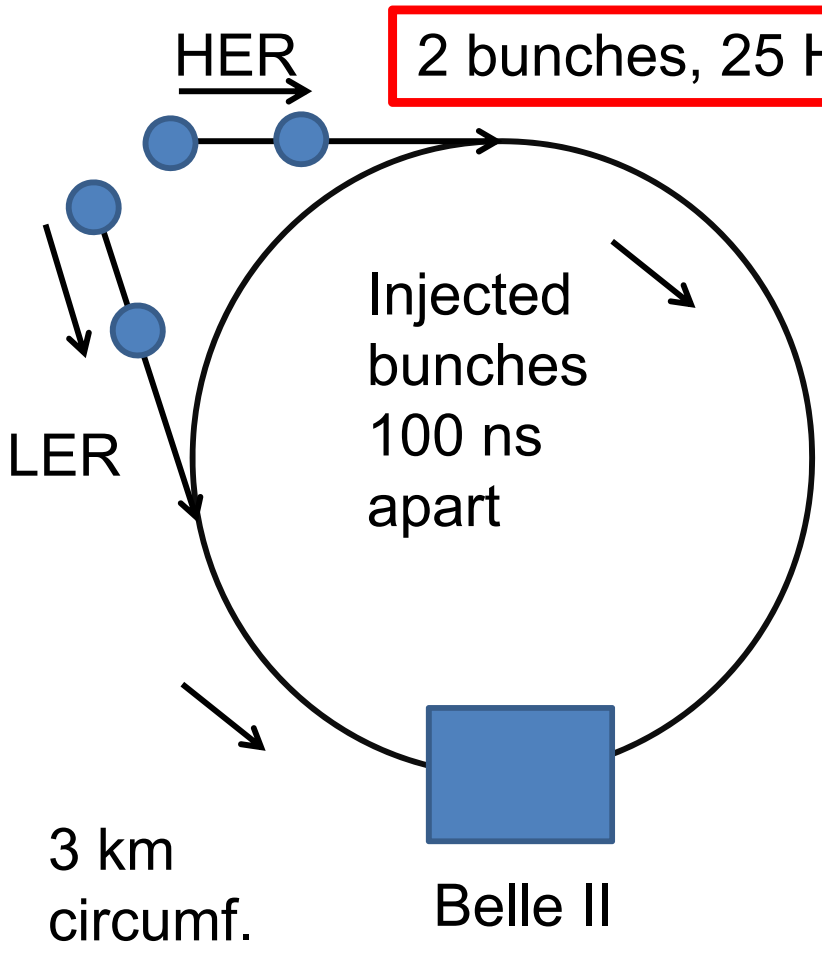
Liouville theorem:
bunches cannot be injected into same phase space volume
-> „cooling“ by synchroton radiation
-> particle loss -> „noisy bunches“

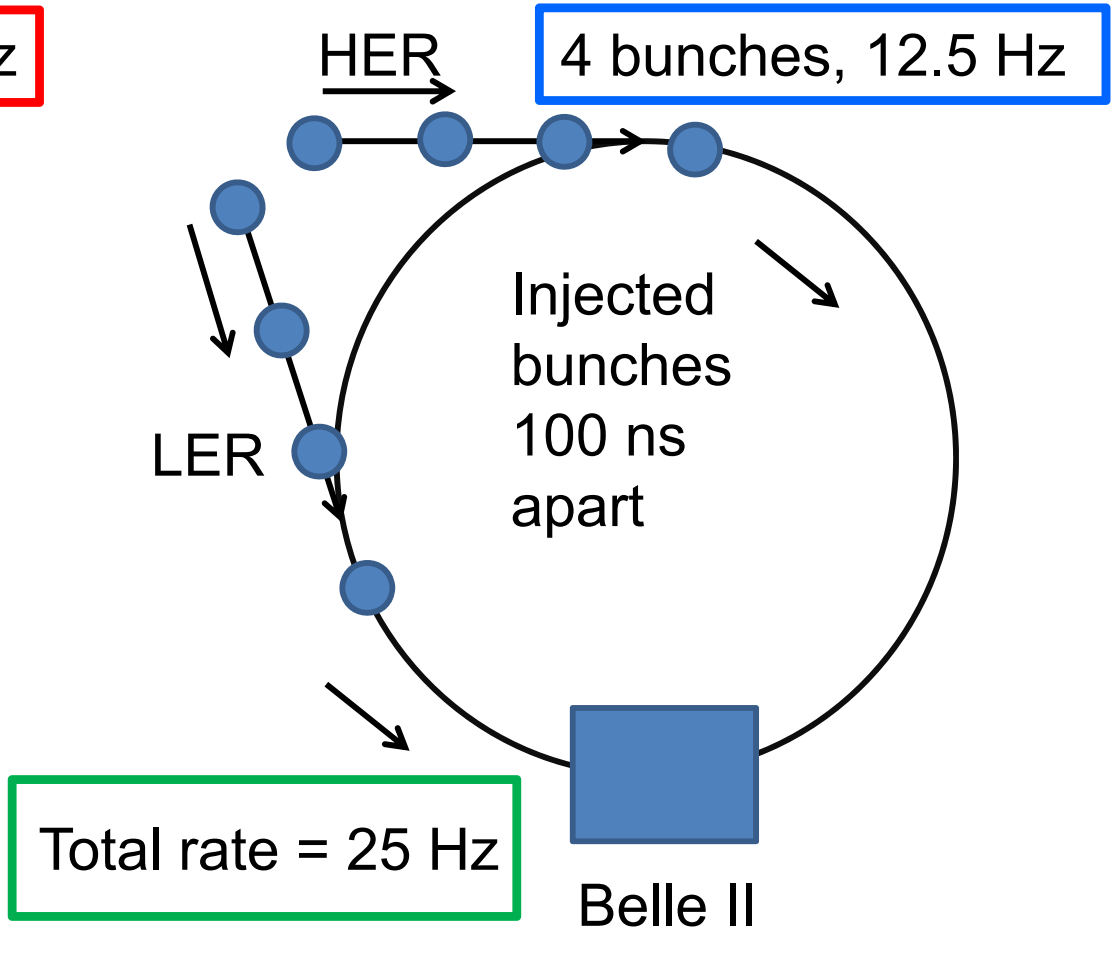


Machine: Injection Noise (cont.)

Three (different) proposals how the machine could help:

1. Inject 4 bunches instead of 2



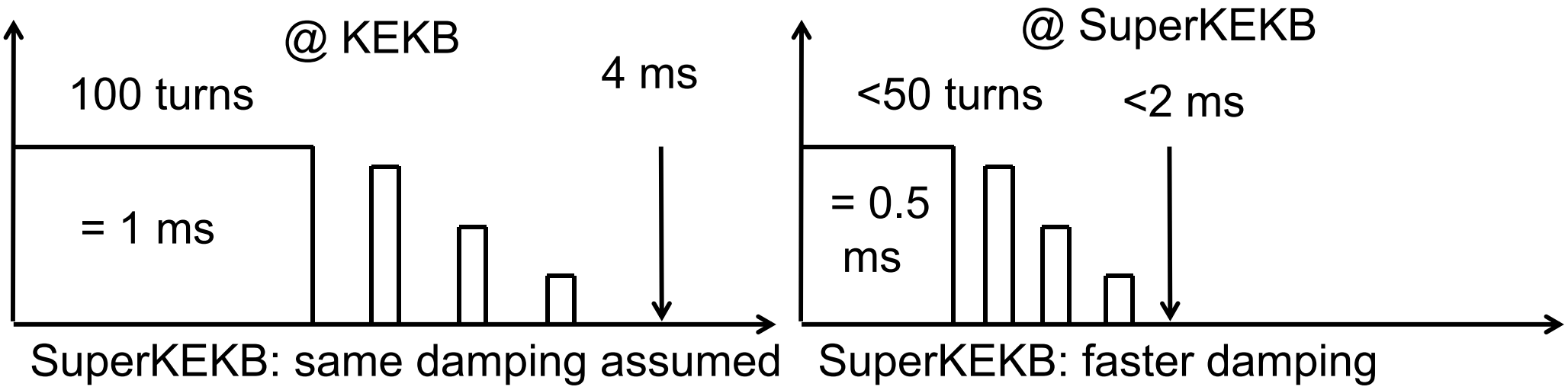


2. Reduce damping time

KEKB: faster damping times were observed, reasons unknown
T ~ O(few 100 µs)

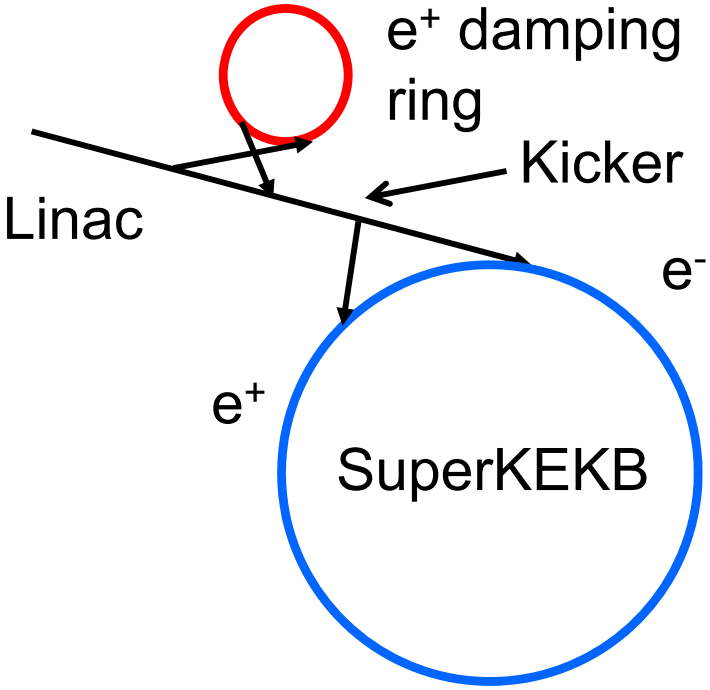
(reason not clear)

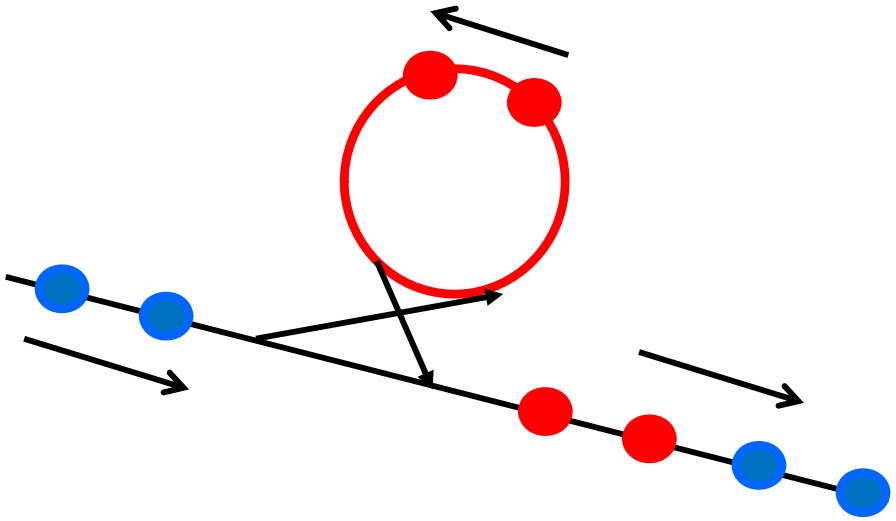
SuperKEKB:
new damping scheme foreseen, using additional synchroton phase oscillation damping



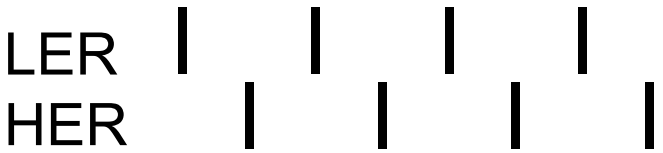
Machine: Injection Noise (cont.)

3. Synchronize injections

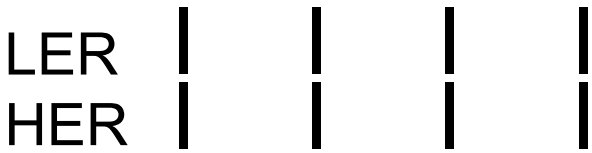




Inject alternatively (50 Hz), but extract from damping ring in phase (same Linac pulse)



Not synchronized -> 50 Hz noise



synchronized -> 25 Hz noise