SVD hardware preparation for DESY beam test

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VXD workshop

The target of DESY beam test

- **System check of a whole procedure in the integrated VXD and DAQ**
  - with the (almost) same setup as phase-2.
    - Important features on phase-3 VXD to be checked are also in phase-2 setup, which is easy to be prepared.

- **Important check items on SVD**
  - A sequence of the data stream and data reduction
    - APV25 → FADC → FTB → COPPER + DATCON
  - Tracking and alignment with the real SVD ladders
    - especially on slanted region
  - Noise on SVD from PXD, and visa versa
  - Stability of FADC readout (Error rate)
  - FOS+NTC Temperature readout, and humidity readout
  - Slow controls
    - FADC readout
    - Online analysis
    - Monitor

Class-B ladder preparation

- **Schedule of class-B ladder completion**
  - L3: Class-C has been completed. Class-B will start after several studies.
  - L4: Production will start just after Oct. B2GM and will take for about 2 weeks.
  - L5: Ready
  - L6: start from the begin of Oct. and will take for about 3 weeks
- **Where should the ladders be sent?**
  - I think DESY. They should be assembled on there.

Site	Site review status (Aug-2015)	final class C - start date	Intermediate SVD/QCG presentation evaluation	class B with new ORIGAMI - start date	Final review for class A	class A - start date
SFW-SBW - Pisa	Qualified for class A	ok	ok	ok	ok	ok
L5 - HEPHY	Qualified for class A	15-Sep	ok	15-Aug	ok	06-Oct
L4 - TIFR	Qualified for class B but additional class C + presentation at QCG needed	30-Sep	date? Mid Oct?	31-Oct	date? Mid Nov?	01-Dec
L6 - IPMU	Qualified for class B but additional class C + presentation at QCG needed	05-Sep	date? End Sept?	06-Oct	date? Beg. Nov?	06-Nov

SVD Cartridge

- **1 ladder / 1 layer**
  - 4 ladders in total
- **The installation direction is +X**
- **B-class ladders before mass production will be used.**
  - because of limited number of spare A-class ladders
- **CO2 cooling will be performed as a study and practice for phase-3.**
- **Space has to be shared with PXD and monitor sensors.**

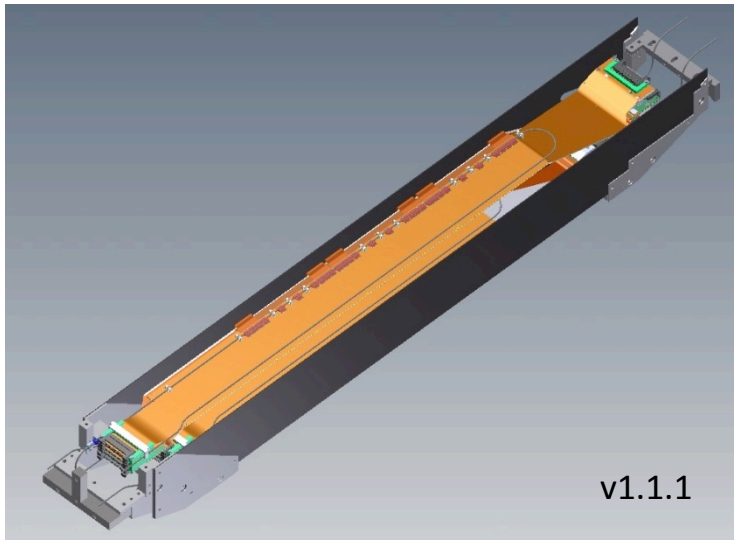
TWiki for SVD phase-2 commissioning

- **Same end-rings cannot be used any more.**
- **Limited cabling service space.**

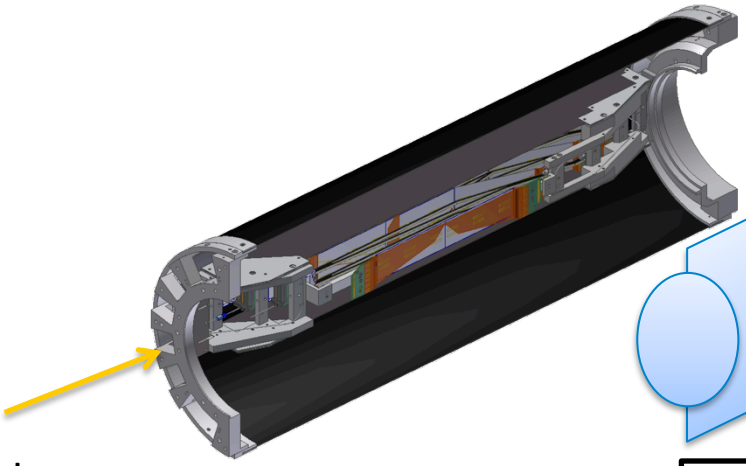
- **"SVD cartridge" would be a good solution for phase-2.**

- **Finalization of design: by the end of Sep.**
- **Production: finish by the end of Nov.**

SVD Cartridge



SVD support structure



Put PXD inside beforehand

Window for beam and PXD

Fill EPDM rubbers to close the cable hole

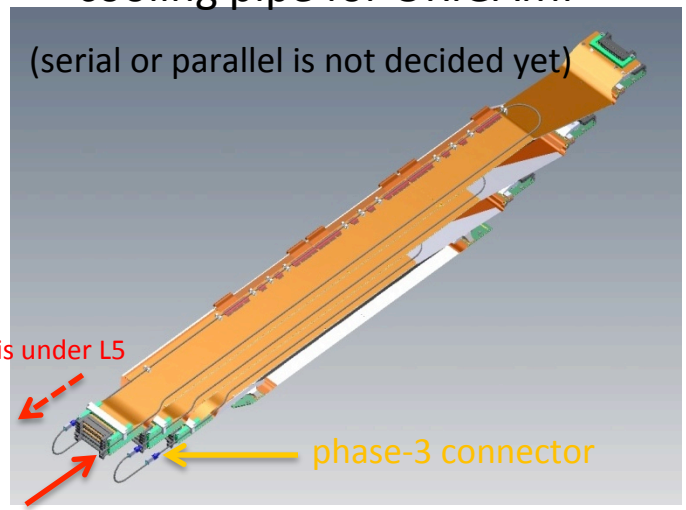
Just a draft idea

- **We use Endflange and CFRP outer cover for SVD support.**
  - Enclose the structure for dry volume
  - Light shielding
  - PXD support structure (make the beam line material-free)
- **Have to be in the solenoid magnet**
  - rotated together with the magnet
  - How large angle can it be rotated?
- **Who will take care the structure for beam test?**
  - Decision of the design needs discussion with PXD group.

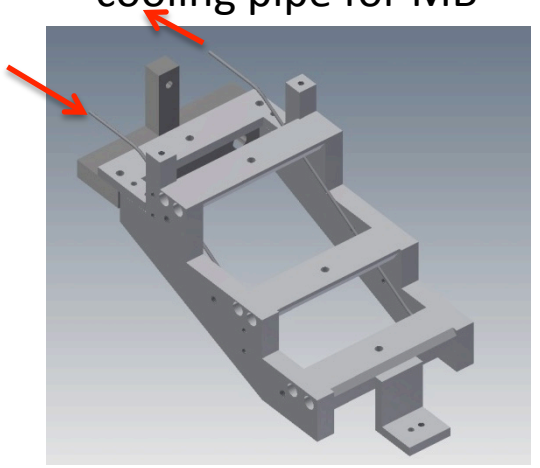
Cooling Pipes on SVD Cartridge

- **The current issue is the routing of the cooling pipes.**
  - ORIGAMI cooling pipe outer diameter: 1.6mm
  - For the support structure cooling, we will use larger diameter cooling pipe, which is bent easily.
- **We use Swagelok connectors for the pipe connection.**
  - The connector is large and we have to think about their positions.
- **Serial or parallel connection of ORIGAMI cooling pipe is under discussion**

cooling pipe for ORIGAMI

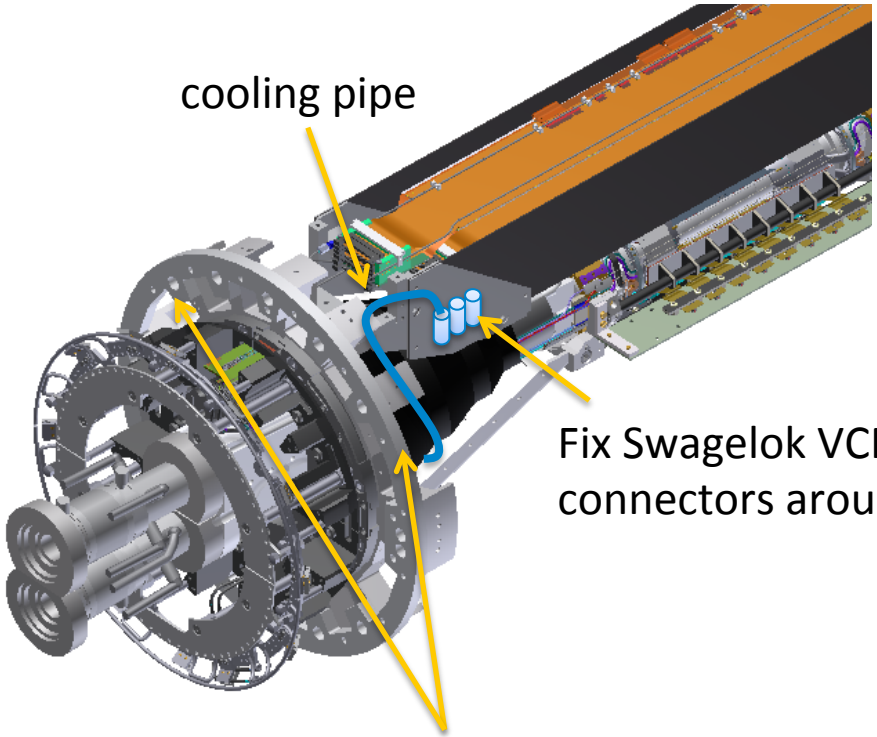


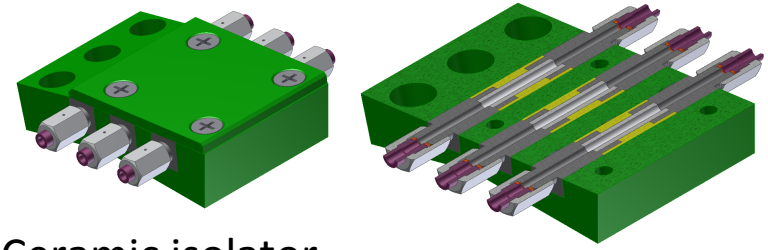
cooling pipe for MB



Cooling pipe connection to outside of Endflange

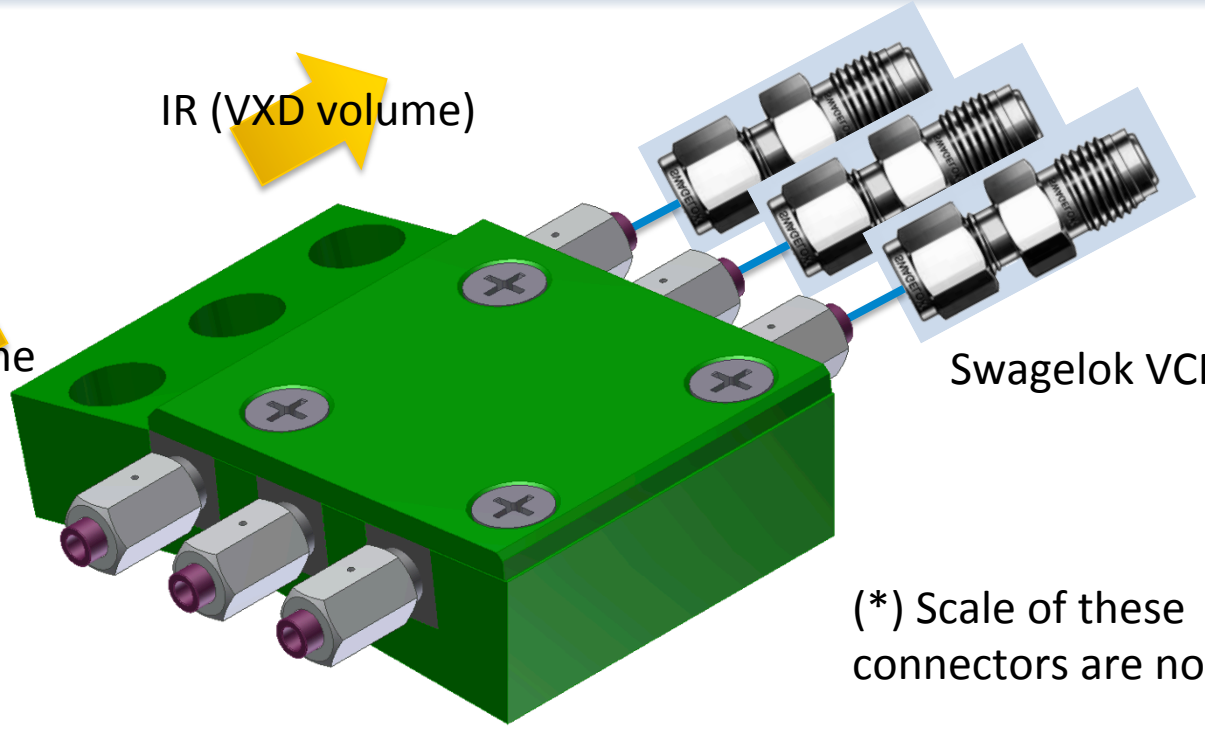
- **Ceramic isolators will be put on Endflange same as phase-3.**
  - FWD: 1 x 2(inlet/outlet) channels
  - BWD: (1 + 1-3) x 2(inlet/ outlet) channels
    - 1: serial, 3: parallel ORIGAMI pipe connection
  - 3 cooling channels can be covered by a ceramic isolator
  - → 1(FWD) and 2 or 3(BWD) ceramic connectors are necessary.
    - In total, 3 or 4 connectors
  - will be prepared by DESY group by the beam test (March, 2016).





Ceramic isolator

Idea from Florian



- **Idea**
  - ask DESY group to put Streuli VCR connectors with short pipes beforehand on the ceramic connector.
  - We don't need to take care the Streuli VCR connectors.

Schedule of SVD structure assembly

2015	Sep.	Finalize SVD cartridge design and start production
	Oct.	22nd B2GM; Production of SVD cartridge
	Nov.	**2nd trial of outer cover gluing (beam test)**
	Dec.	Cooling pipe production
2016	Jan.	
	Feb.	23rd B2GM; **Endring gluing (FWD/BWD phase-3 Endring)**
	Mar.	DESY beam test; CMM measurement for the glued FWD-BWD phase-3 Endring
	Apr.	DESY beam test; CMM measurement for the glued FWD-BWD phase-3 Endring
	May.	**3rd trial of outer cover gluing (phase-2)**; **Outer cover gluing (phase-3)**
	Jun.	24th B2GM

Schedule of readout debugging

- **SVD readout chain**
  - APV25 → FADC → FTB → COPPER+DATCON
- **Items to be developed**
  - implementation of new B2Link and B2TT
  - Check of data flow with the latest (almost final) components
    - Hopefully, redesigned FADC is available
  - EPICS control of FADC controller

- **In the last beam test, all the relevant members worked together at HEPHY and debugged them from 2 months ago.**
  - Shorter time (1-1.5 months) may be enough because we already have well developed system.
  - Can we do the chain test at DESY? Or better at HEPHY?

Power supply

- **CAEN poser supply is used**
  - Noise check (interference with PXD)
- **CAEN PS modules will be delivered from KEK.**
- **Small crate would be necessary.**
- **Will we test a filter circuit made by HEPHY?**

Who can participate to the beam test?

Contact person from SVD

tasks	contact person (deputy)	adviser	related persons	communication w/ outer group
SVD support structure assembly	K. Nakamura	T. Kohriki	F. Buchsteiner (mechanics), T. Higuchi(ladder), F. Bosi, N. Sato	PXD
VXD assembly preparation	S. Tanaka	T. Kohriki	T. Tsuboyama (SVD assembly),	PXD
KEK SVD CO2 management	T. Tsuboyama	S. Tanaka	F. Buchsteiner (mechanics)	IBBelle, KEK facility
SVD DAQ preparation	K. Nakamura	M. Friedl	M. Friedl (electronics), R. Thalmeier, H. Yin, S. Bacher	DAQ, DATCON
Tsukuba B1 management	K. Nakamura	T. Tsuboyama	F. Buchsteiner (mechanics), T. Tsuboyama (SVD assembly), M. Friedl (electronics)	PXD, KEK facility
DESY beam test preparation	C. Irmler? (tentatively)		L. Vitale (monitor), M. Friedl (electronics) K. Nakamura	PXD, DAQ
SVD phase-2 commissioning preparation	K. Nakamura (communication with machine group)	S. Tanaka	L. Vitale (monitor), F. Buchsteiner (mechanics), M. Friedl (electronics)	PXD, DAQ, BEAST
VXD cosmic commissioning preparation	K. Nakamura	T. Tsuboyama	M. Friedl (electronics) and many others	PXD, DAQ, IBBelle

But Christian might be too busy for ladder assembly…

We should think who is a proper person…