

# Sailing Towards Phases 2 and 3: calibrations and tests for SVD/VXD in Trieste



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*Belle II* Italia, Trieste 05/05/2017

# Reminder: ongoing activities

SVD DSSD  
microstrip sensors

FOS temperature  
sensors & readout

Radiation monitor  
sensors & readout

NTC temperature  
sensors & readout

Dew Point sniffers  
sensors & readout

VLHI  
VXD Local Hardwired Interlock

# Some highlights only

SVD DSSD \*  
microstrip sensors

FOS temperature  
sensors & readout

Radiation monitor \*  
sensors & readout

NTC temperature \*  
sensors & readout

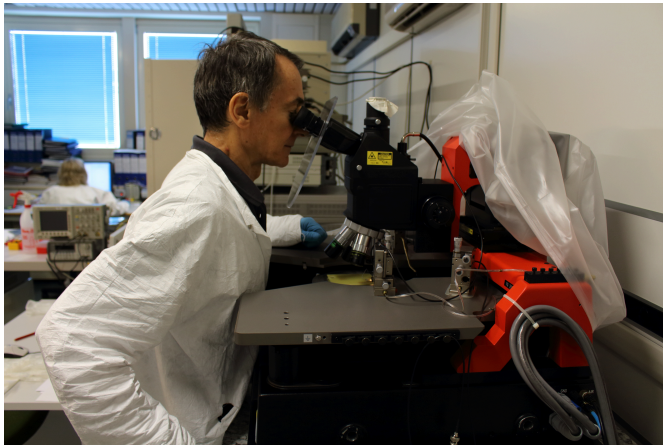
Dew Point sniffers  
sensors & readout

VLHI \*  
VXD Local Hardwired Interlock

# DSSD sensors tests for SVD

- Supposedly terminated two years ago, recently more requests for tests, still ongoing  
verification/recovery of HPK Layer4 sensors  
Micron sensor tests and repair (done)  
3 small + 14 large HPK sensors to be tested

L.Bosisio

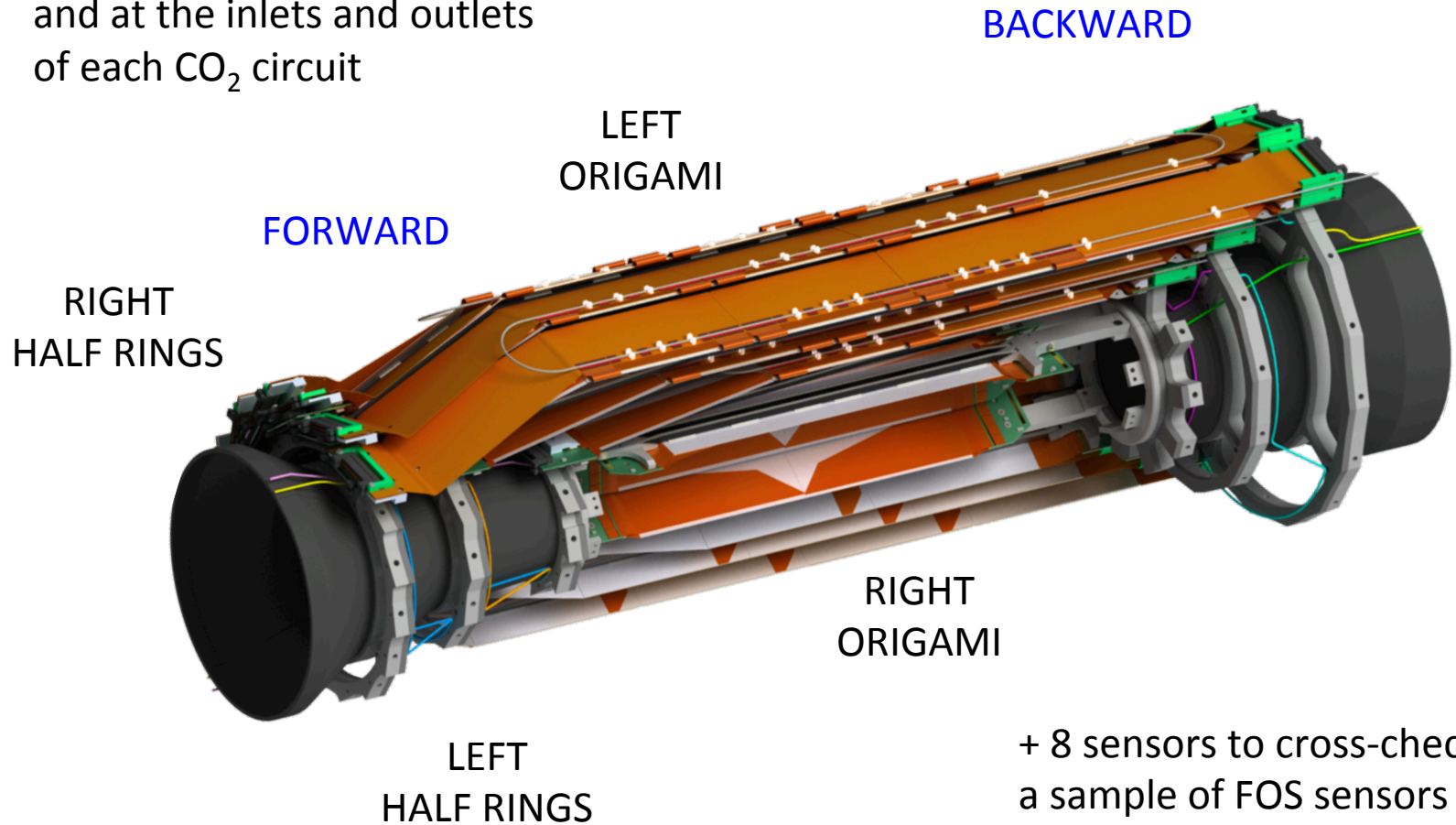


L.Rashevskaya



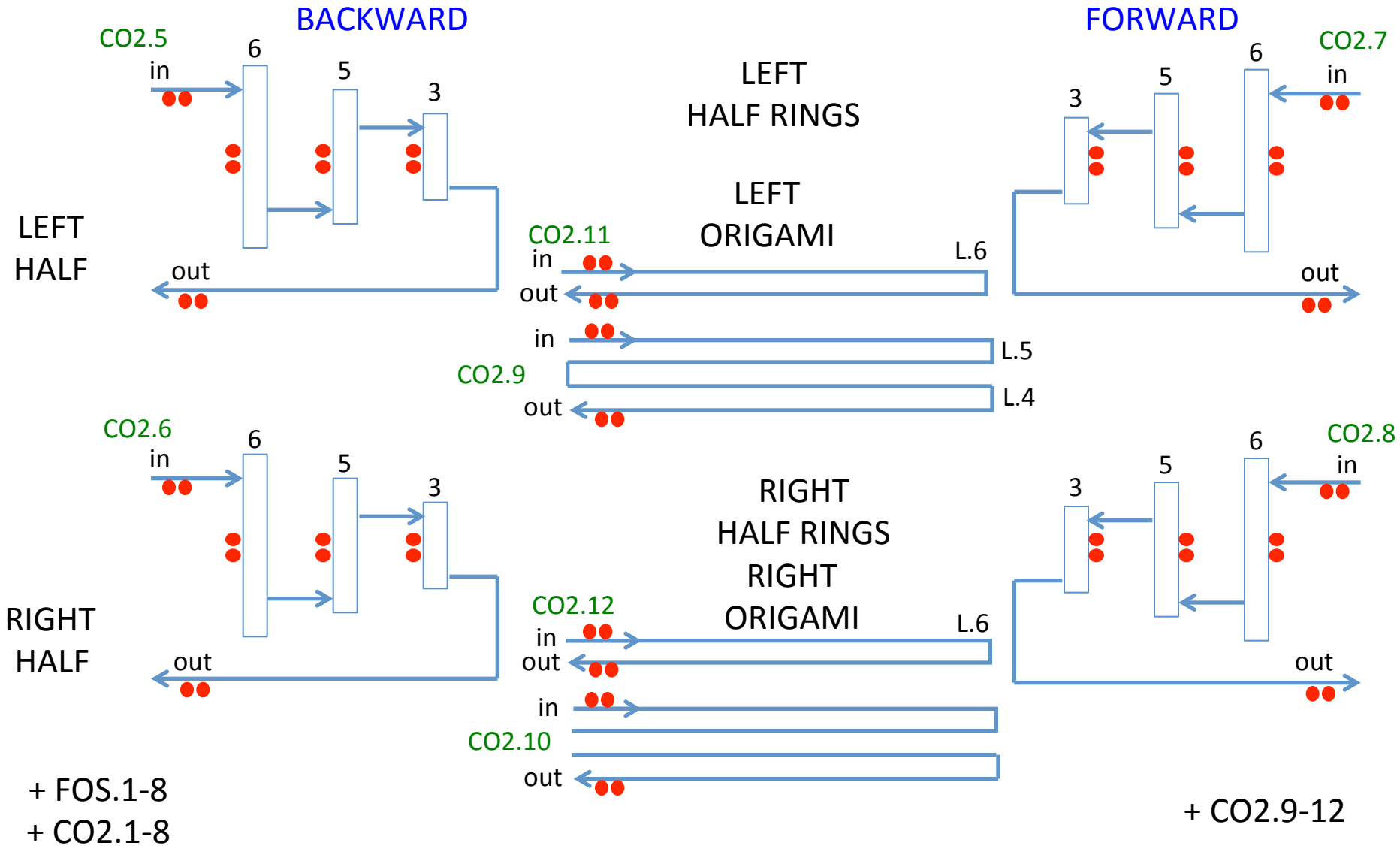
# CO<sub>2</sub> cooling system: monitoring

Temperatures of the half rings  
and at the inlets and outlets  
of each CO<sub>2</sub> circuit

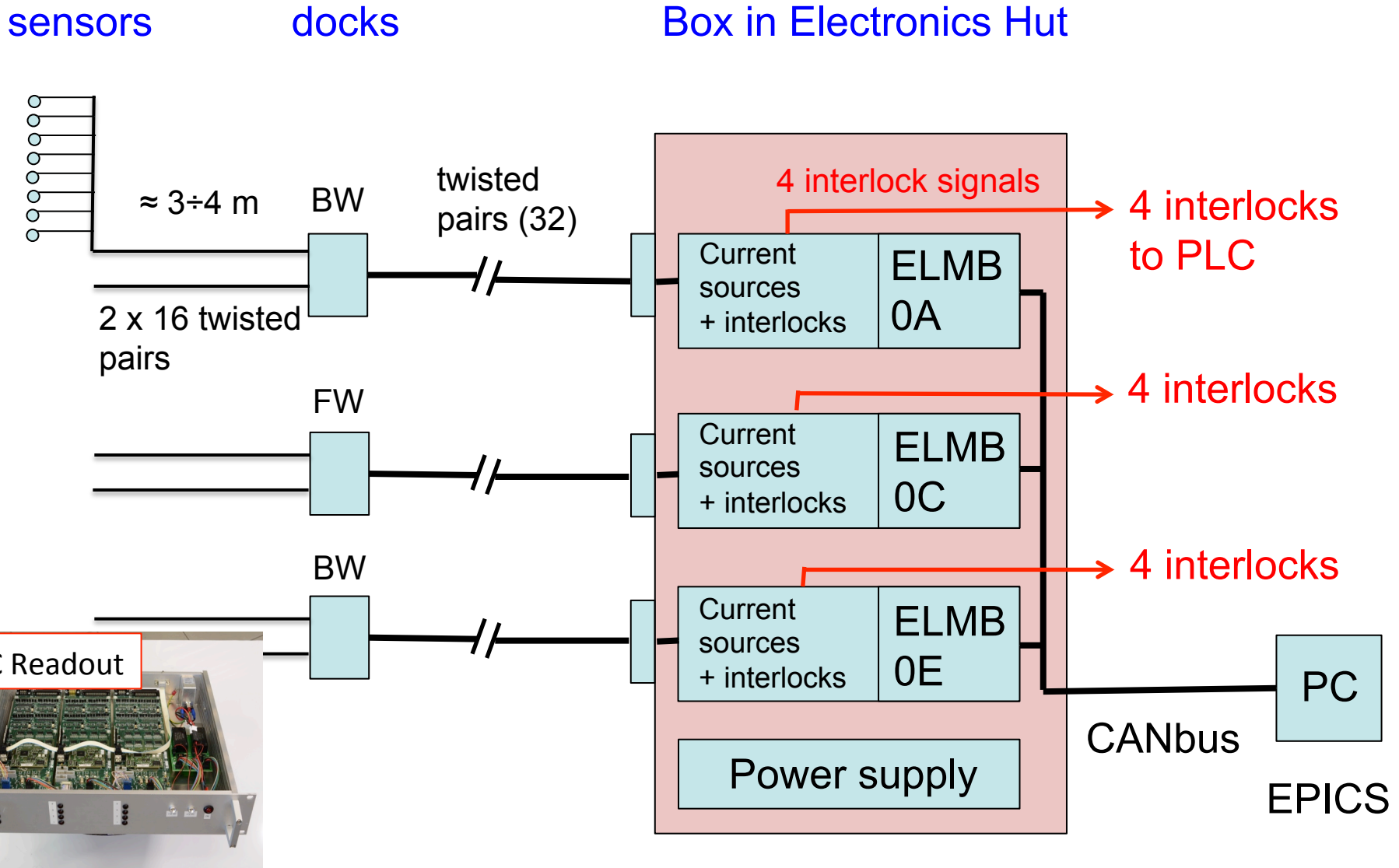


+ 8 sensors to cross-check  
a sample of FOS sensors  
+ 12 for CO<sub>2</sub> in the external circuits,  
requested by the CO<sub>2</sub> group

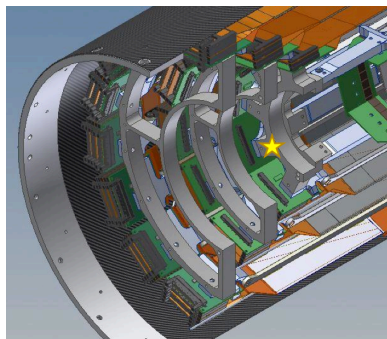
# NTC final configuration for Phase 3



# NTC read out for Phase 3

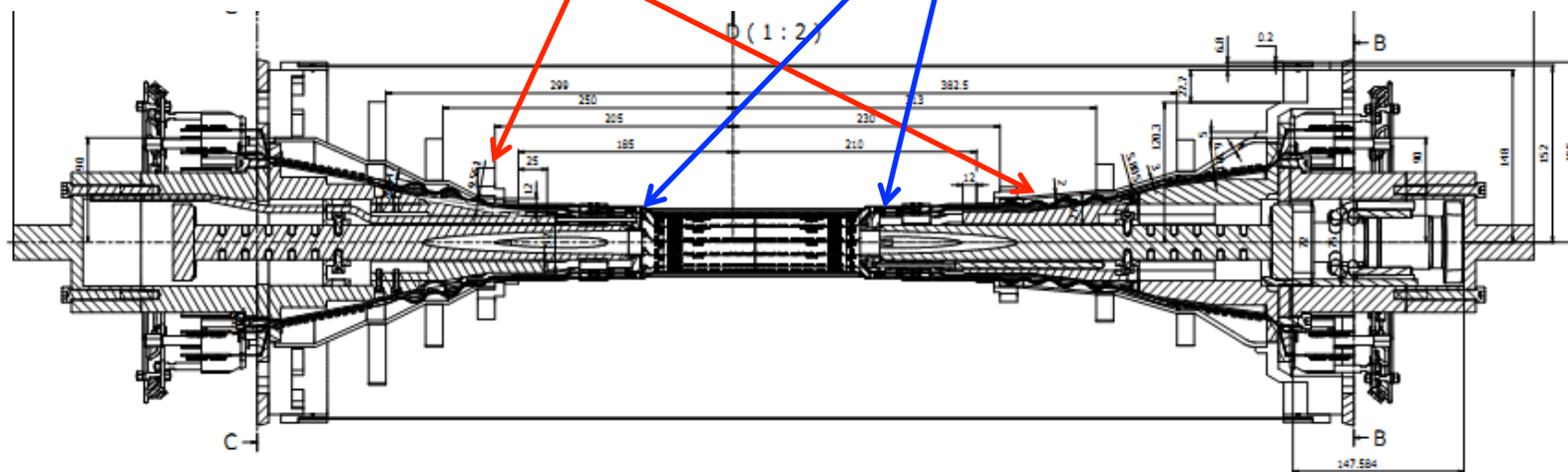
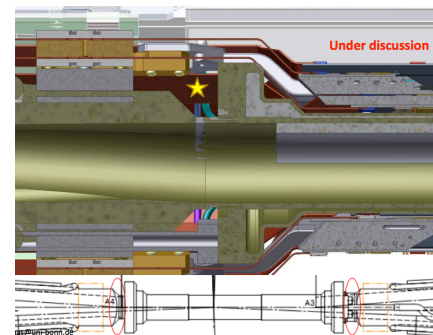


# sCVD Radiation Sensors: Phases 2 and 3



6 + 6 sensors  
close to SVD L3  
support rings

4 + 4 sensors  
PXD-beam pipe



Now: assembling  
+ test, calibration  
1-2 weeks/sensor

*Phase 2: 8 "PXD" sCVD sensors*  
*Phase 3: 8 "PXD" + 12 "SVD"*

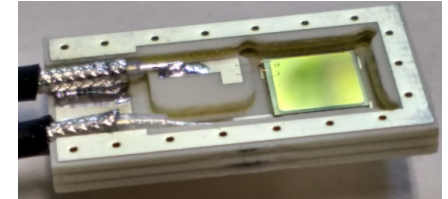
*In parallel !*



# sCVD sensors: assembly, tests, calibration

- **Package preparation:**

HV test, sensor gluing, cables soldering/gluing,  
I-V in the dark



- **Transient Current Test (TCT) with alpha source**

fast amplifier + fast oscilloscope

sCVD crystal quality, electrons/holes transport parameters

- **Beta source (3 MBq):**

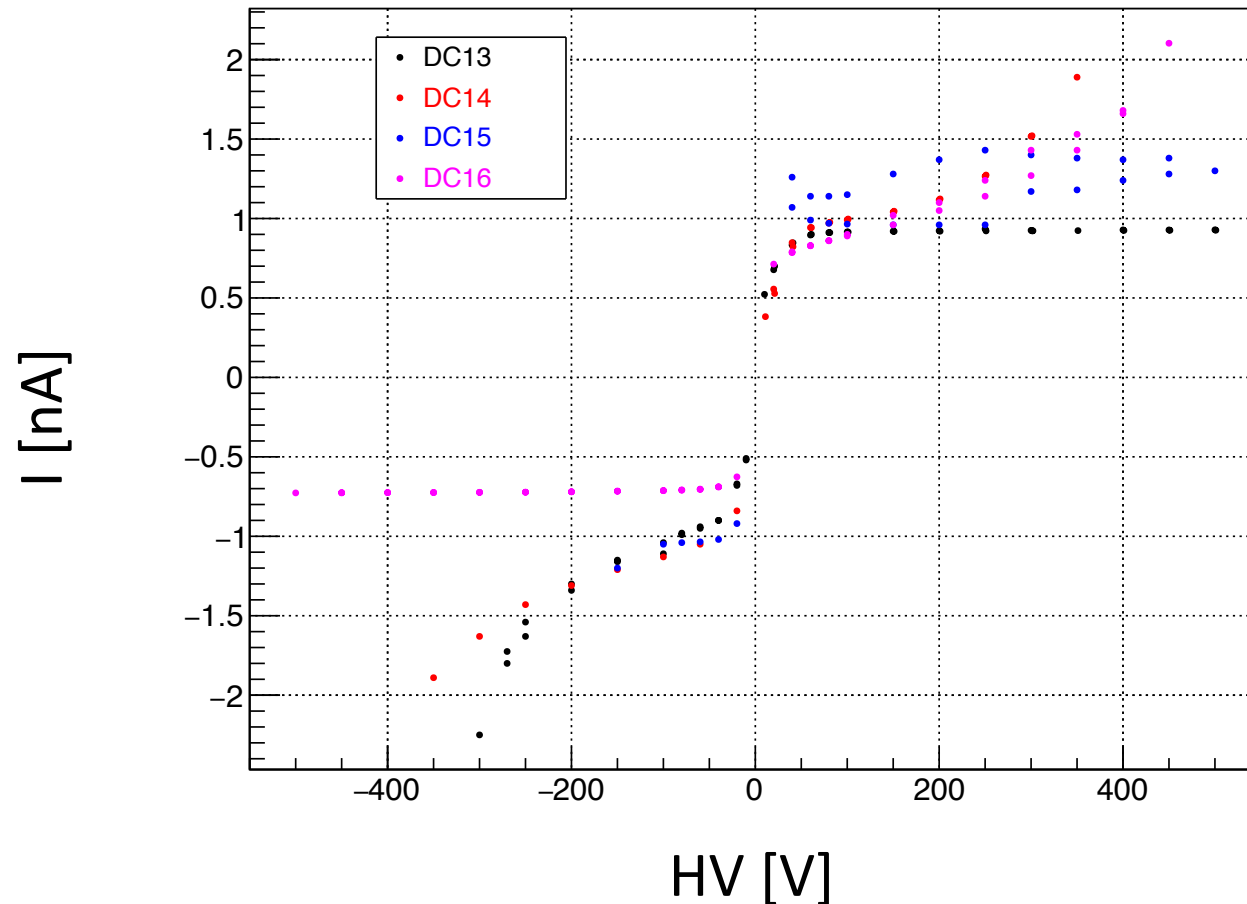
Priming/pumping to fill-in traps

Stability tests at “high” current (about 1 nA)

Calibrations: current vs particle flux (realized by changing the source distance), comparison with Fluka simulation and film dosimeters

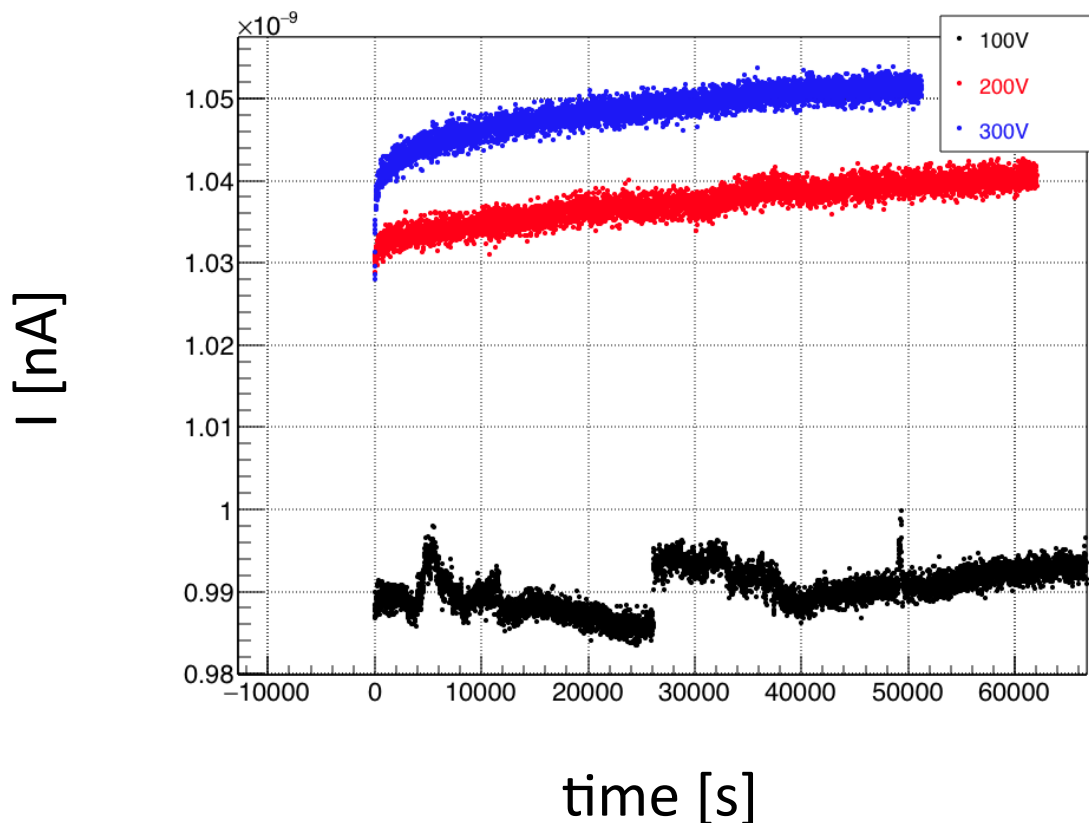
# Examples from 12 tested sensors - 1

I-V measurements: sCVD crystals are not all equal!



# Examples from 12 tested sensors - 2

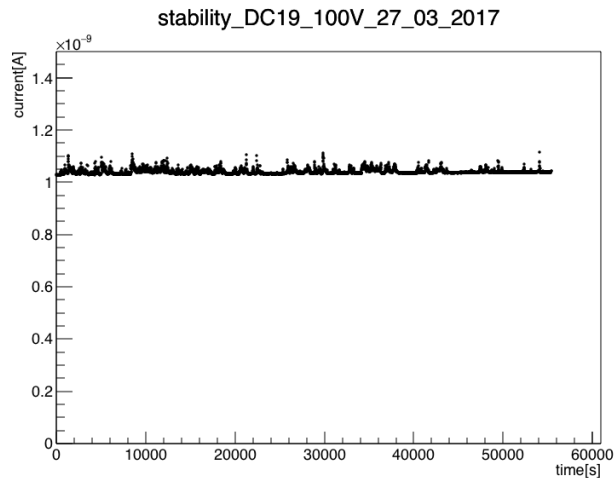
Priming/stability studies at different HV values for one specific sensor



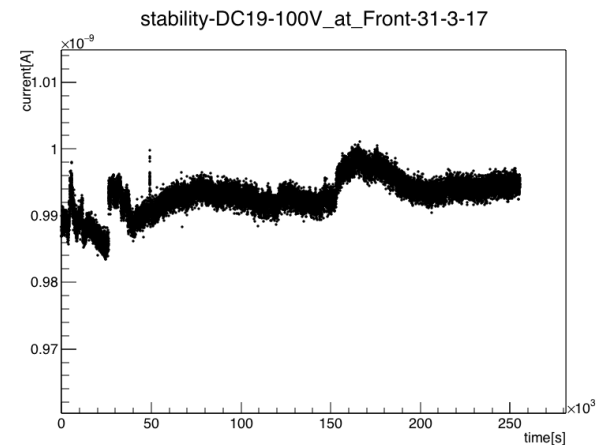
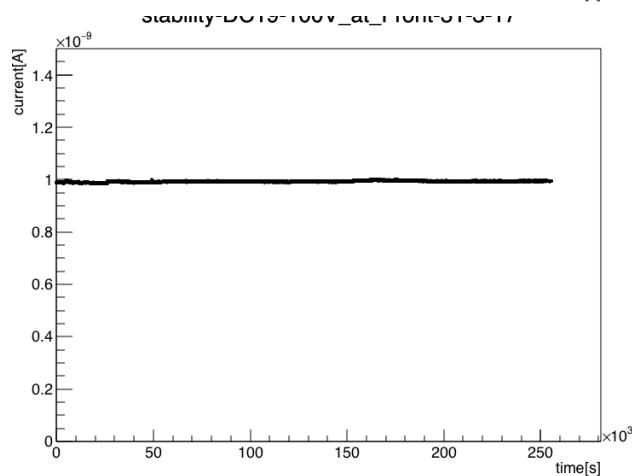
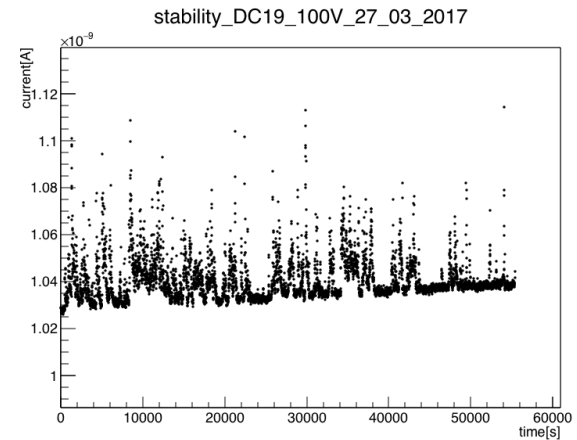
# Examples from 12 tested sensors - 3

stability studies at about 1 nA: not all diamonds are perfect

I [nA]



zoom

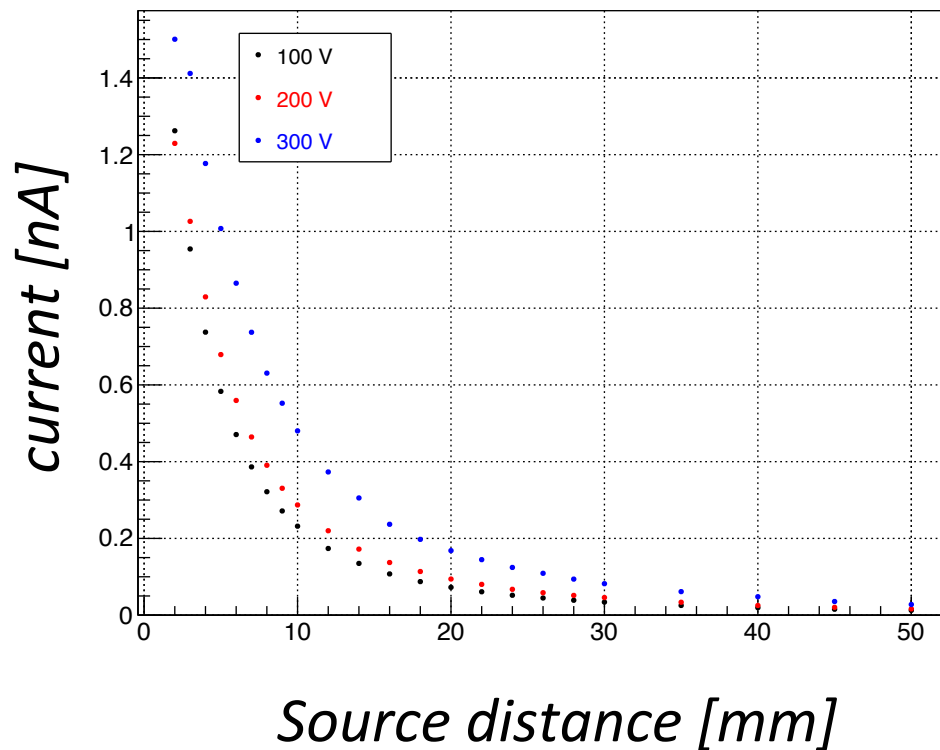


time [s]

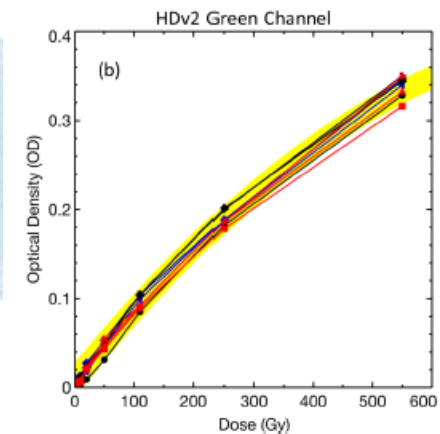
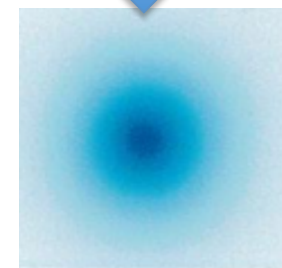
time [s]

# Examples from 12 tested sensors - 4

*Calibrations:* extracted from the sCVD current vs source distance, at different HV value and polarity, compared with FLUKA simulations  
*New:* also radiochromic film dosimeters, collaboration with Naples

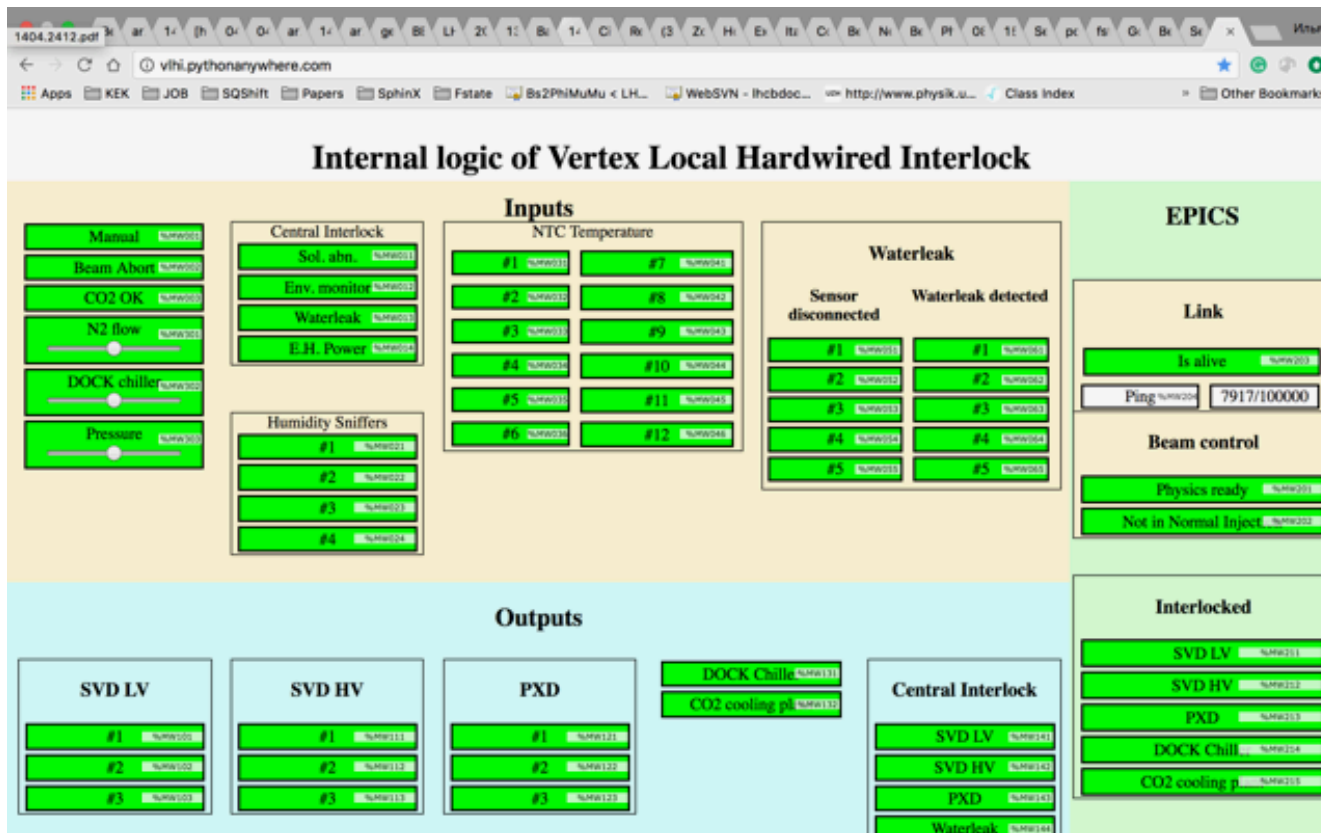


Dose range: 3 kGy- 100 kGy



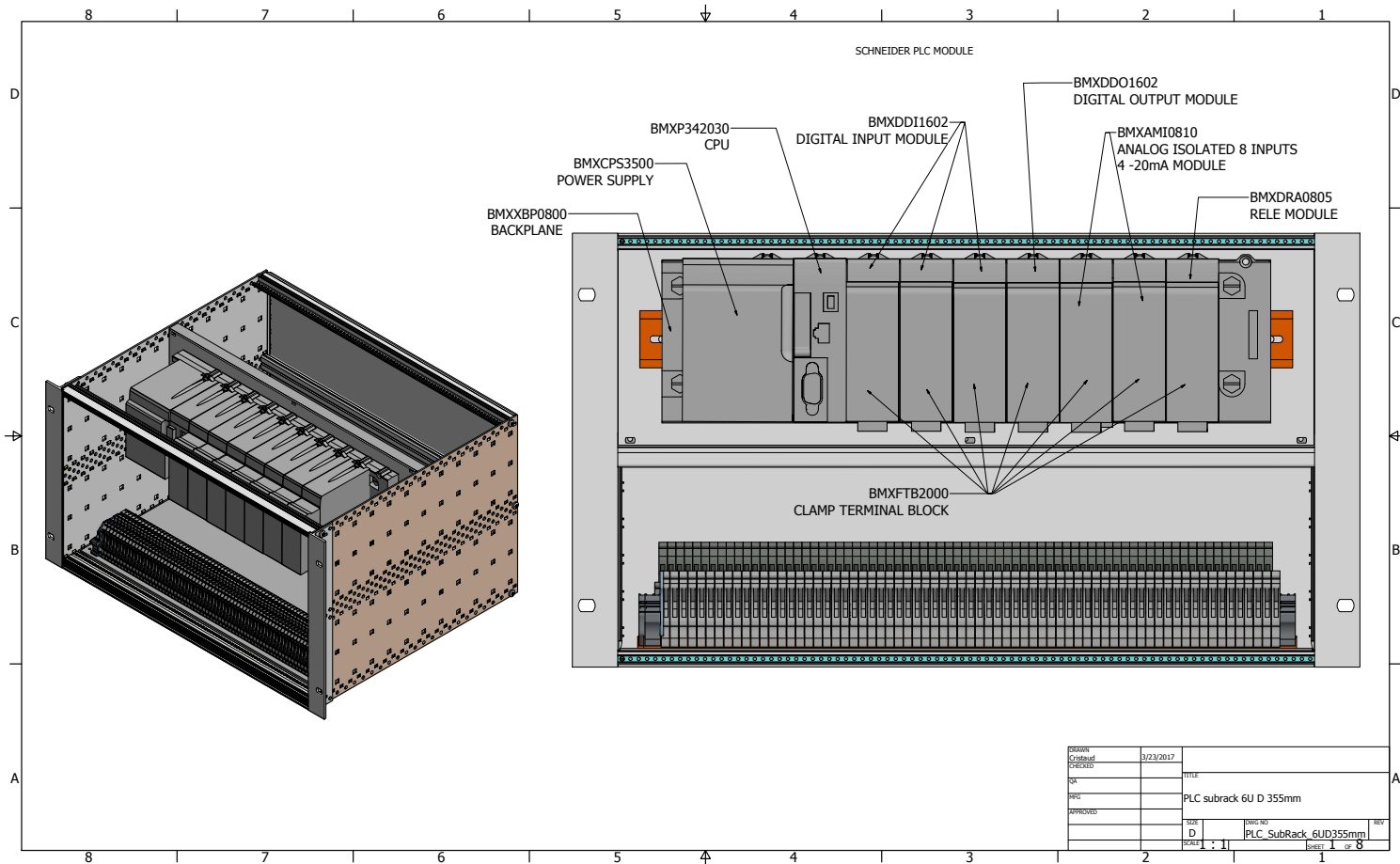
# VXD Hard-wired Interlock - 1

*Ilya Komarov*: from conceptual design to detailed specifications;  
inputs, outputs, SVD and PXD power supplies interlock conditions  
Schneider PLC implementation (programming) and simulations



# VXD Hard-wired Interlock - 2

*Pietro Cristaudo*: hardware configuration design  
 Components from RS: purchase in progress



# Conclusions

SVD DSSD

microstrip sensors

Generally “on-track”;  
non-trivial compatibility  
with the work at KEK for:

FOS temperature sensors & readout  
Position monitor sensors & readout

NTC temperature sensors & readout  
- SVD ladder mount  
- Phase 2 installations  
- Phase 3 preparations  
Point sniffers  
sensors & readout

VLHI

VXD Local Hardwired Interlock