

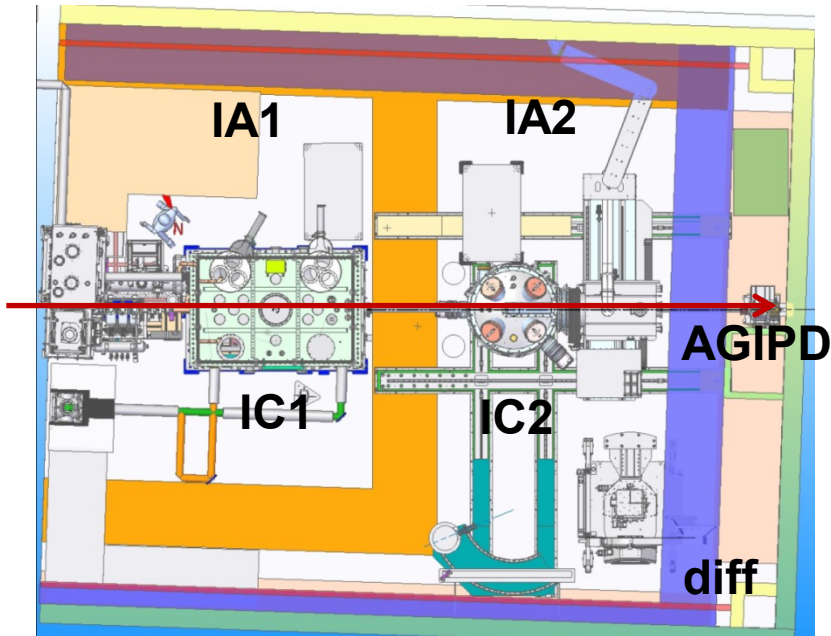
News from interaction area 2

precision diffraction experiments exploiting the energy range, peak brilliance and time structure of eu.XFEL

C. Strohm on behalf of HIBEF
XFEL users meeting 22.01.2019.

interaction area 2

a multi purpose area



Top view of the HED Hutch

HIBEF contributions

- > interaction chamber 2 (DESY)
- > DAC setup (DESY)
- > shock setup (DESY)
- > nanofocusing and PCI (DESY)
- > detector bench and rail system (DESY)
- > detector systems (DESY)
- > pulsed magnets and diffractometer (HZDR & DESY)

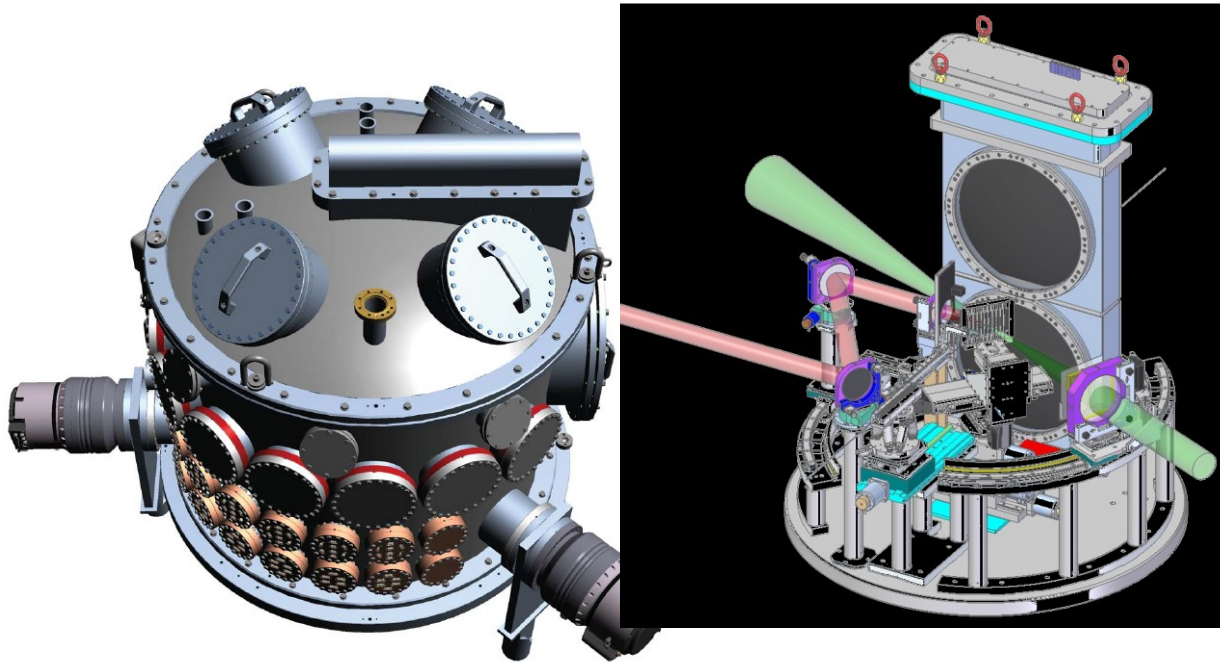
interaction area 2

overview

- > interaction chamber 2
- > AGIPD detector
- > detector bench
- > rail system
- > diffractometer and pulsed fields

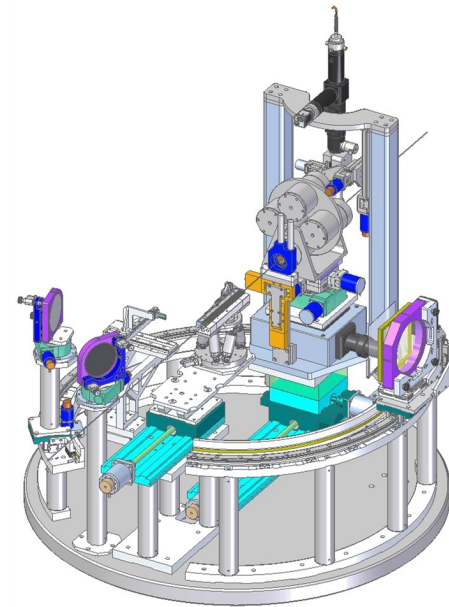
interaction chamber 2

one chamber, multiple setups

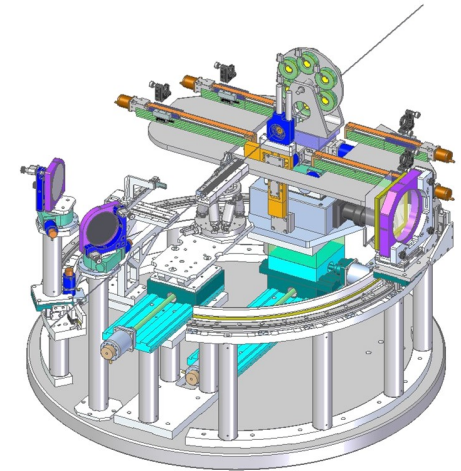


> chamber

> shock



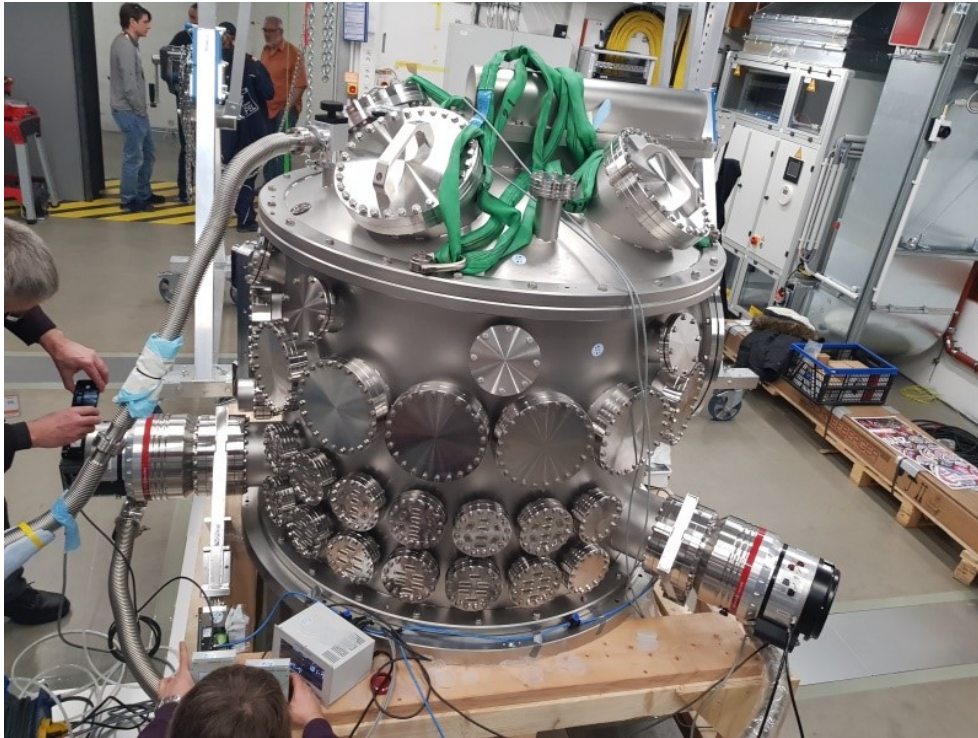
> dDAC, dsDAC



> LH-DAC

Interaction chamber 2

vacuum chamber

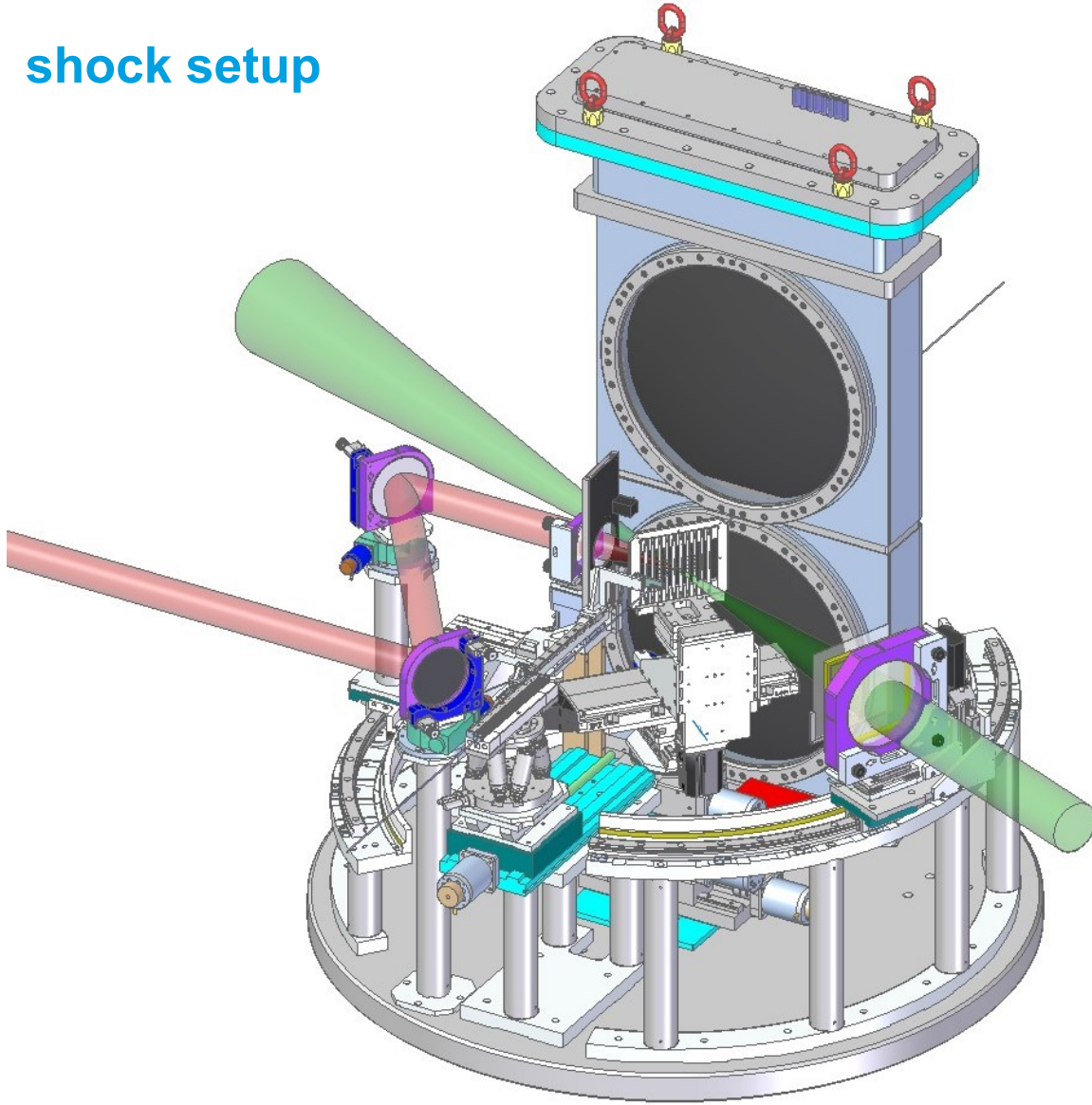


status vacuum chamber

- > design defense: 30.08.17
- > FAT: 10.12.18
- > SAT: ongoing
- > support structure: 23.01.19

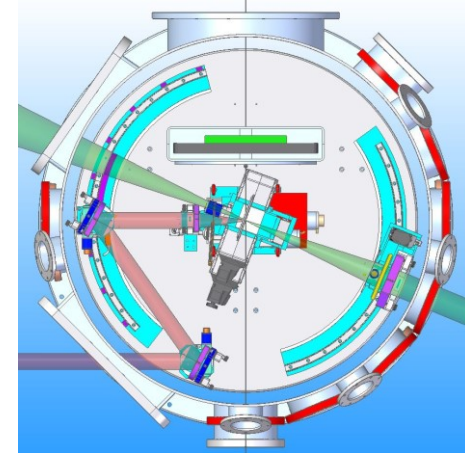
interaction chamber 2

shock setup

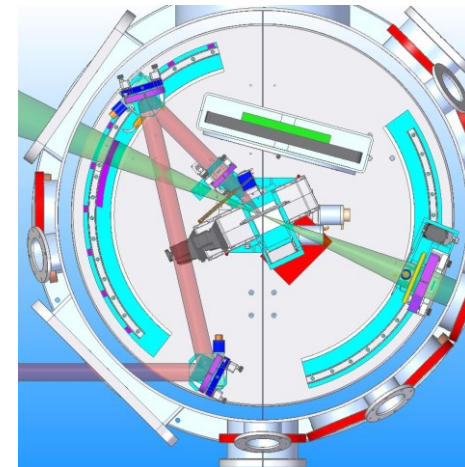


different shock geometries

> perpendicular

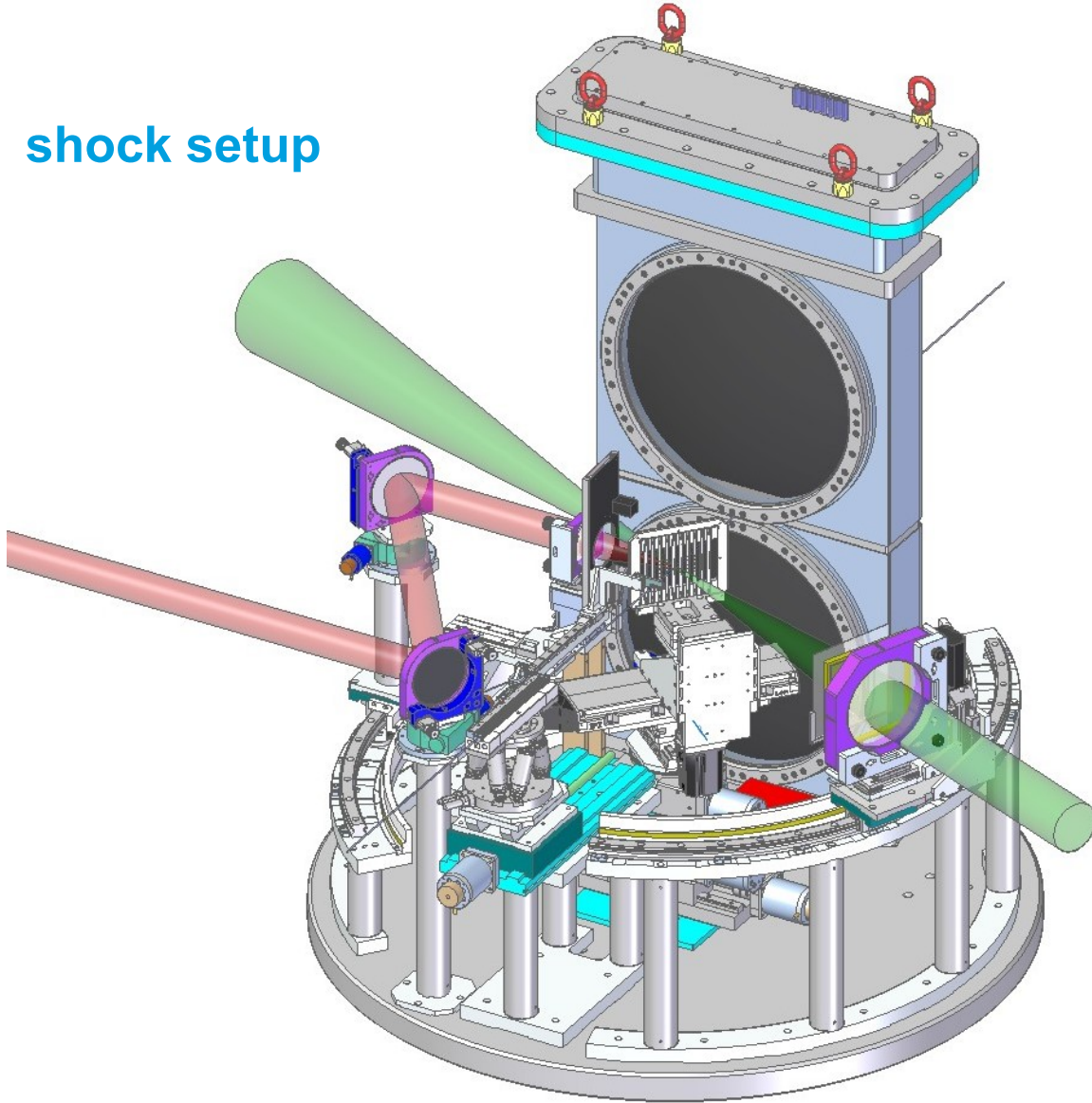


> colinear

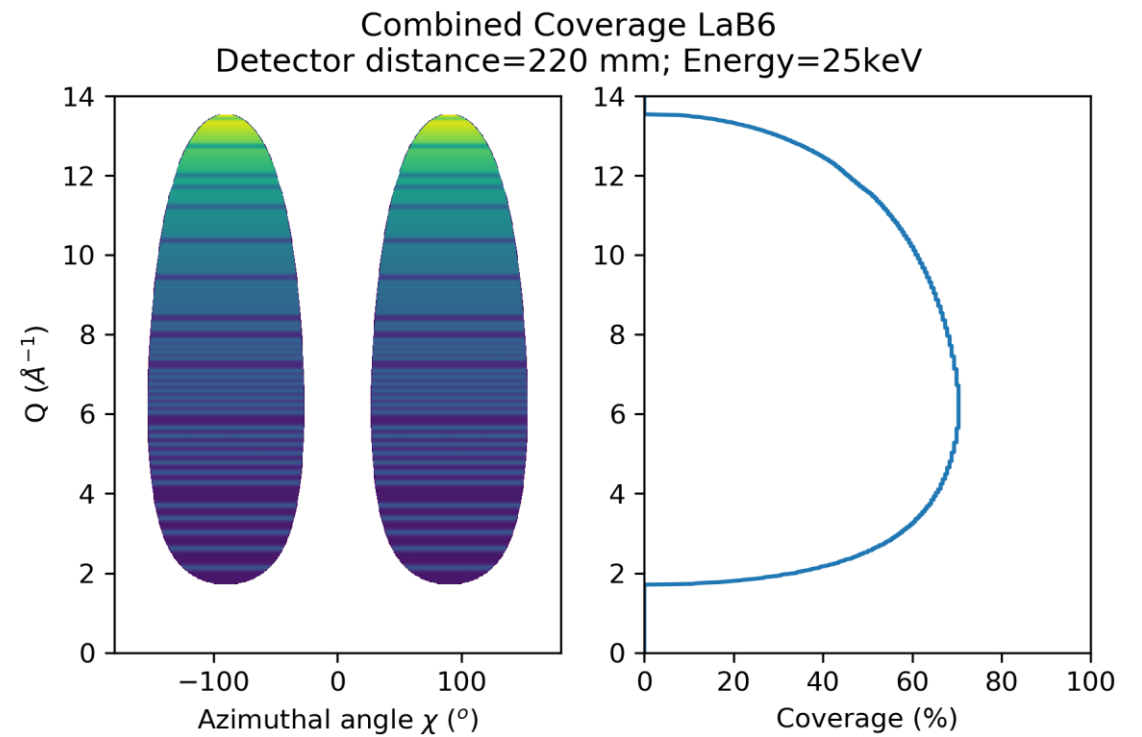


interaction chamber 2

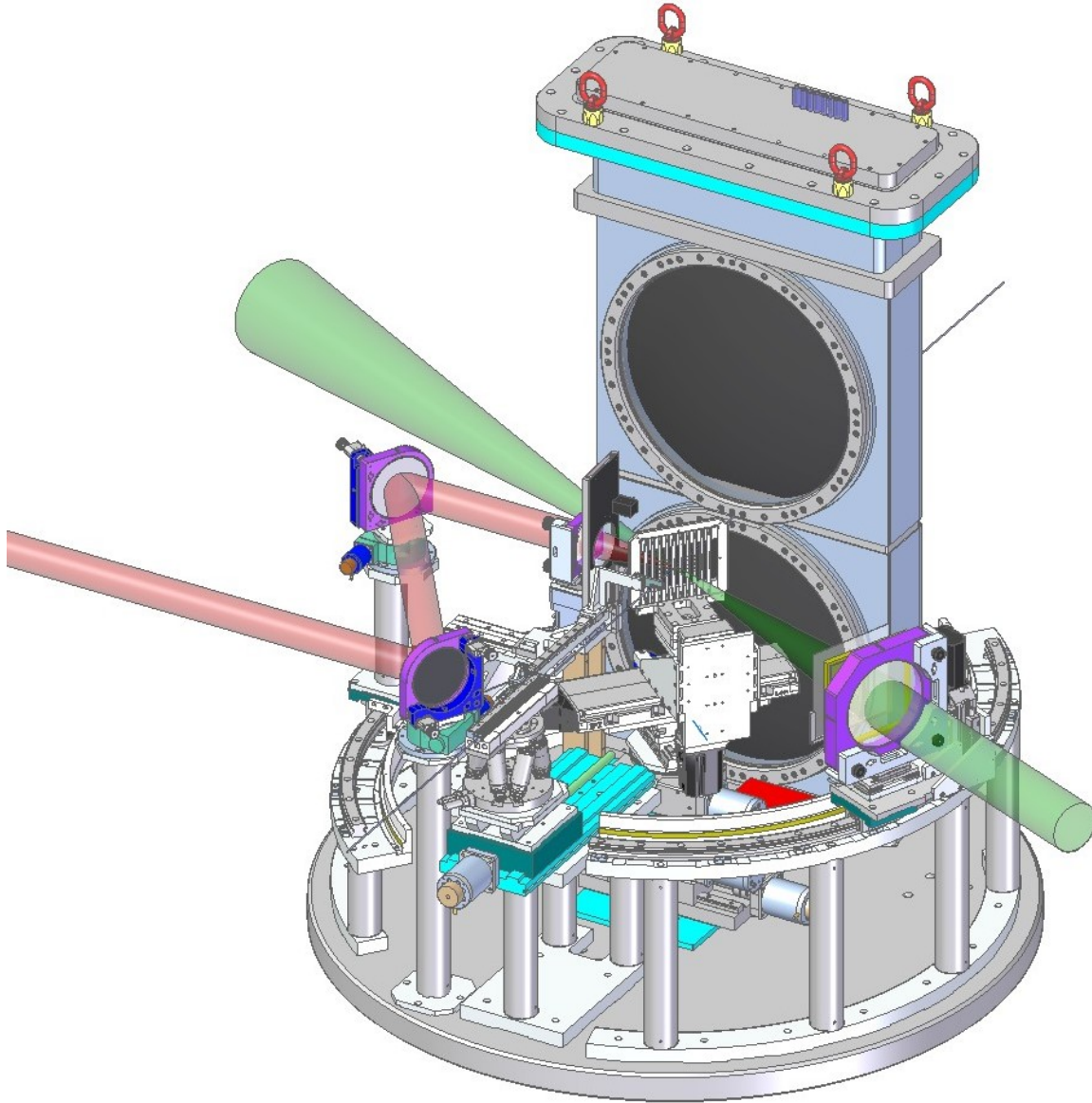
shock setup



coverage on 2 Varex 4343 CT
(perp. config.)



interaction chamber 2

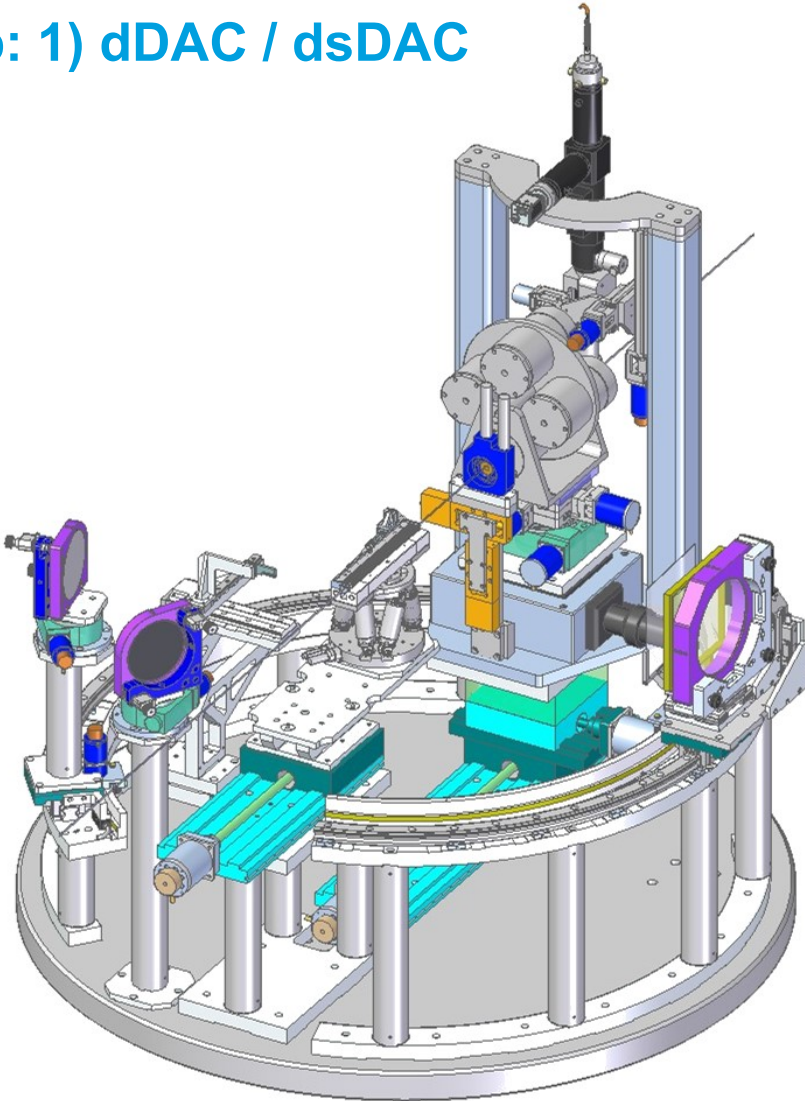


status shock setup

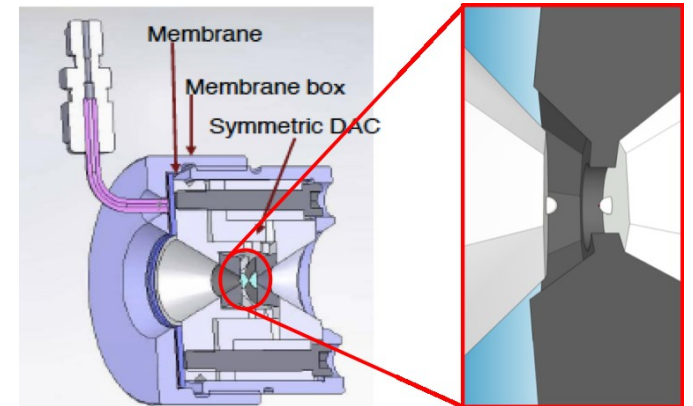
- > workshop: 19.12.2016
- > design nearing completion
- > design defense: Q1 2019

interaction chamber 2

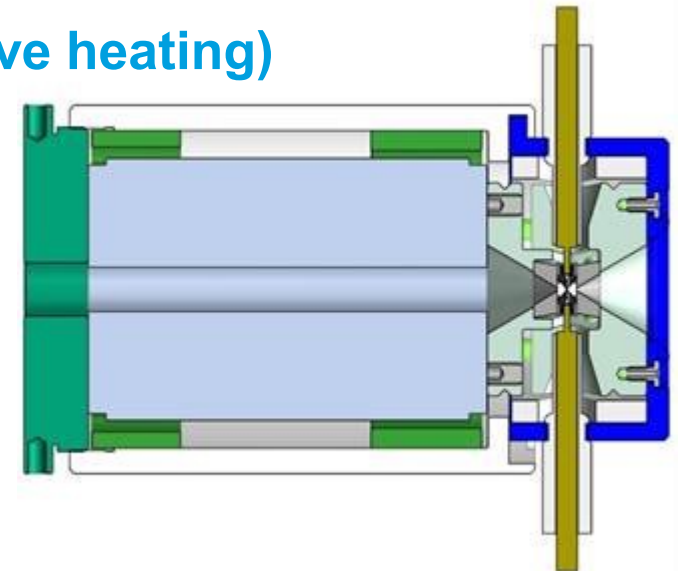
DAC setup: 1) dDAC / dsDAC



conventional and dsDAC



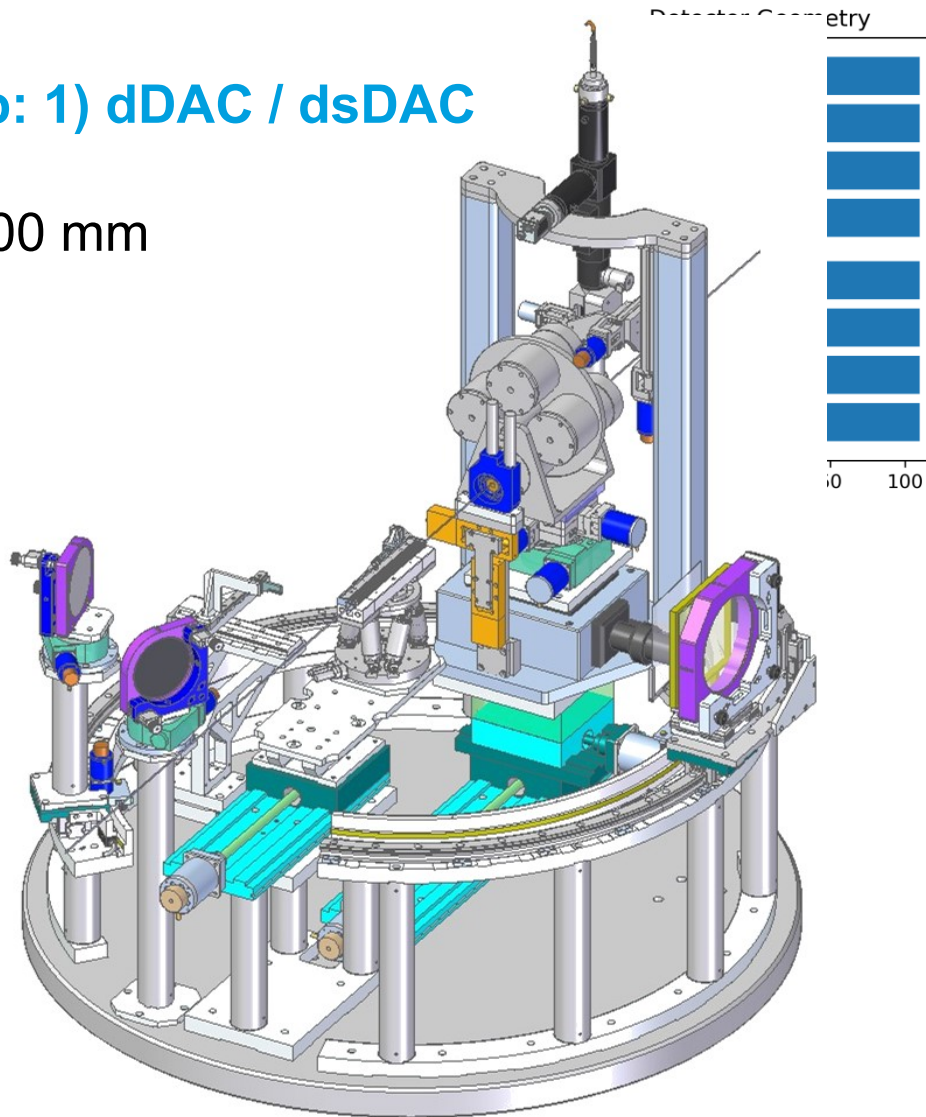
dDAC (+ resistive heating)



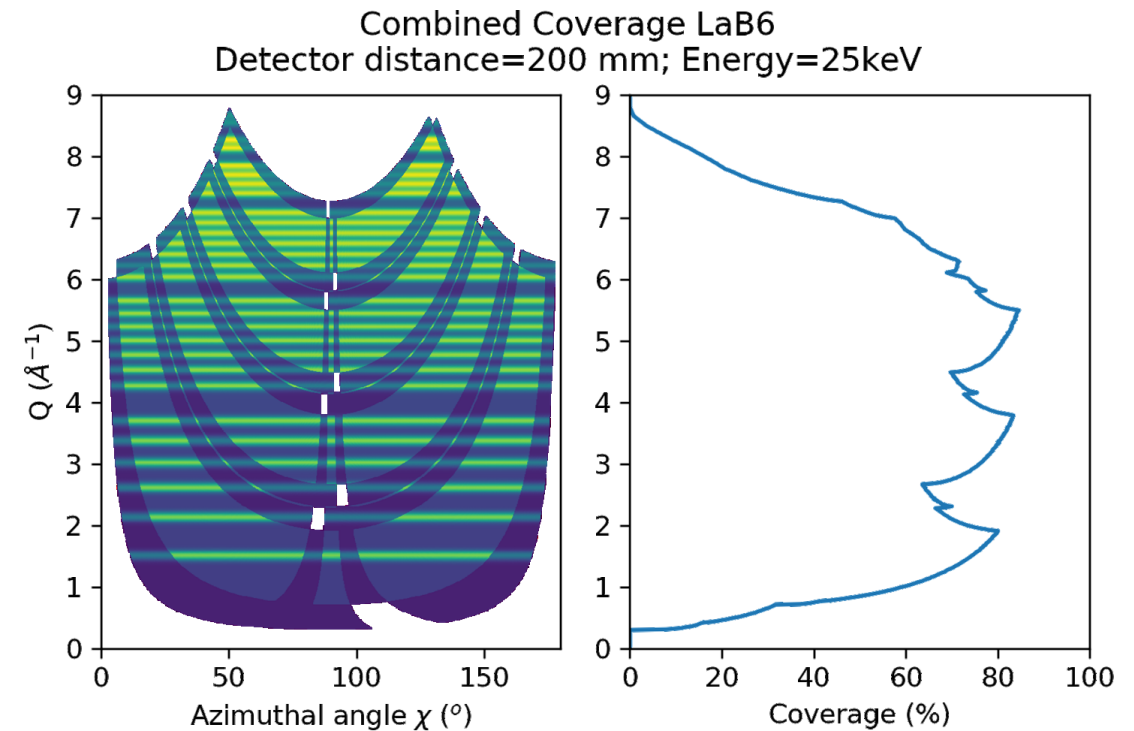
interaction chamber 2

DAC setup: 1) dDAC / dsDAC

> SDD = 200 mm



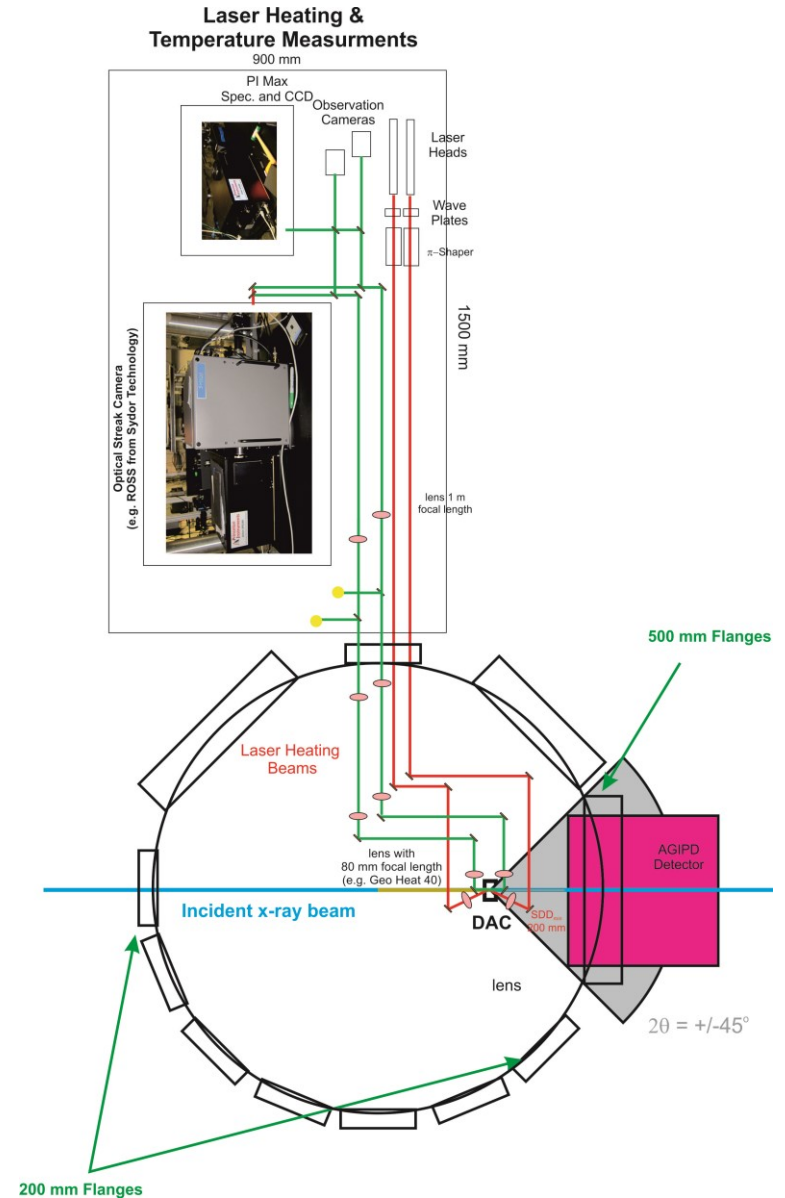
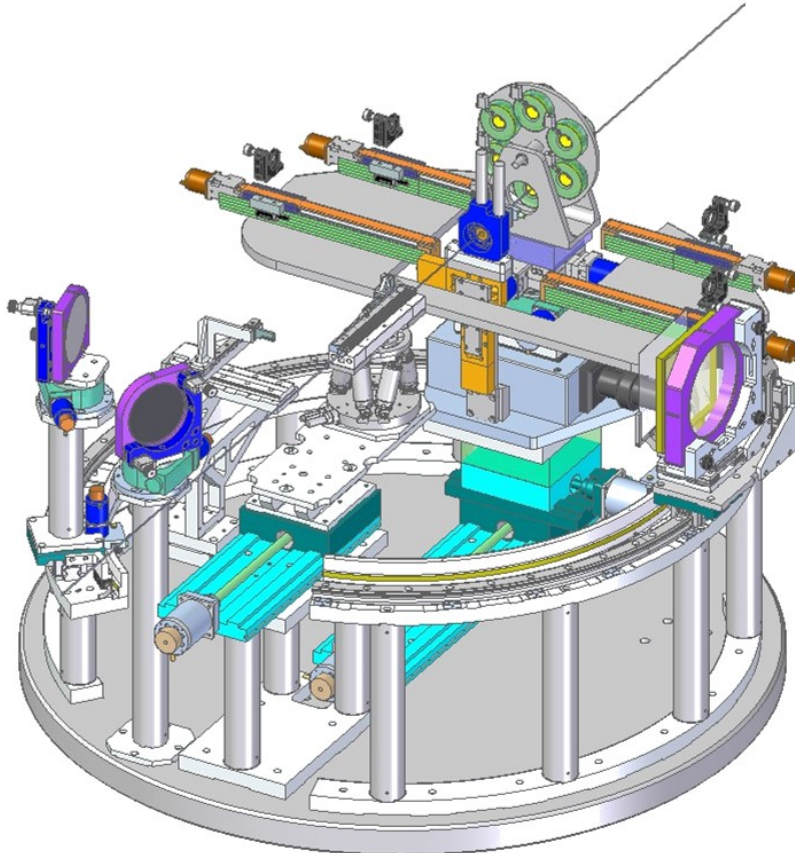
coverage on AGIPD



interaction chamber 2

DAC setup: 2) laser heating

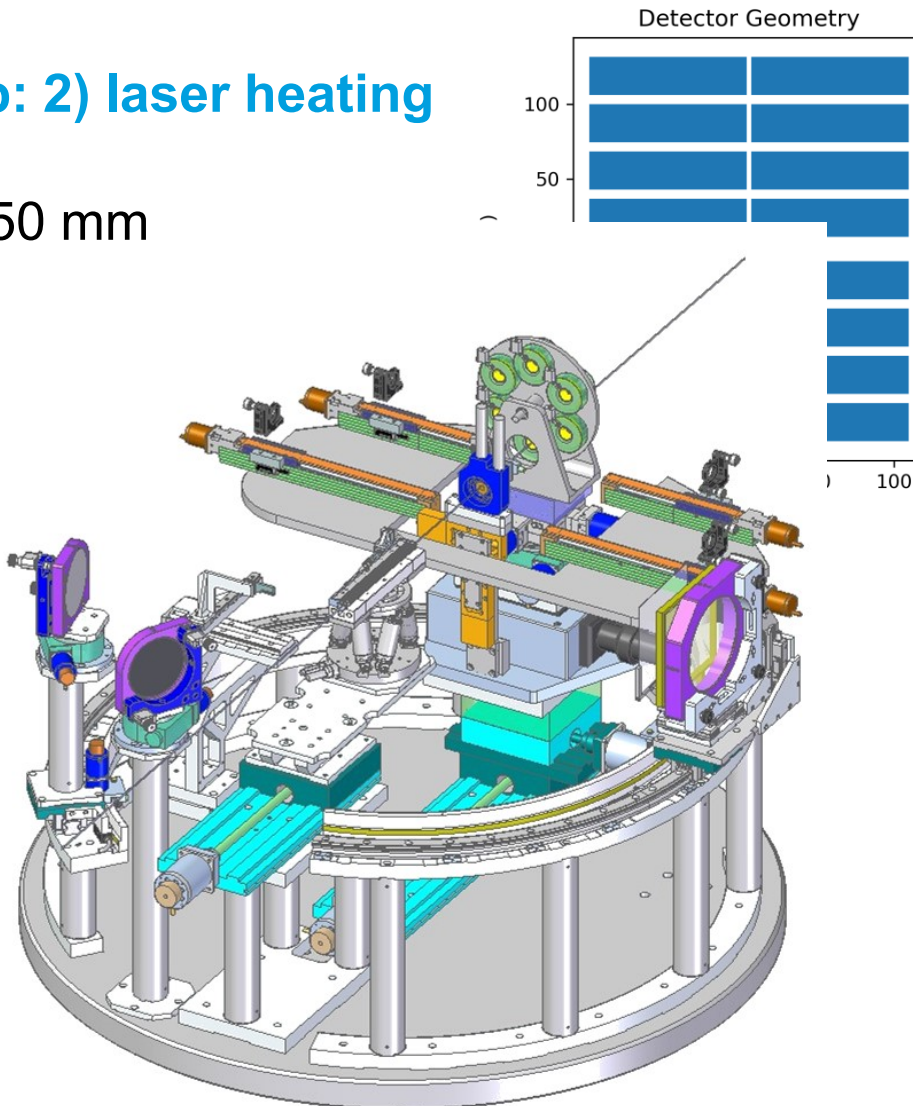
> SDD = 150 mm



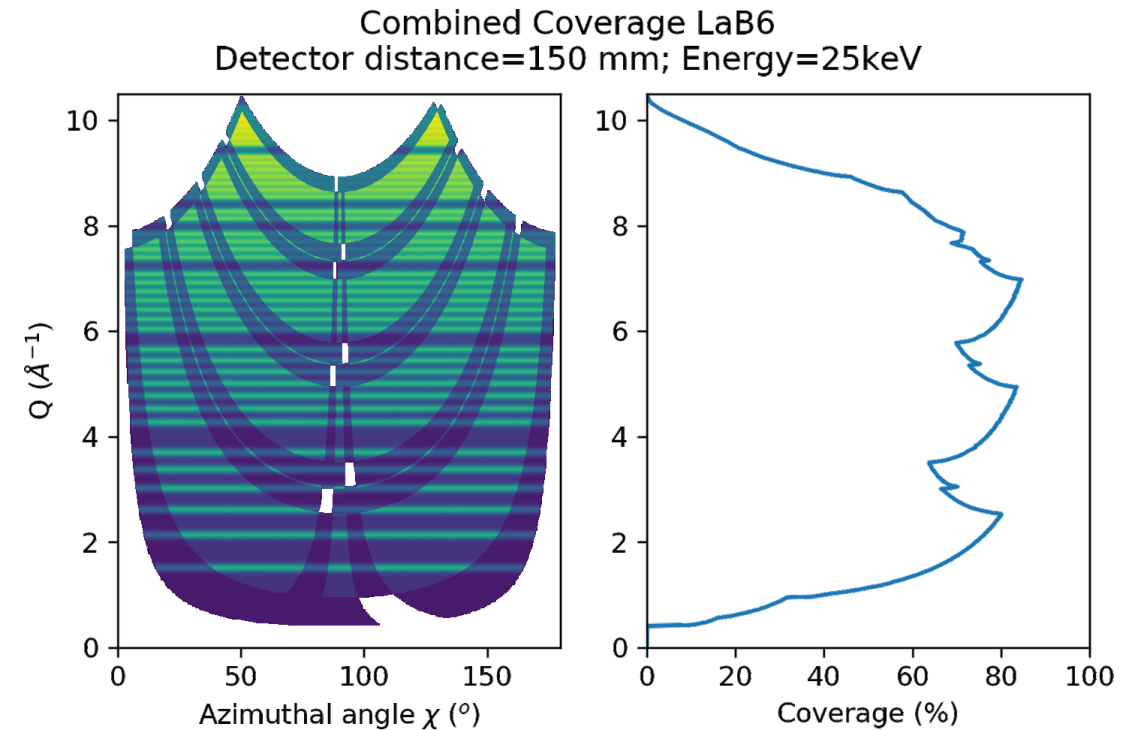
interaction chamber 2

DAC setup: 2) laser heating

> SDD = 150 mm



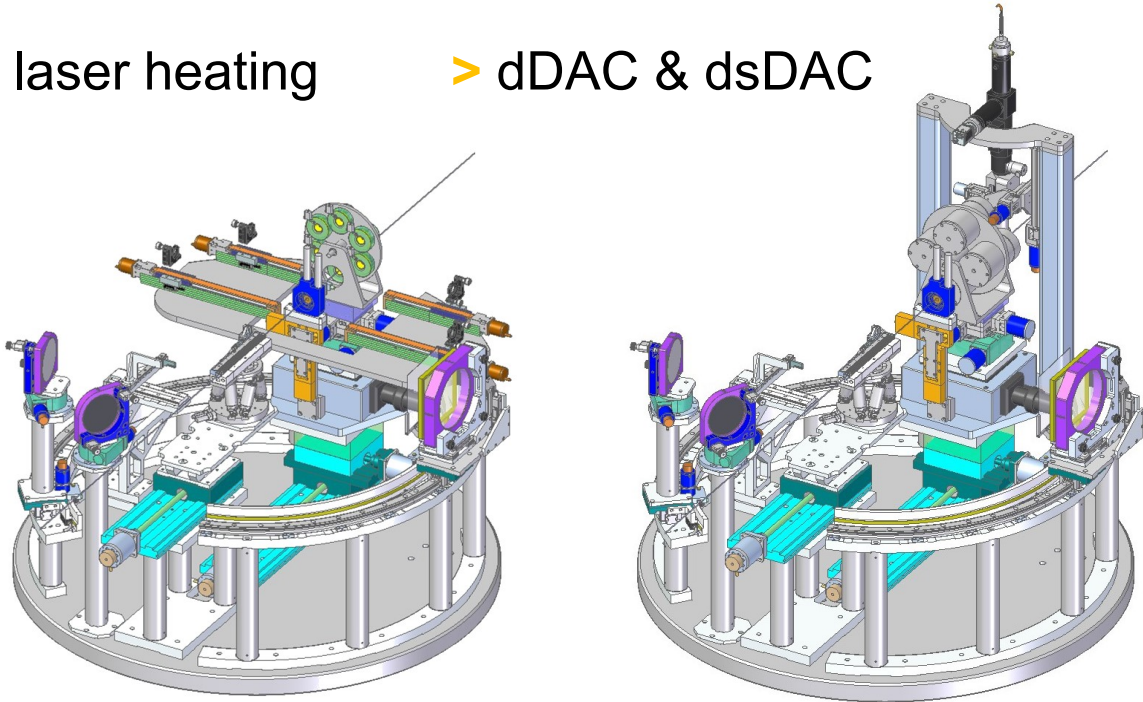
coverage on AGIPD



interaction chamber 2

DAC setups

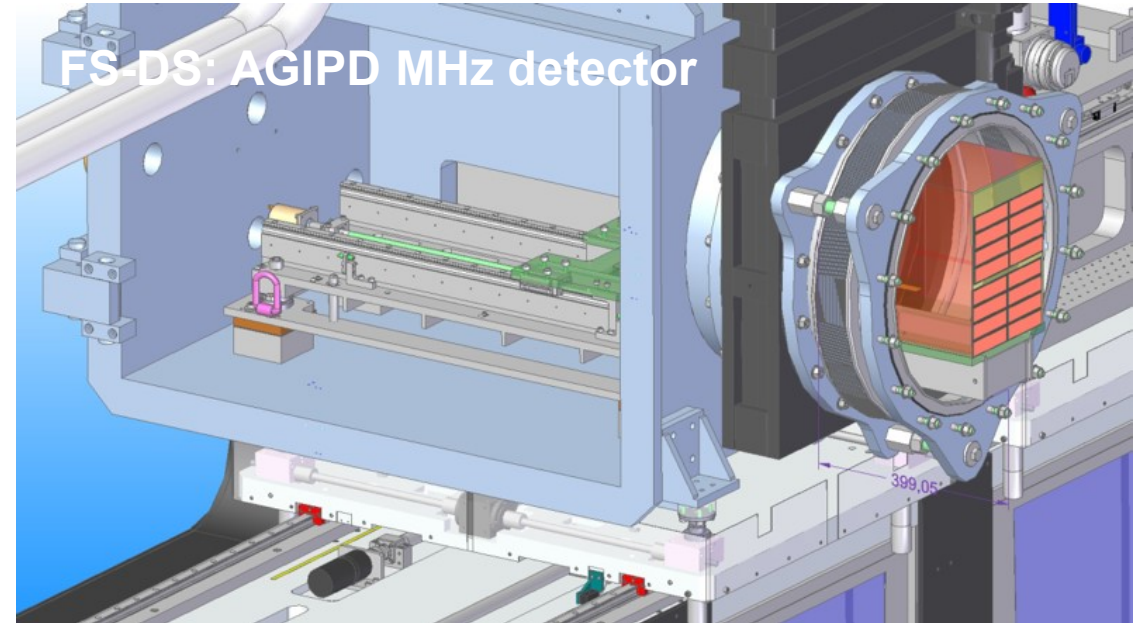
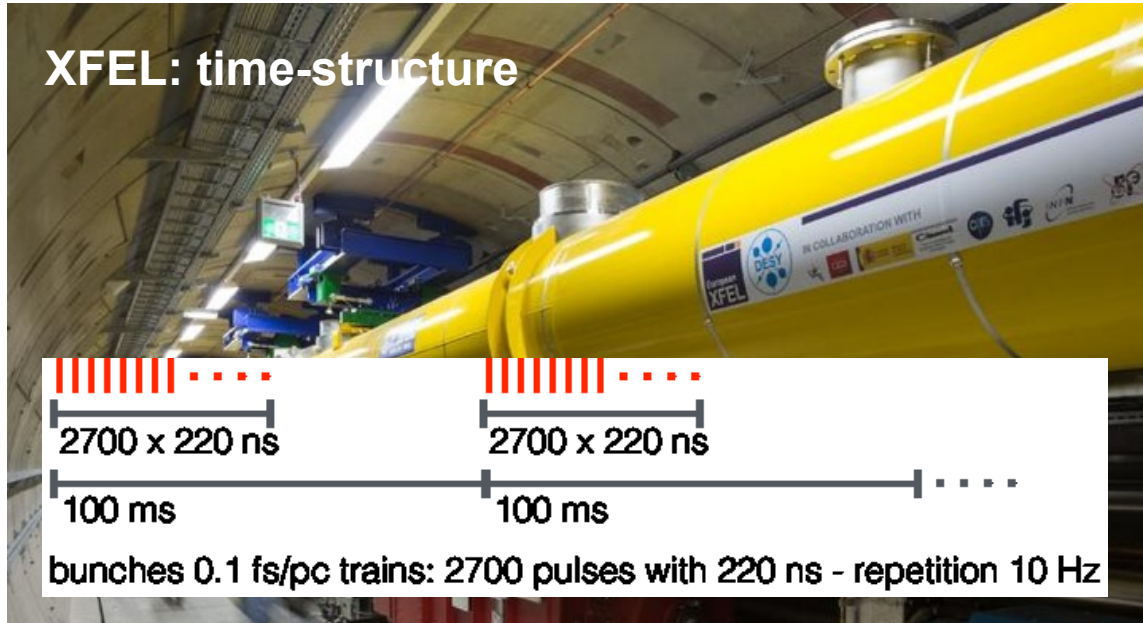
- > laser heating
- > dDAC & dsDAC



status DAC setup

- > 1st workshop: 26.01.2016
- > 2nd workshop: 15.05.2018
- > design completed
- > design defense: Q1 2019
- > installation: Q2 2019
- > community proposal

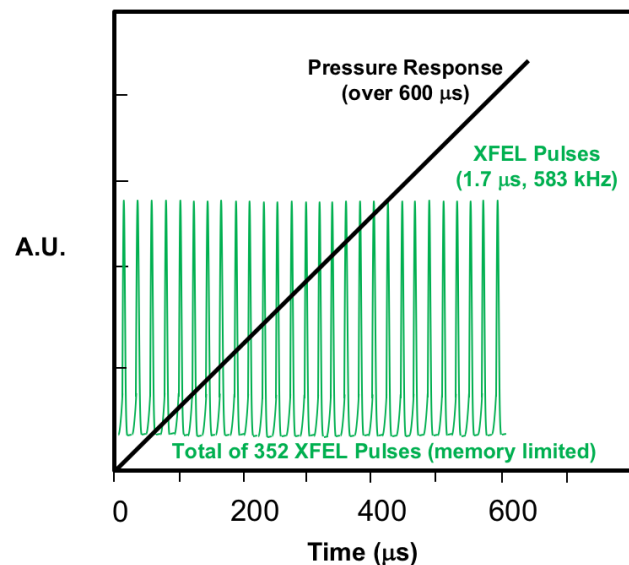
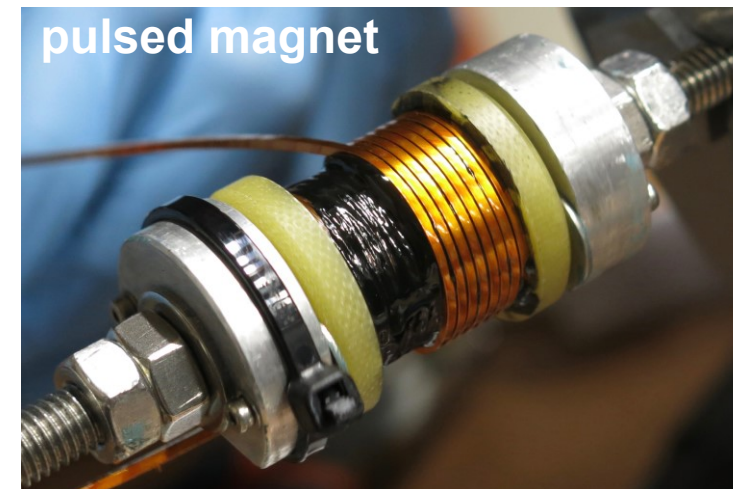
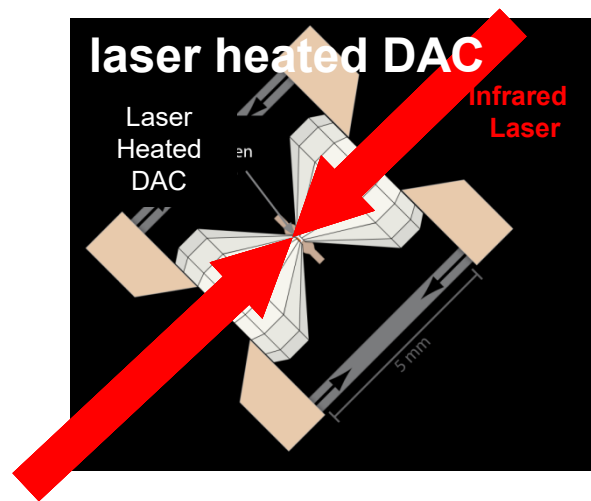
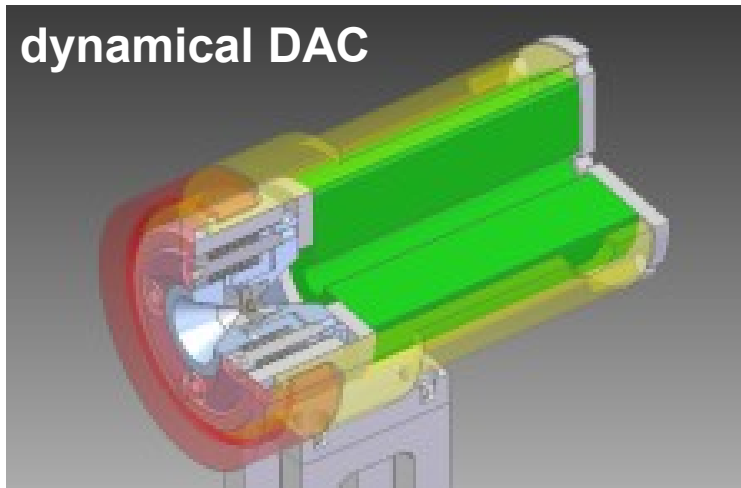
AGIPD detector



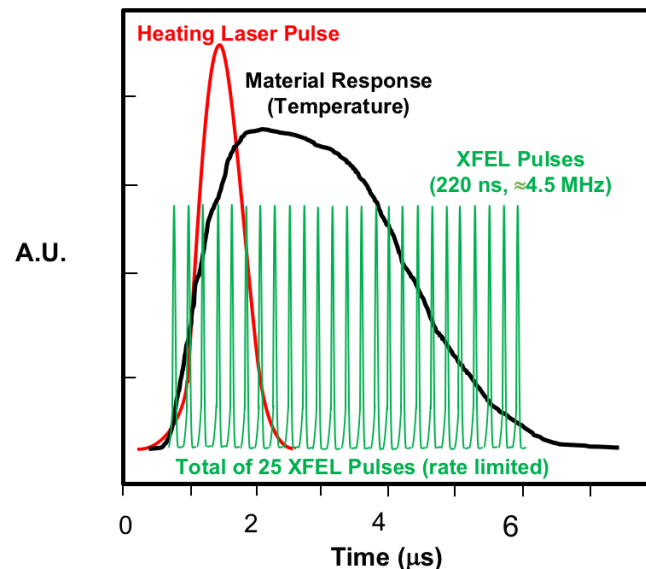
sensor

- > day 1: Si 500 μm , later high-Z (GaAs)
- > pixel size: 200 μm · 200 μm
- > 1 M-pixel: 8 twin modules with 2 · 512 pixel · 128 pixel
- > 352 images at 4.5 MHz

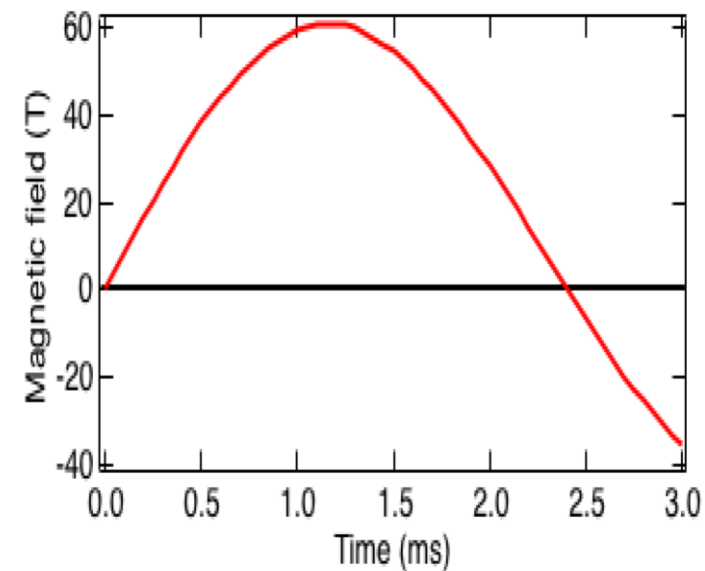
AGIPD detector – exploiting the XFEL bunch train



- **strain rate: 100 TPa/s**

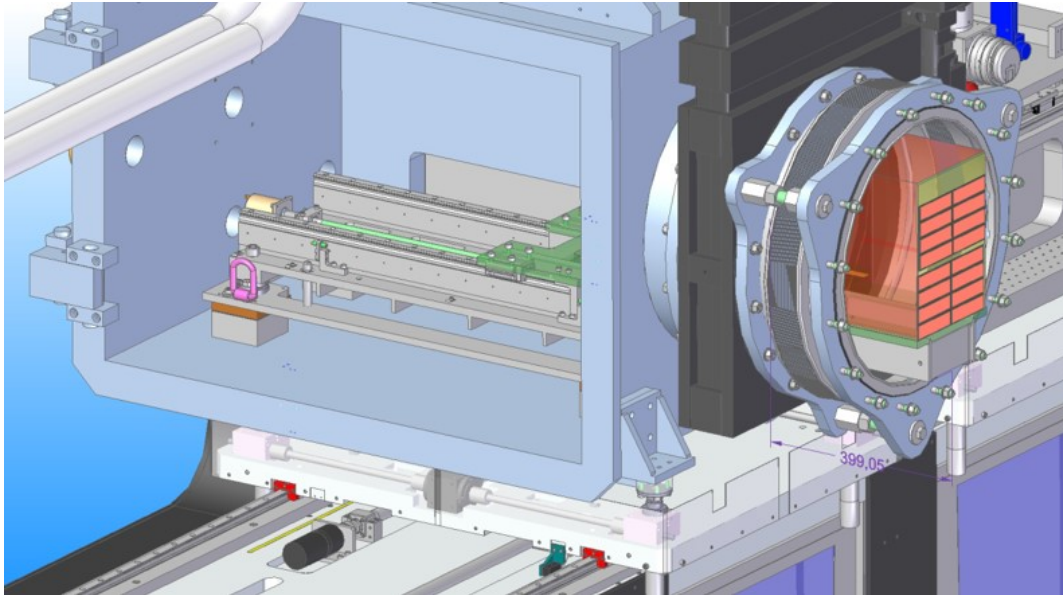


- **300 GPa 6500 K**



- **60 T**

AGIPD detector – exploiting the XFEL bunch train

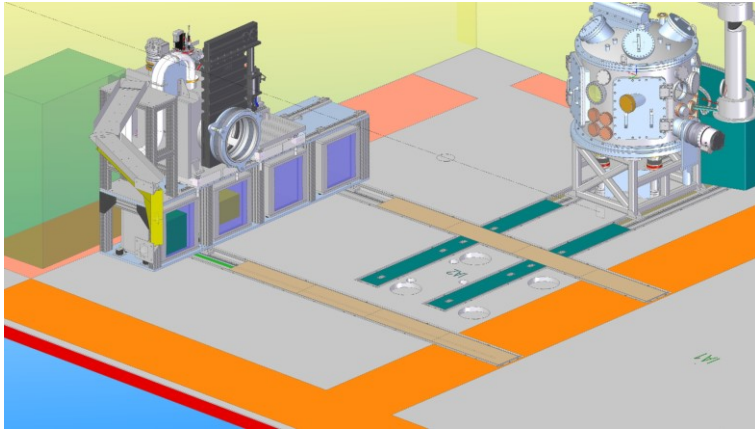


status

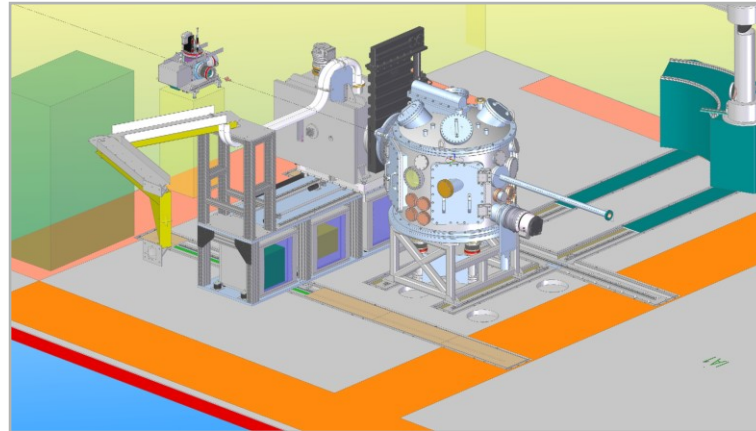
- > vacancy of coordinator filled
- > reliable project plan for Si version
- > delivery of Si version further delayed until Q4 2019 (incl. 3 months of assembly and commissioning)
- > no experiments with Si version before Q1 2020
- > high-Z development ongoing

detector bench

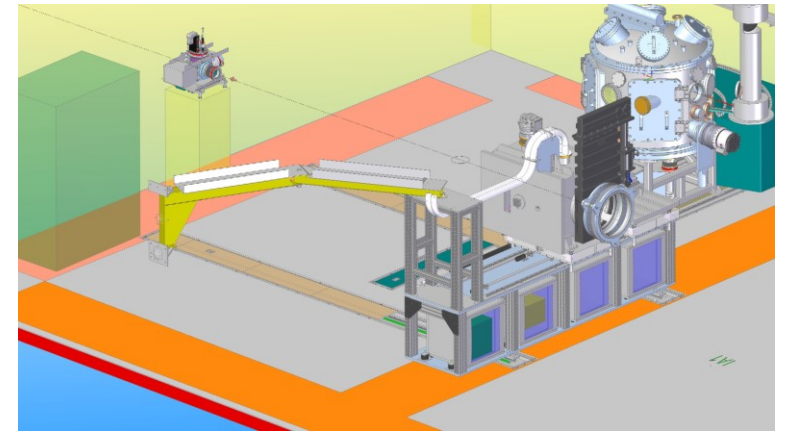
> parking position



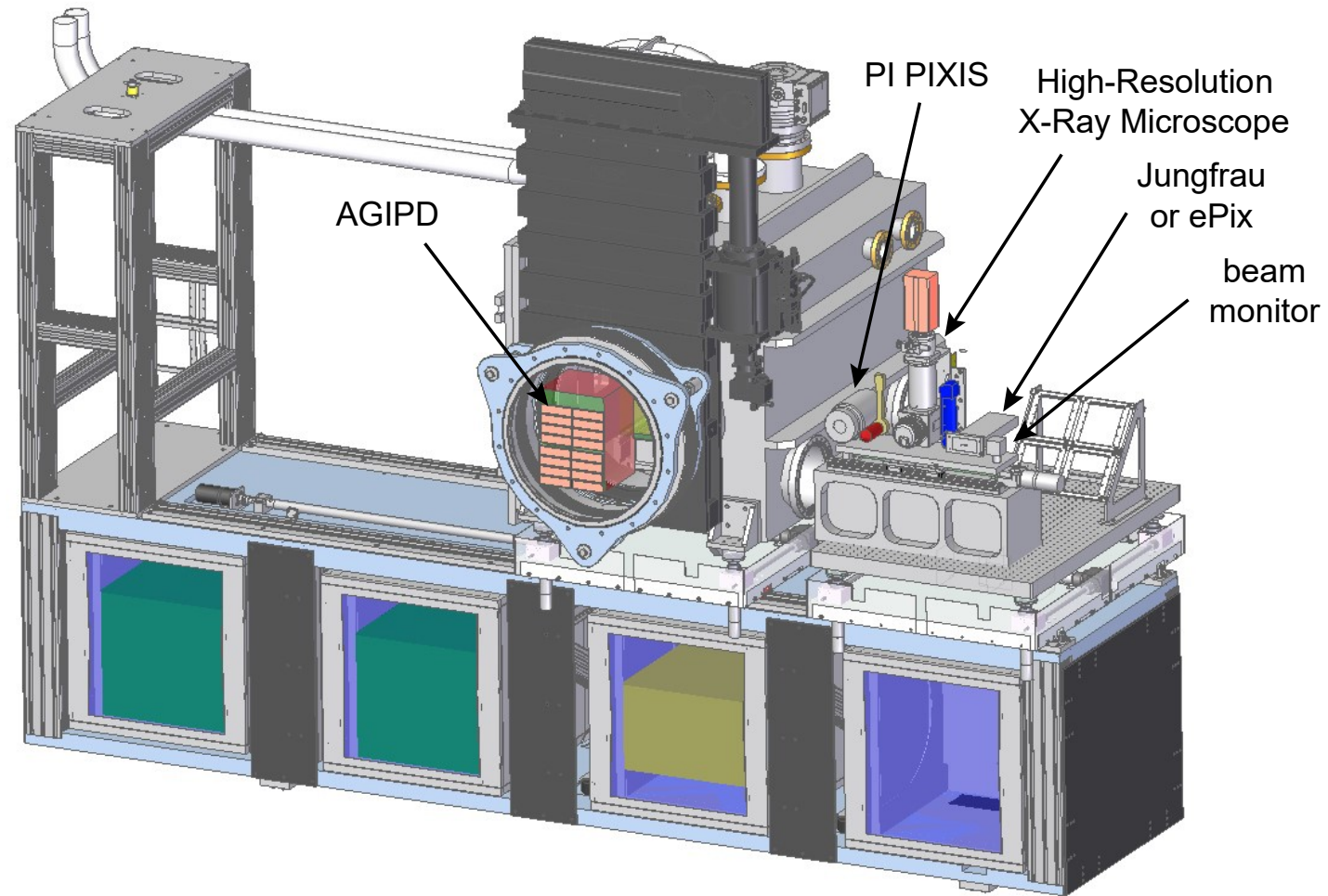
> docked to interaction chamber 2



> docked to interaction chamber 1



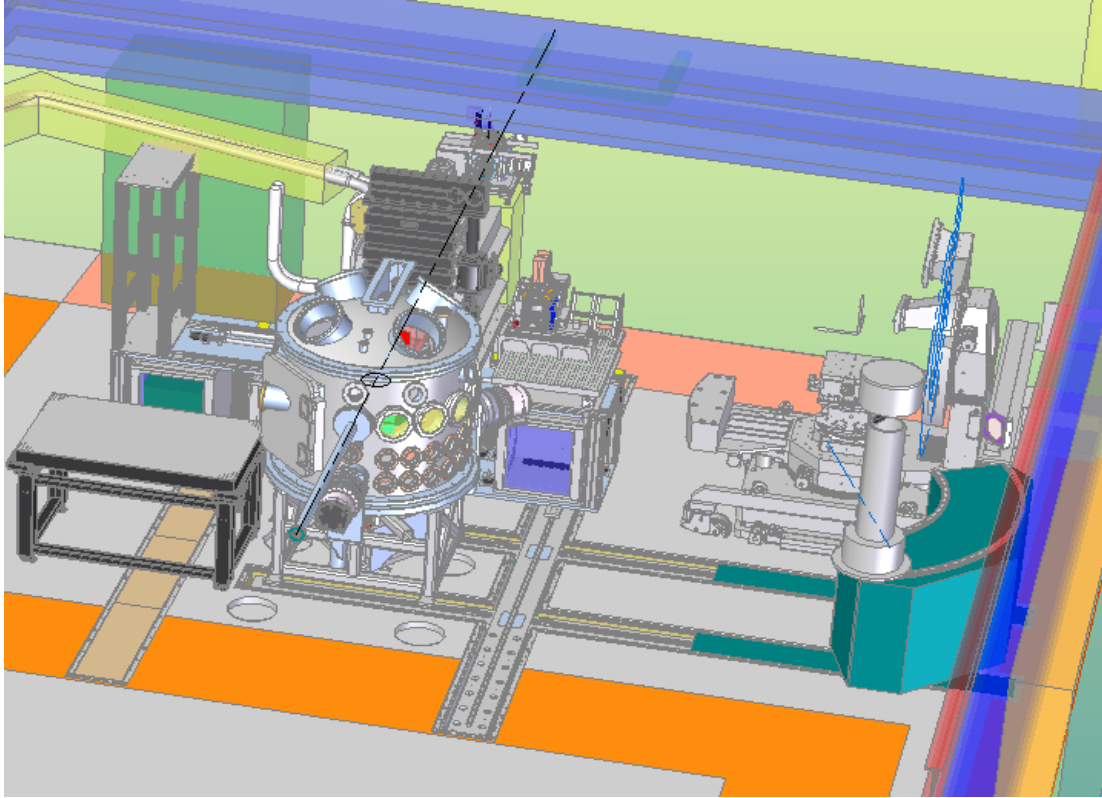
detector bench



status

- > design defense: 08.11.18
- > procurement: ongoing
- > start assembly: Q1 2019
- > installation: Q2 2019

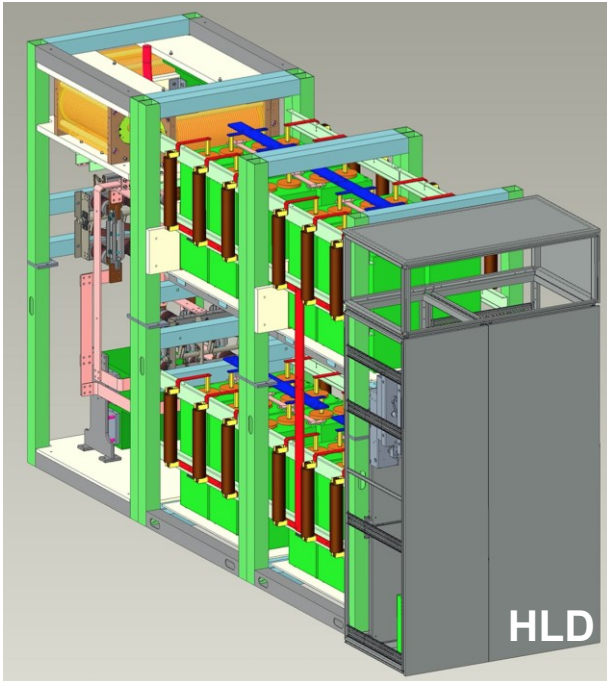
rail system



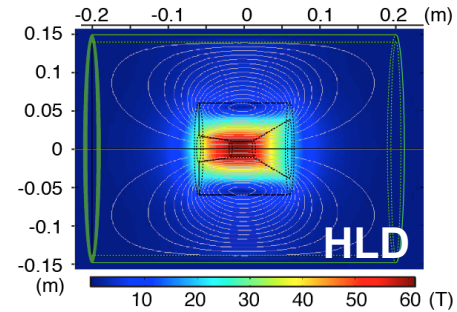
status

- > grooves cut
- > covers installed
- > floor pans grouted
- > base plates, rails: ongoing

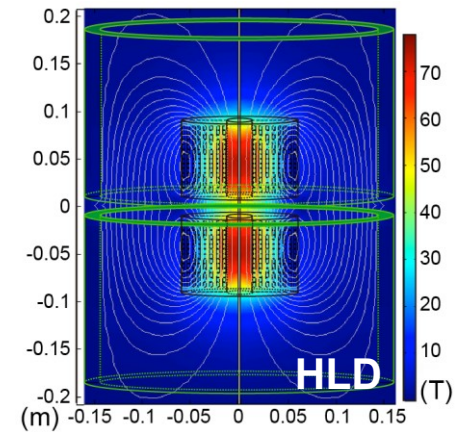
pulsed magnets and diffractometer



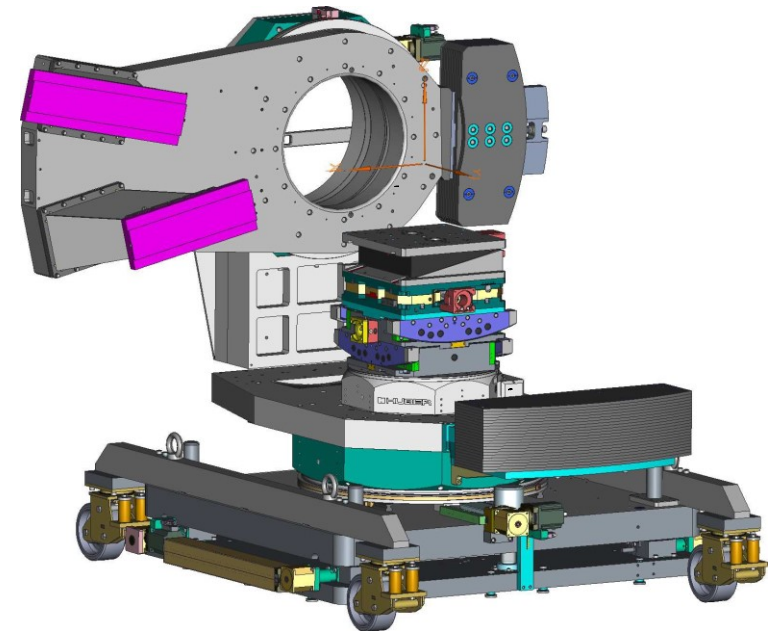
> pulser



> bi-conical solenoid



> split pair



> hor. 6-circle diffractometer

pulsed magnets and diffractometer

status

- > workshop: 22.01. 2018
- > extended science case acknowledged by XFEL management Q3 2018
- > compilation of TDR Q1 2019

pulser

- > procurement
- > manufacturing
- > discussion of pulser location
- > installation from Q4 2019

bi-conical prototype 20° - 20°

- > successful test at 58 T

bi-conical coil 20° - 60°

- > design completed
- > tests from 03.2019

split coil

- > conceptual design

cryostat

- > collaboration with industry

diffractometer

- > review of specifications Q1 2019

detectors

- > Jungfrau available through HED
- > AGIPD mod. to be procured

phase plate

- > design as soon as engineering capacity allows

acknowledgments

This is a huge collaborative effort. Thanks to:

- > the entire HED team
- > the DESY HIBEF team
- > the HZDR HIBEF team
- > engineering and manufacturing support from DESY ZM
- > P02
- > HLD
- > the interested communities for their continuous feedback and support
- > those whom I may have forgotten

Thank you for your attention !