

Mechanical integration of PANGEA and conversion procedure to the hypernuclear/atom setup

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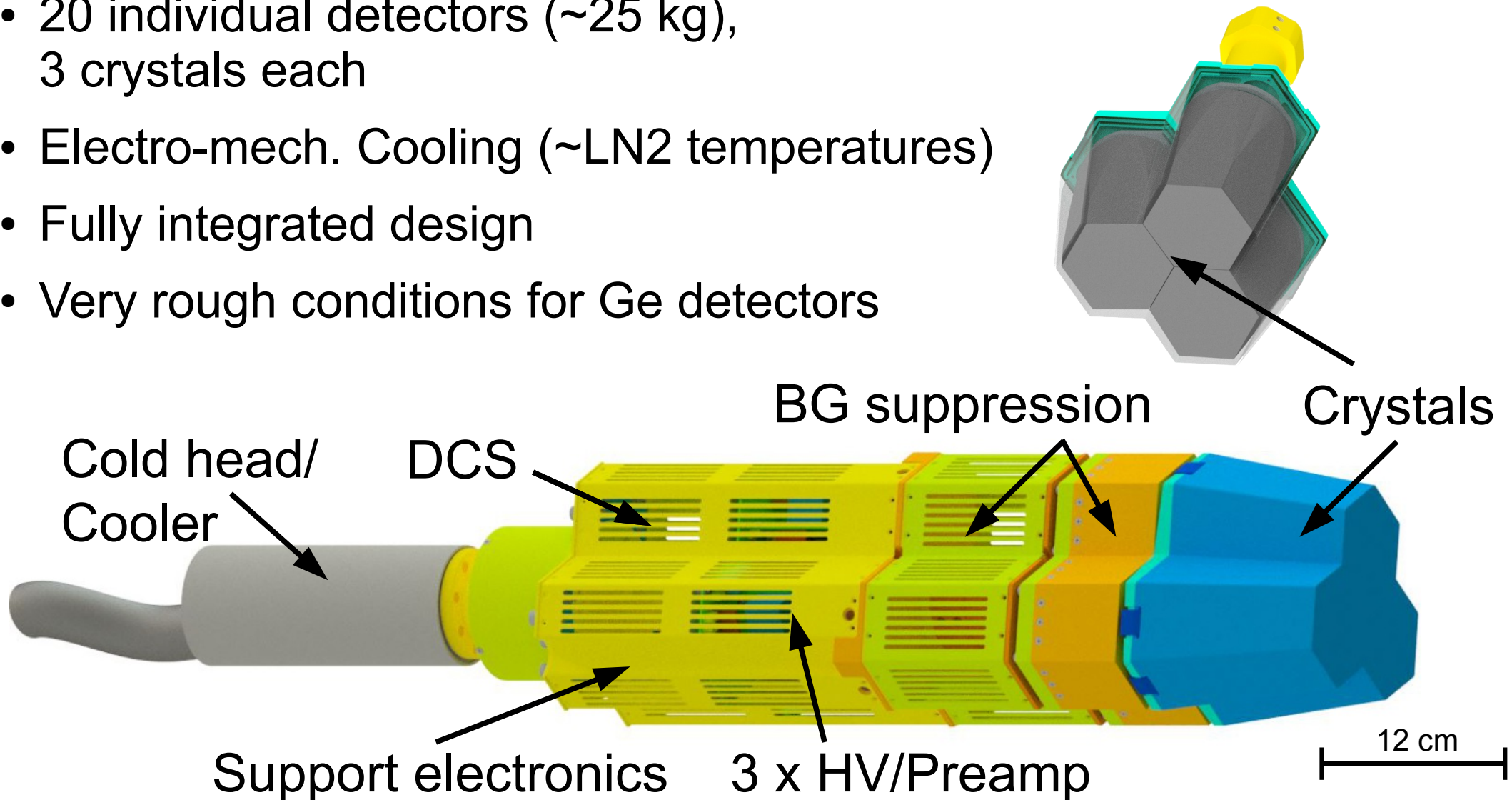


Reminder

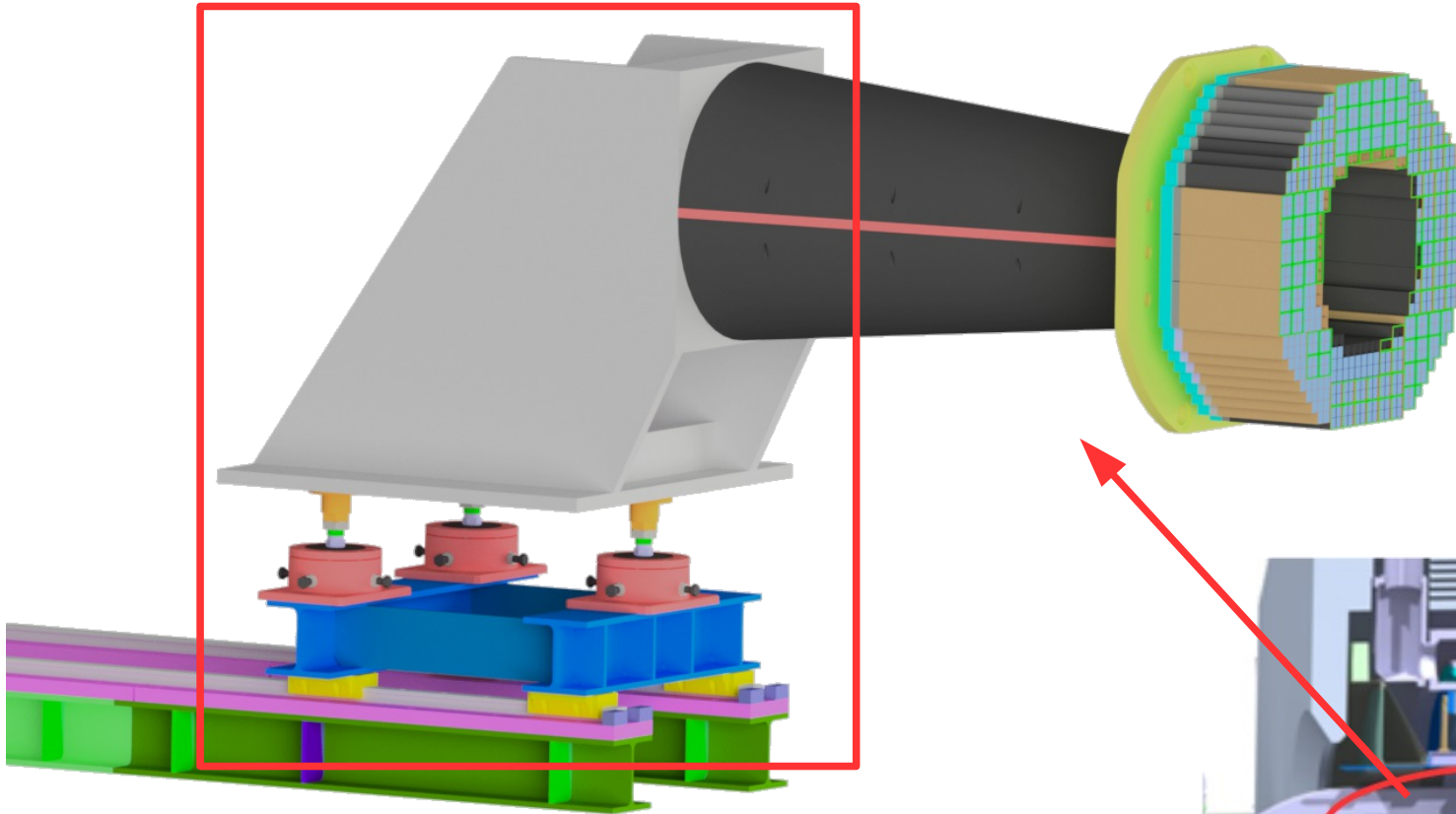
- Spectroscopy of hyper nuclei/atoms requires a dedicated setup
 - **Two staged active target system** for production of hyper nuclei/atoms and detection of decay pion
 - **Dedicated beam pipe** required for the target system
 - **PANGEA** (PANda GERmanium Array) for high resolution γ spectroscopy (<10 MeV)

PANGEA – PAnda GERmanium Array

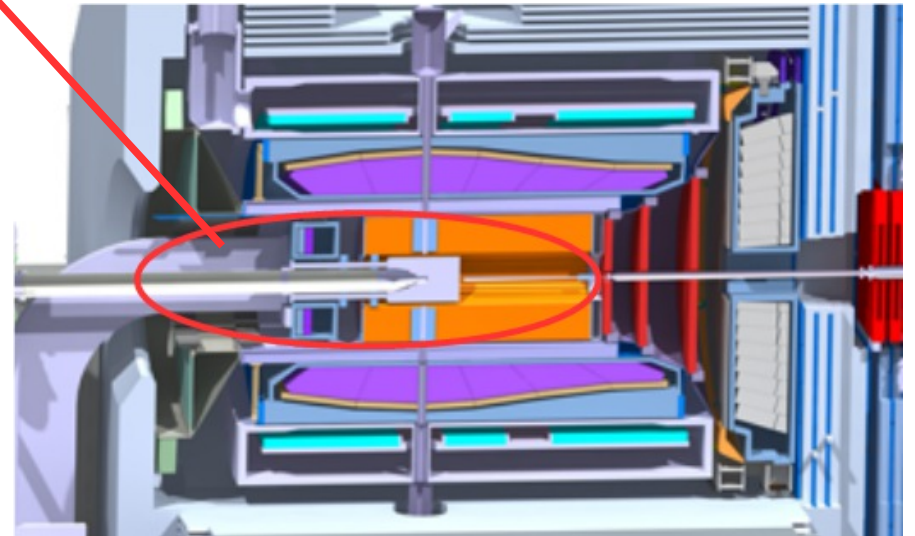
- 20 individual detectors (~25 kg),
3 crystals each
- Electro-mech. Cooling (~LN2 temperatures)
- Fully integrated design
- Very rough conditions for Ge detectors



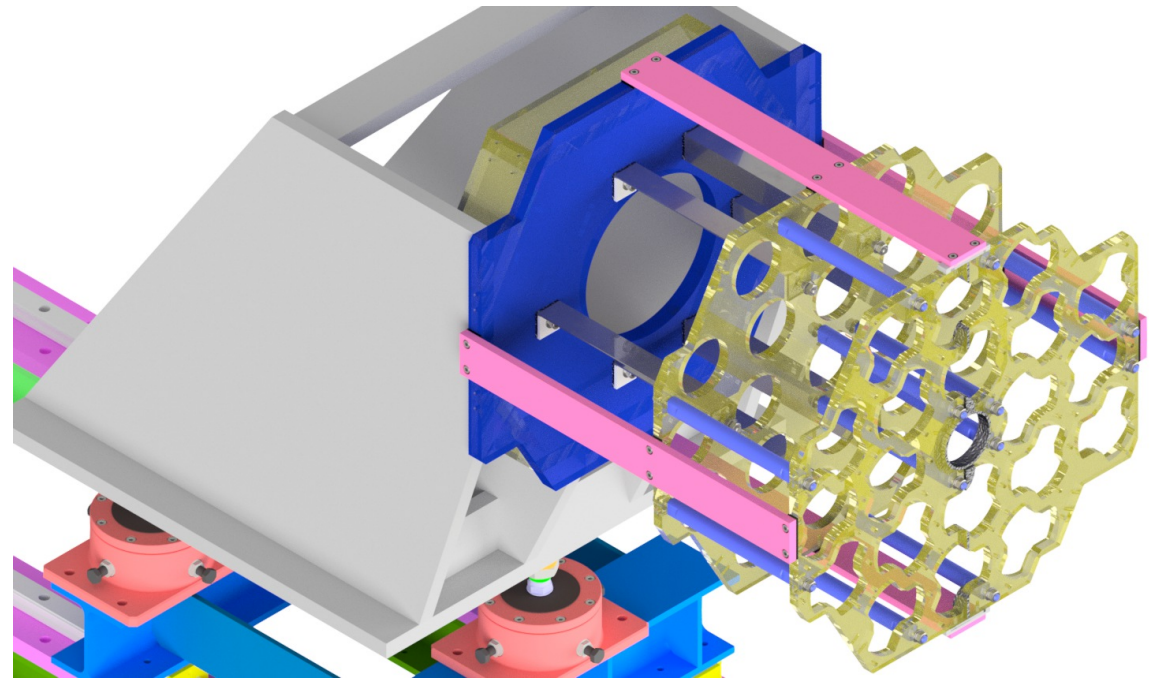
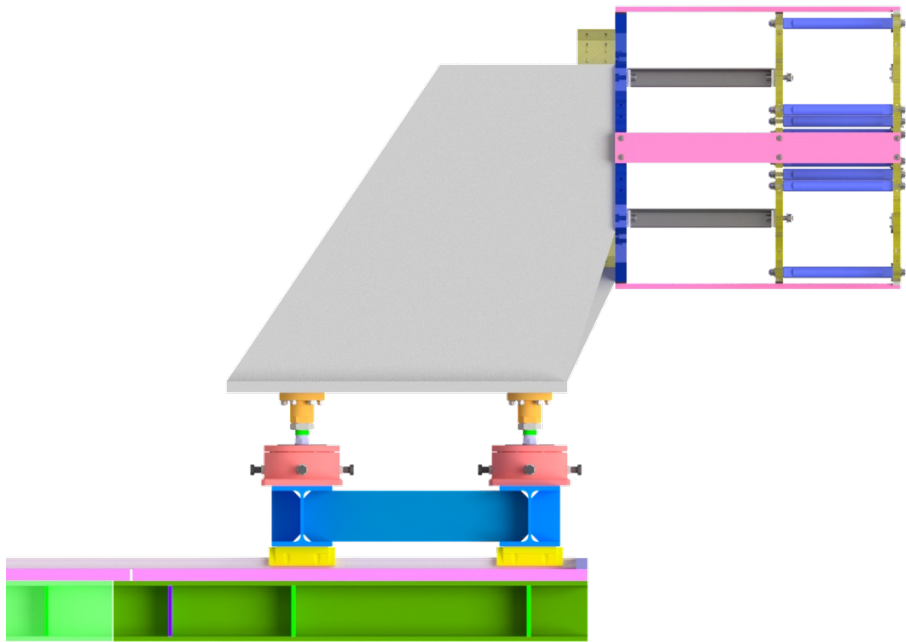
Backward Endcap EMC



- Rails for mounting
- Long lever
- Counterweights on the platform
- Mass: 700 – 800 kg (> PANGEA)



Holding Frame

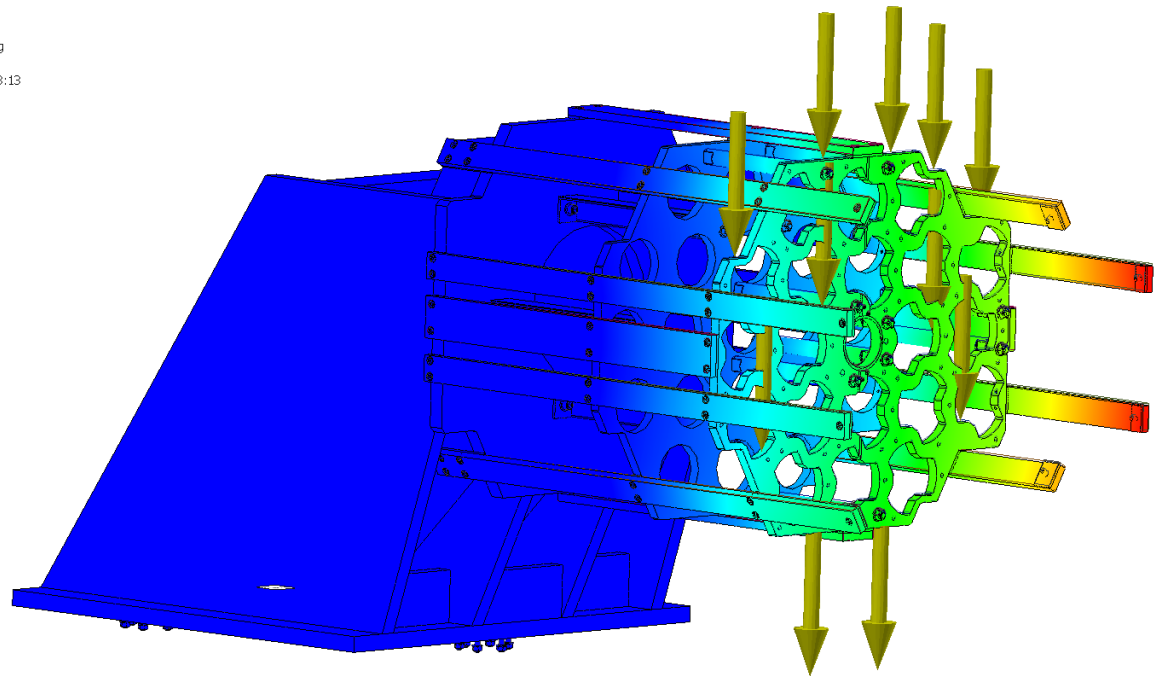
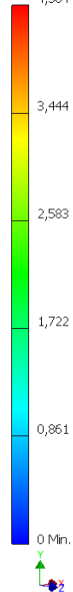


- Same rails as BW EMC
- Multiple segmented plates
- Stainless steel and aluminium
- Individual parts electrically isolated
- Tripping of solenoid uncritical (max. 200 N)

In coll. with Ferchau Engineering

Load simulation

Typ: Verschiebung
Einheit: mm
17.09.2018, 15:33:13
4,304 Max.



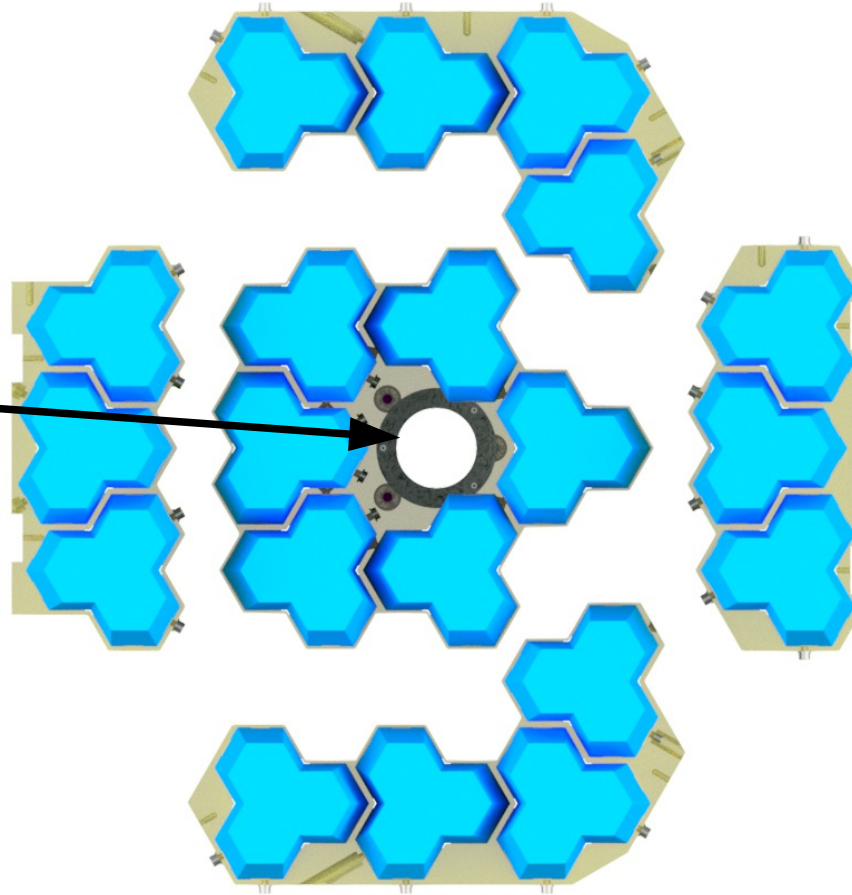
- 2000 kg (x4)
- Max shift: 4.3 mm
- Safety margin: 10 mm
- Compensable by level adjusters

Sub-modules

Beam pipe hole:

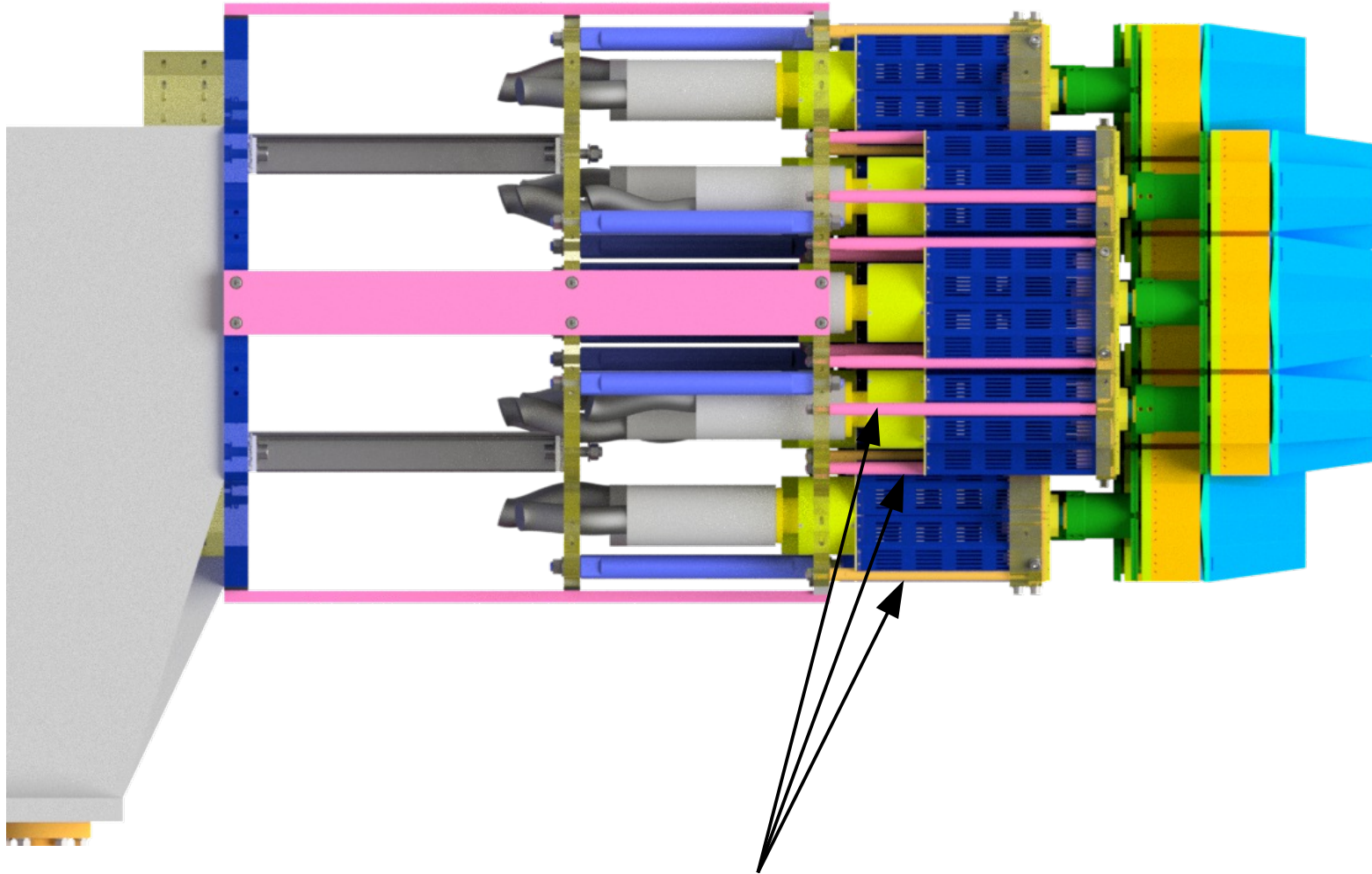
$d = 95 \text{ mm}$

- no MVD in this setup
- no gas target)



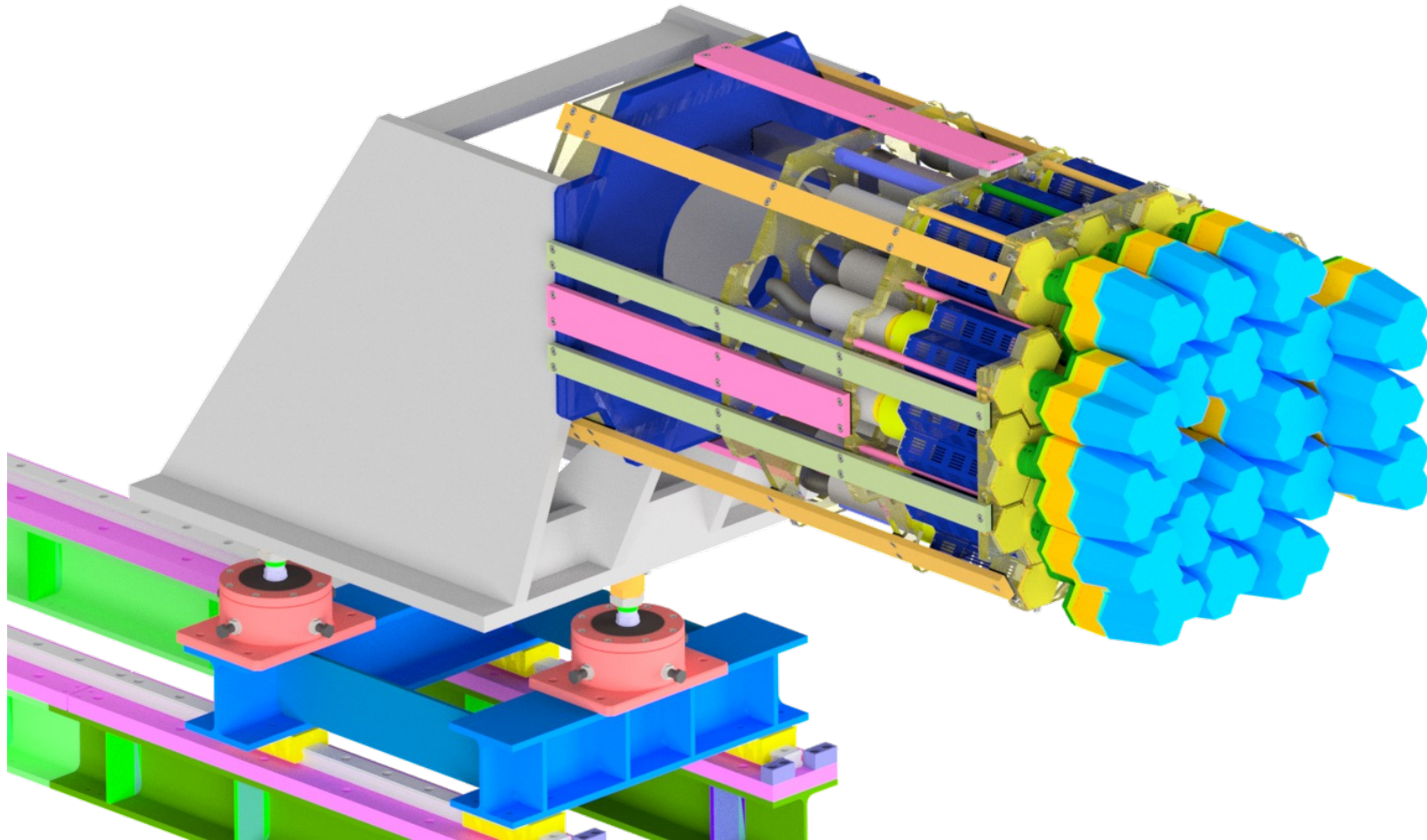
- 5 sub-modules for easy mounting / maintenance
- each sub-module accessible via crane / lifting device

Mounted Detectors



Sub-modules connected to holding plates via rods

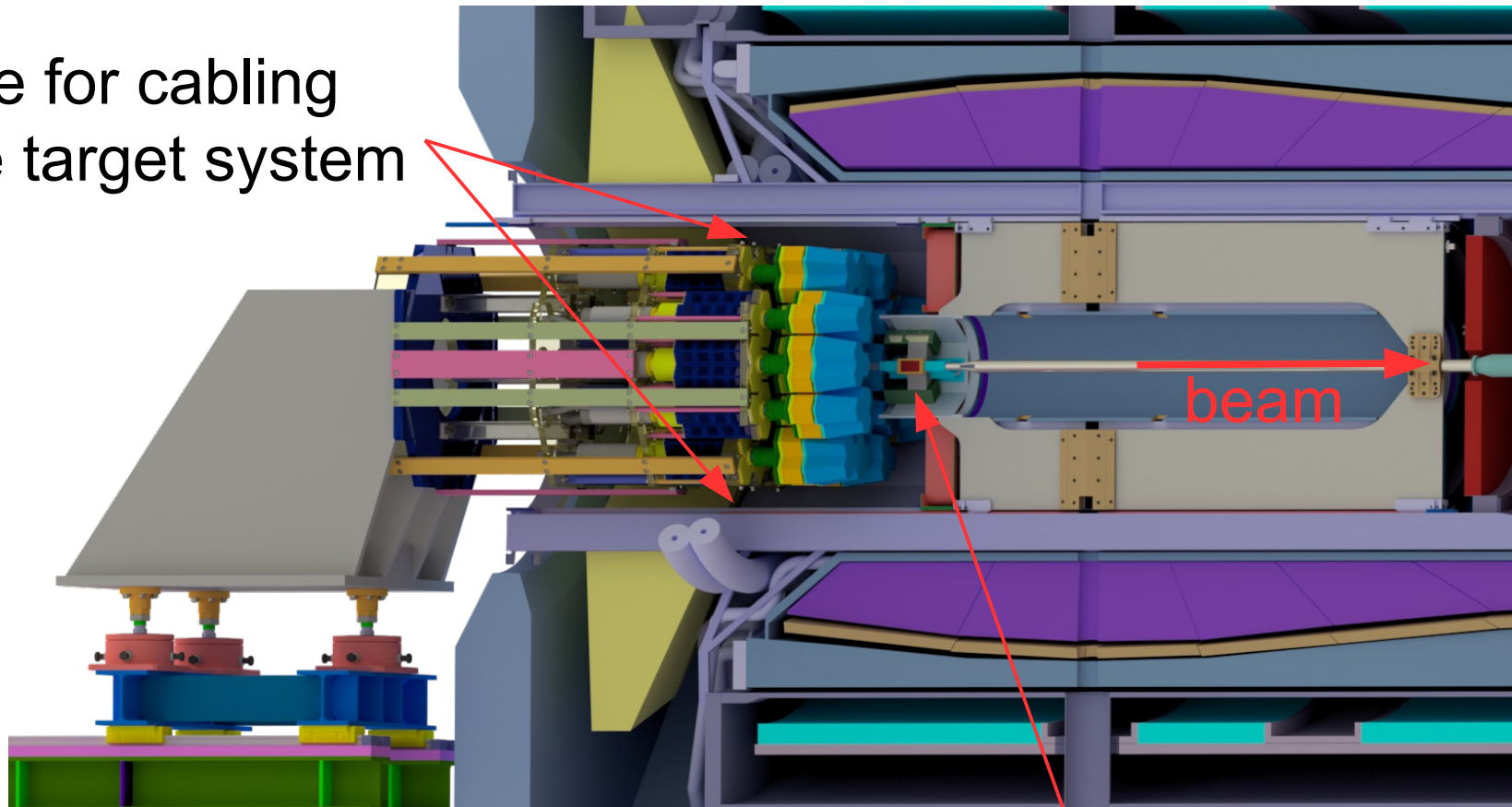
Mounted Detectors



Additional connectors on the outside

PANGEA inside the PANDA barrel

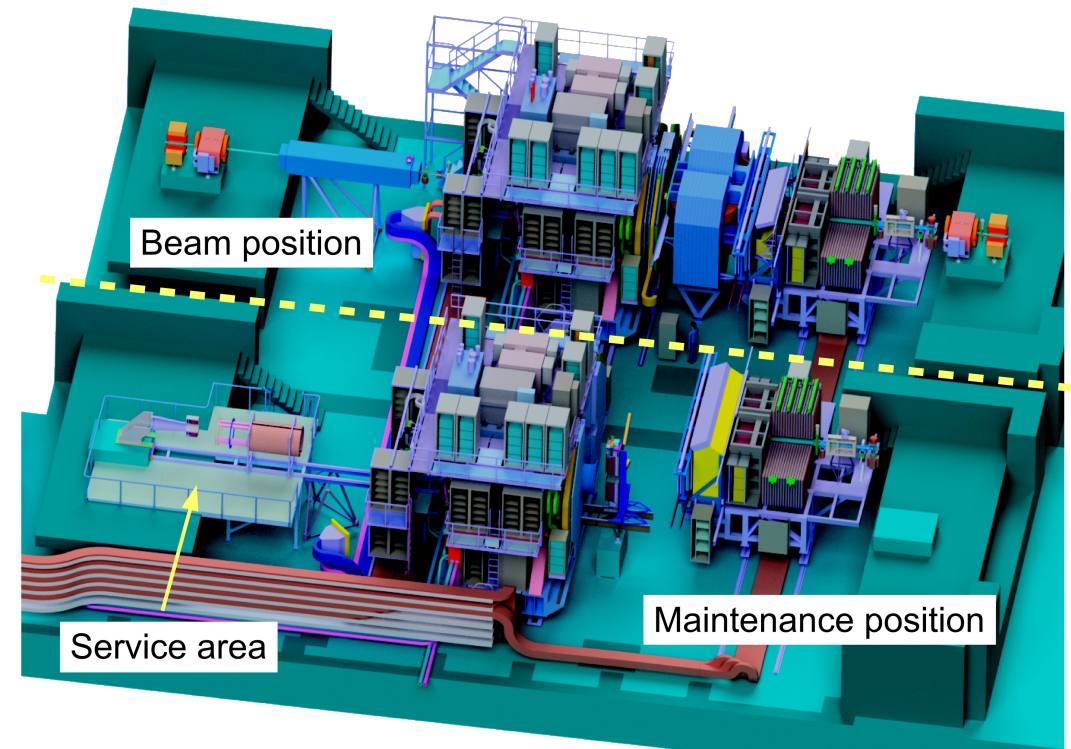
Space for cabling
of the target system



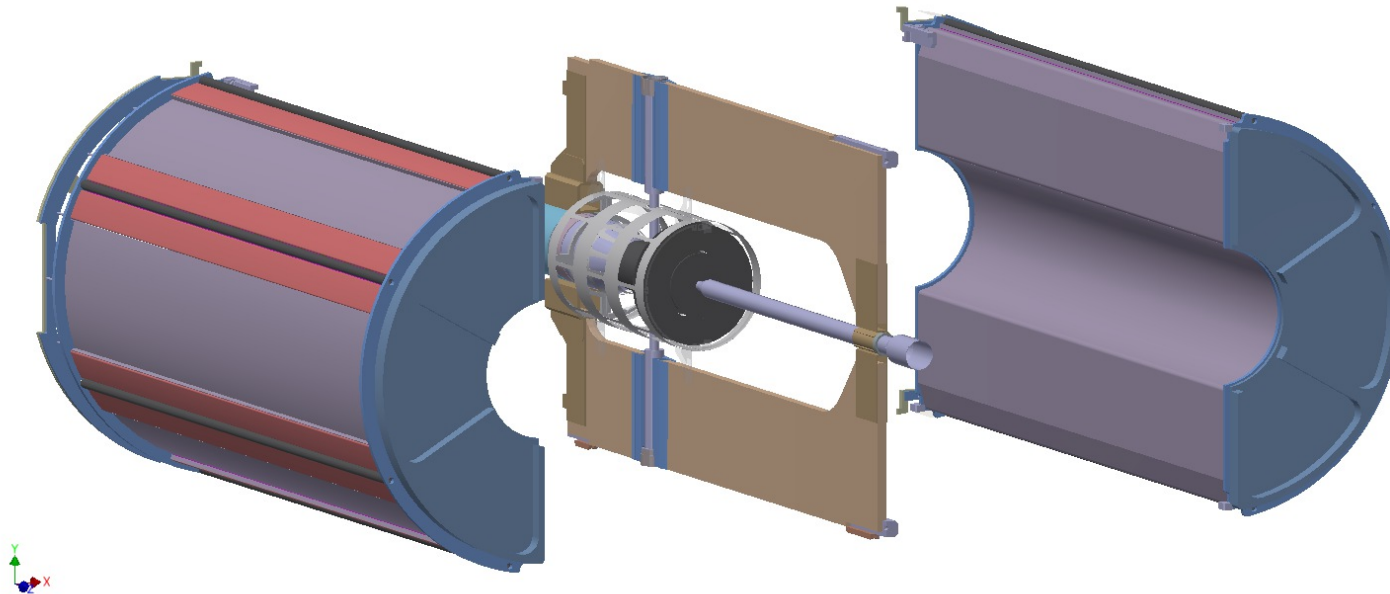
Target system

Conversion procedure

- Access to the central detectors required
- Removal of Backward EMC and MVD
- Change of beam pipe
- Direct exchange of BEMC with PANGEA

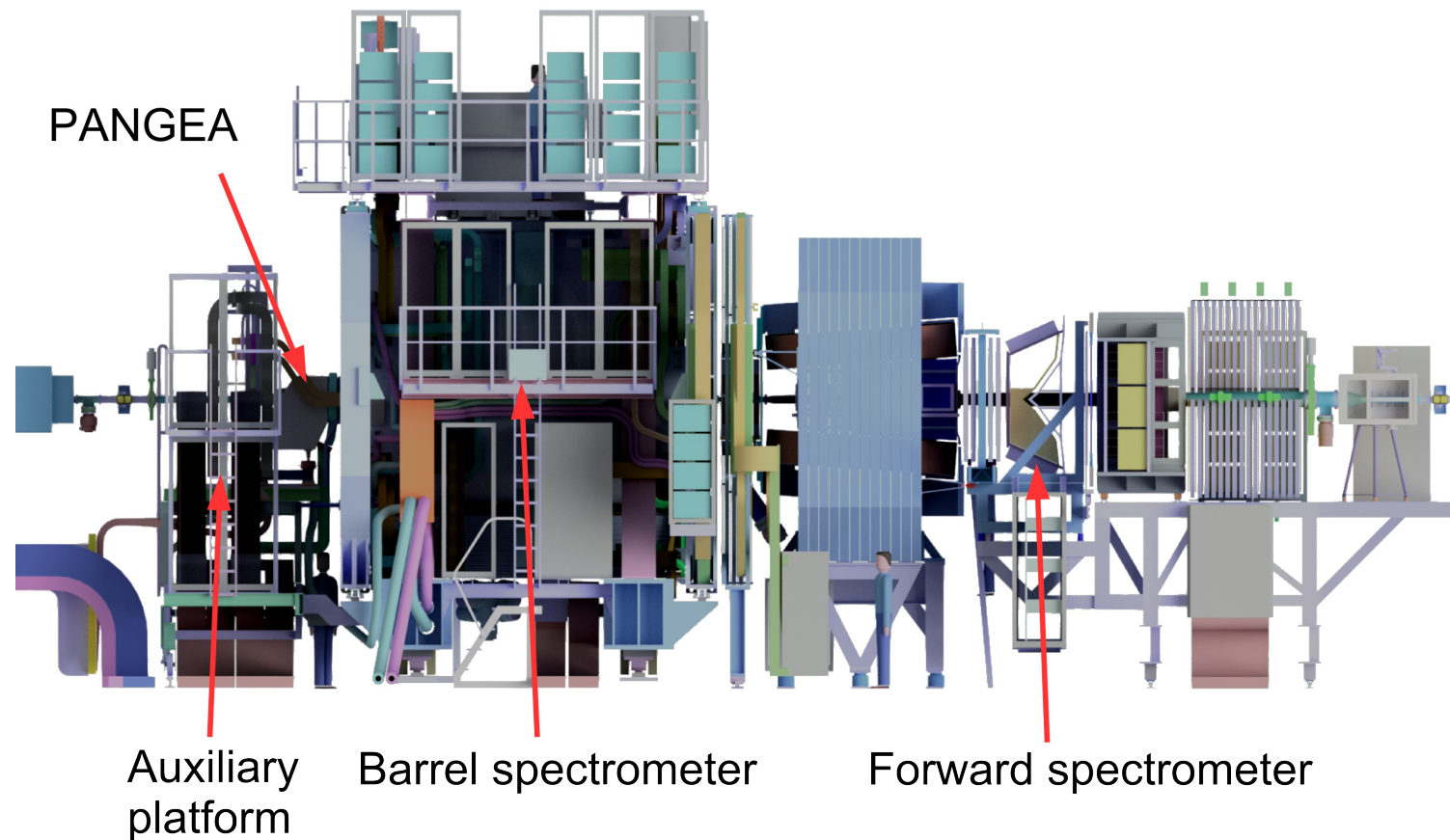


Integration of the target system



- Remove MVD and target pipe as a module with central frame
- New central frame with prepared target system and new beam pipe

Placement of readout electronics



- Electronics of the hypernuclear setup in aux. platform
- Sufficient rack space without BEMC and MVD

Time estimation for the conversion

Process	Time requirement
Move \bar{P} ANDA to maintenance position	1 week
Remove EMC endcap	1 - 2 weeks
Detach STT and remove MVD and beam pipe (central frame)	1 week
Install hypernuclear target system and beam pipe (central frame) and attach STT	1 week
Build up PANGEA	1 week
Move hypernuclear setup into \bar{P} ANDA barrel and calibration	1 week
Move \bar{P} ANDA to beam position	1 week
Cool down magnet, pumping, final calibration and commissioning of PANGEA	2 week
Total	9-10 week

No parallel work included in estimations