

Barrel DIRC Installation

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PANDA Collaboration Meeting 18/3

Darmstadt, 2018/11/06

Outline

- Barrel DIRC Main Components
- Installation Procedure Radiator Barrel
- Installation Procedure Readout Unit
- Intervention Procedures
- Summary & Outlook

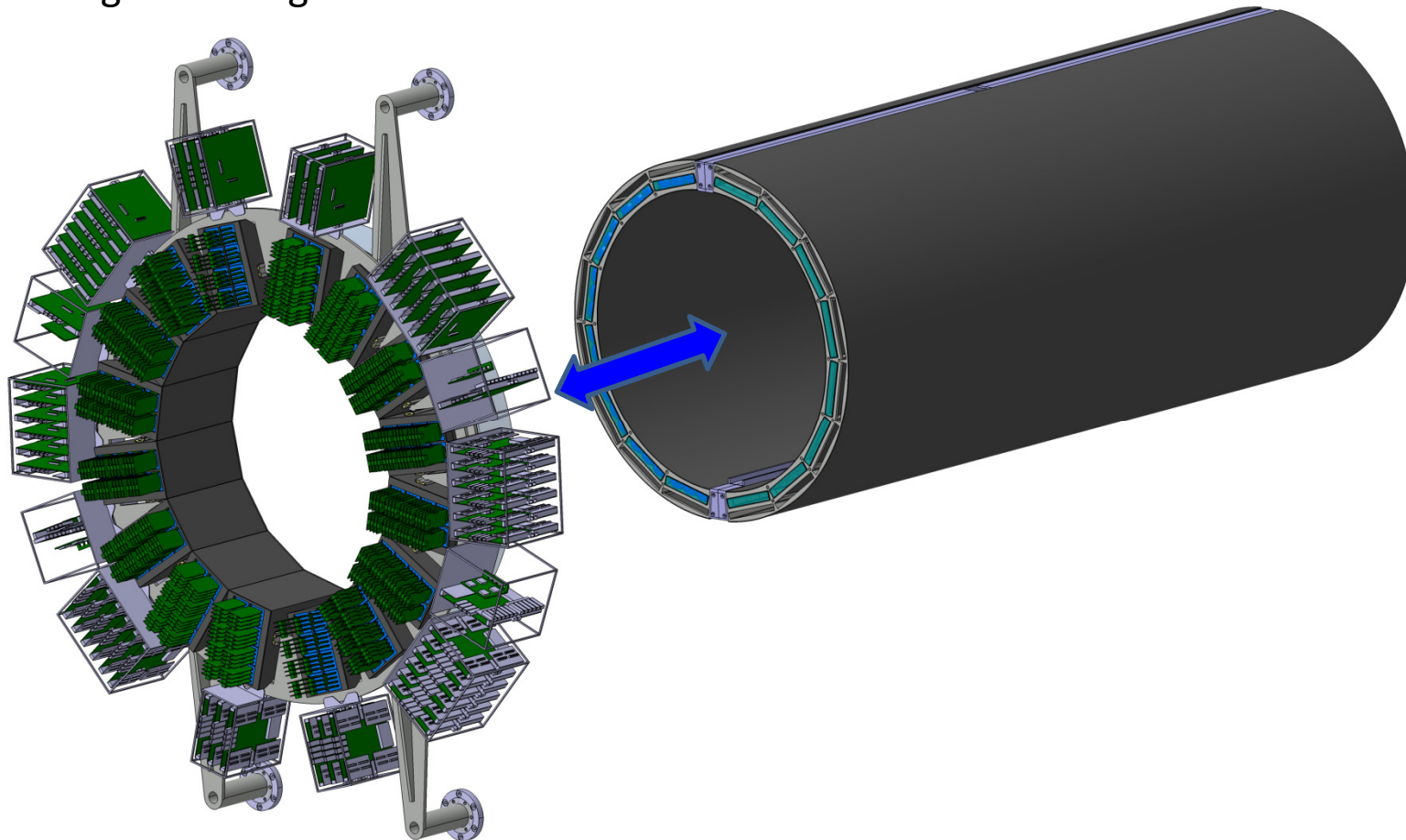
Barrel DIRC Main Components

Readout Unit

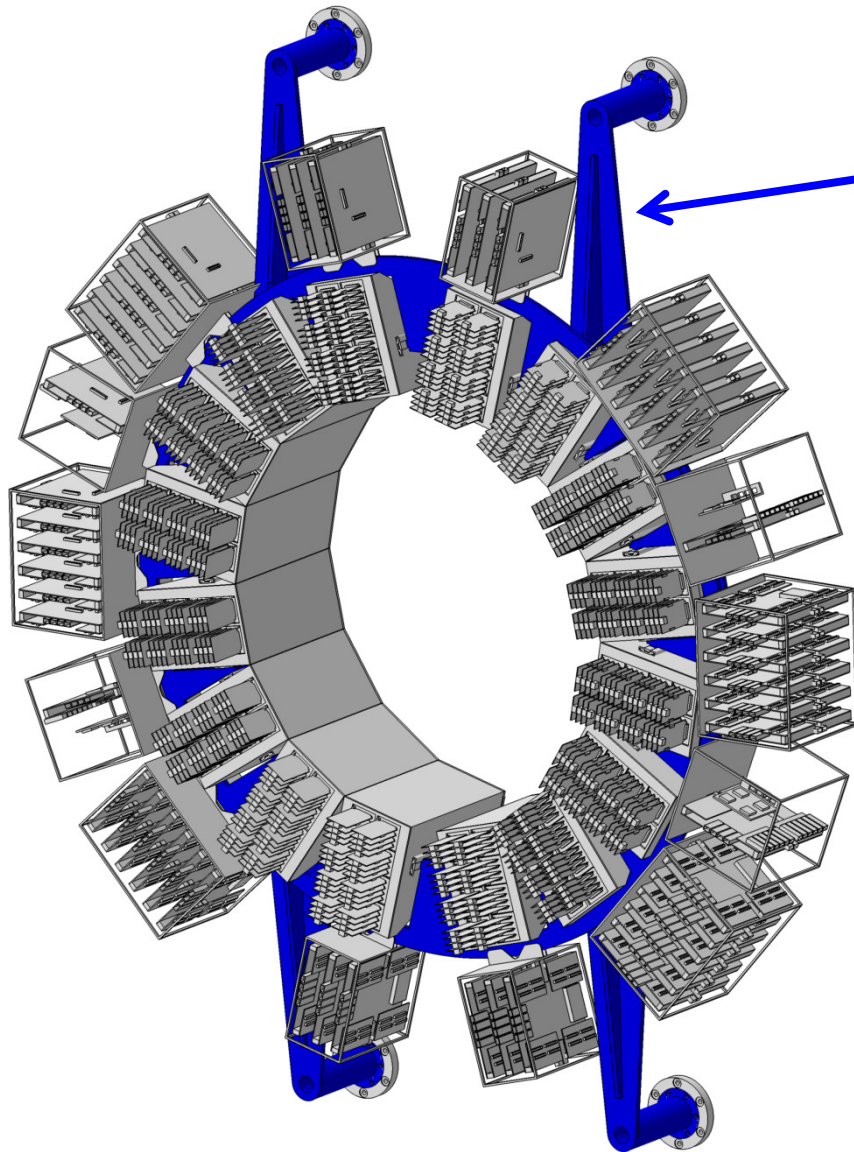
- Internal radius 448mm
- External radius 1080mm
- Total weight \approx 500kg

Radiator Barrel (SciTil Support)

- Internal radius 448mm
- External radius 538mm
- Total weight \approx 400kg

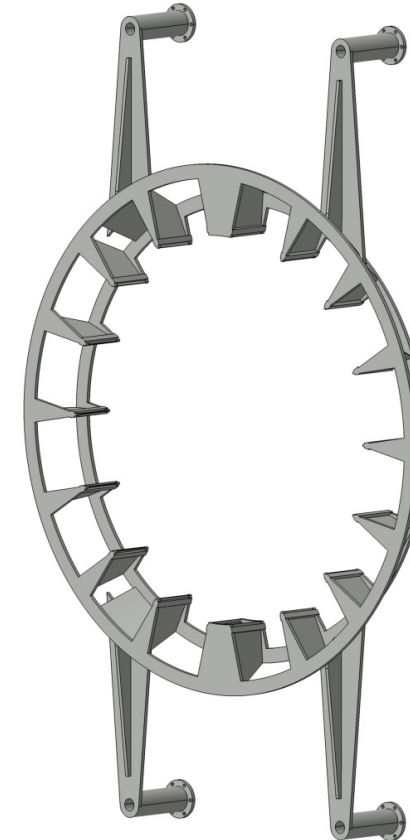


Barrel DIRC Main Components – Readout Unit

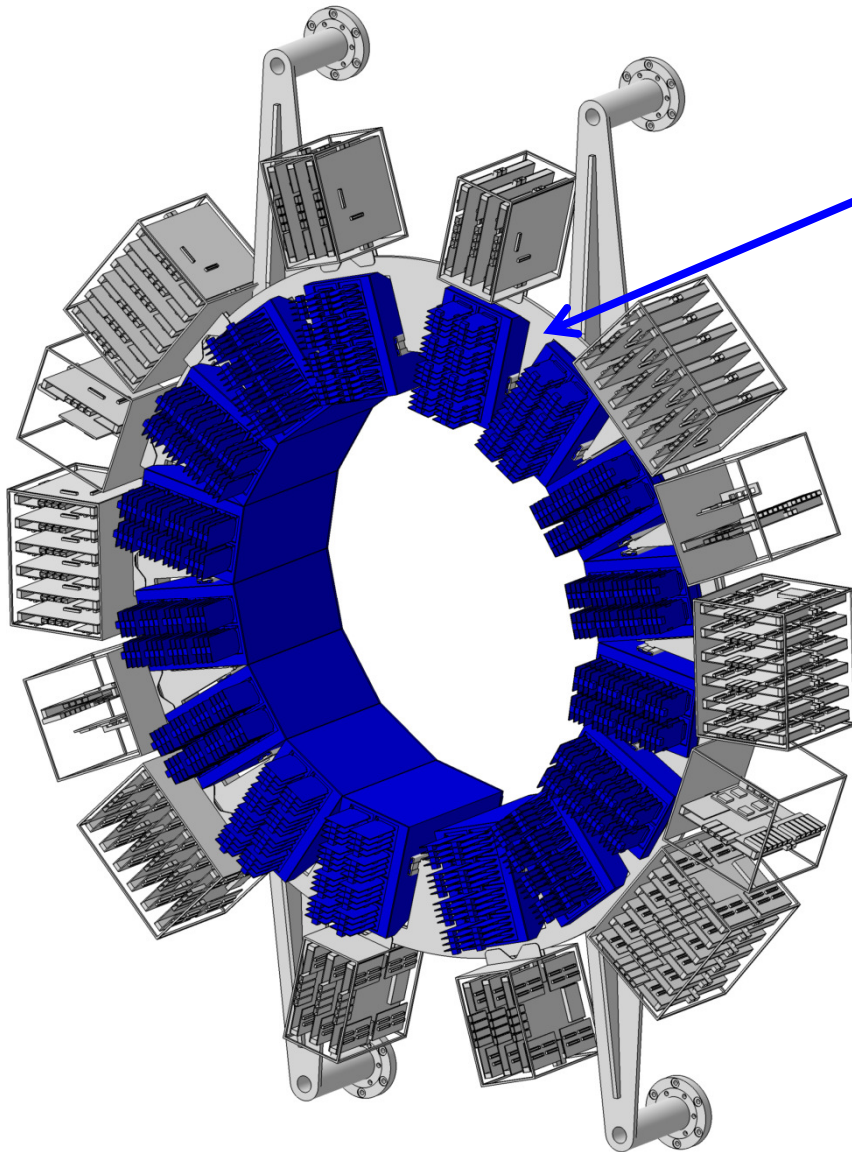


1X Readout Unit Support Ring

- Aluminum alloy
- Total weight \approx 20-25kg

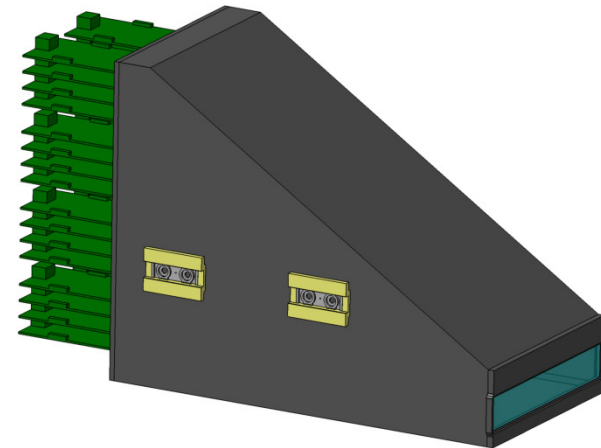


Barrel DIRC Main Components – Readout Unit

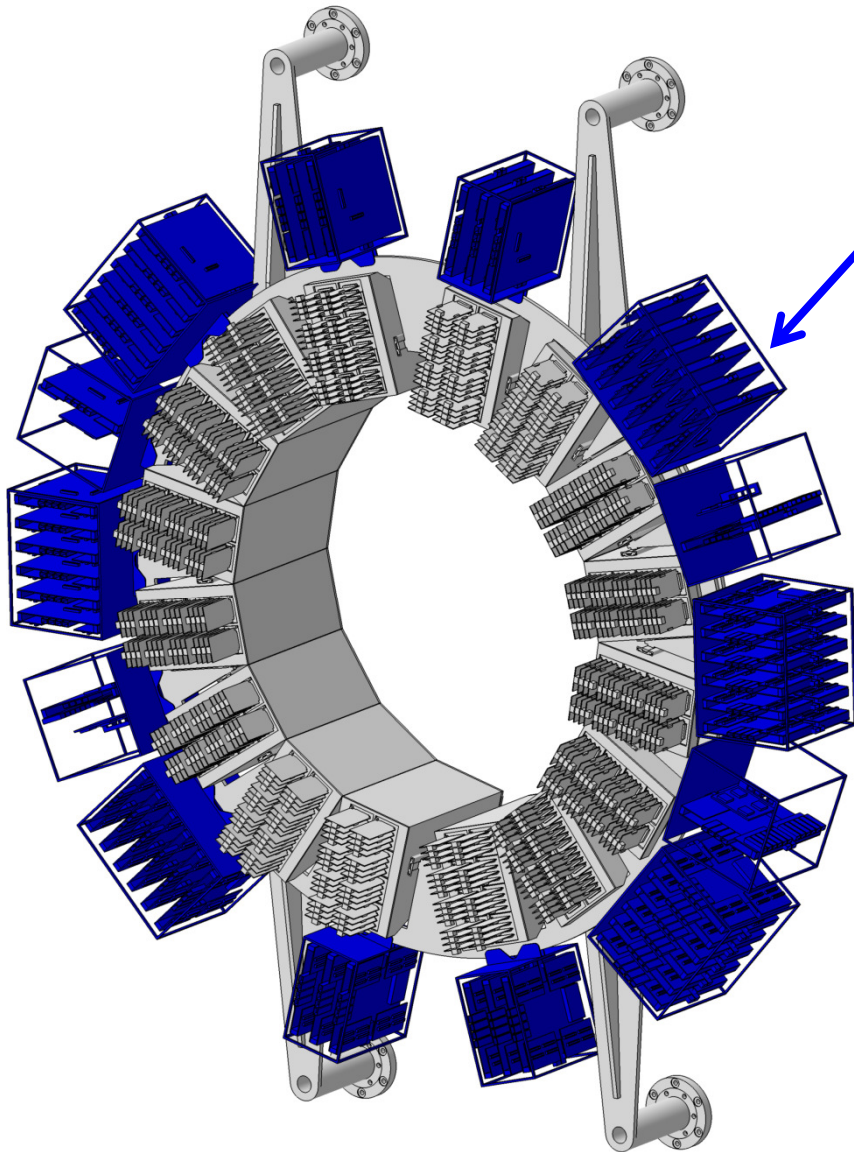


16X Prism Box including

- FEE
- MCP-PMTs
- Synthetic fused silica prism
- Coupling flange
- Linear unit
- Total weight of one box $\approx 18-20\text{kg}$

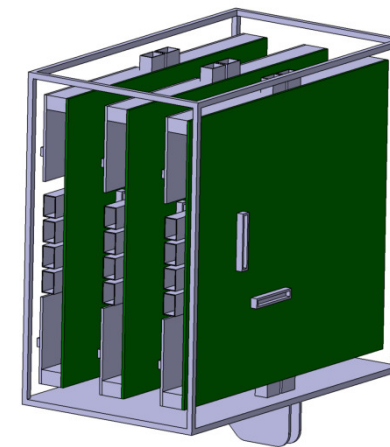


Barrel DIRC Main Components – Readout Unit

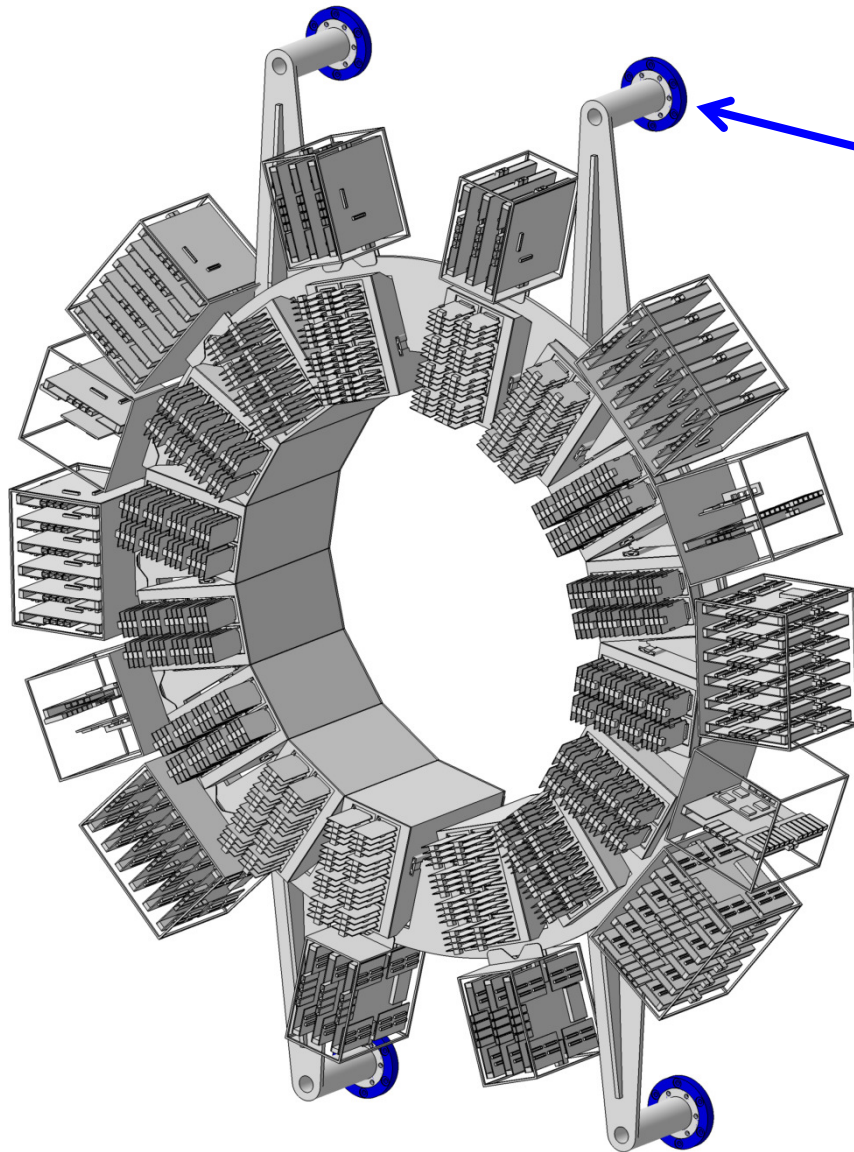


Sub-Racks including

- TRBs
- CTS
- Network switches
- etc.

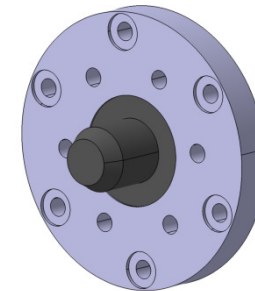


Barrel DIRC Main Components – Readout Unit

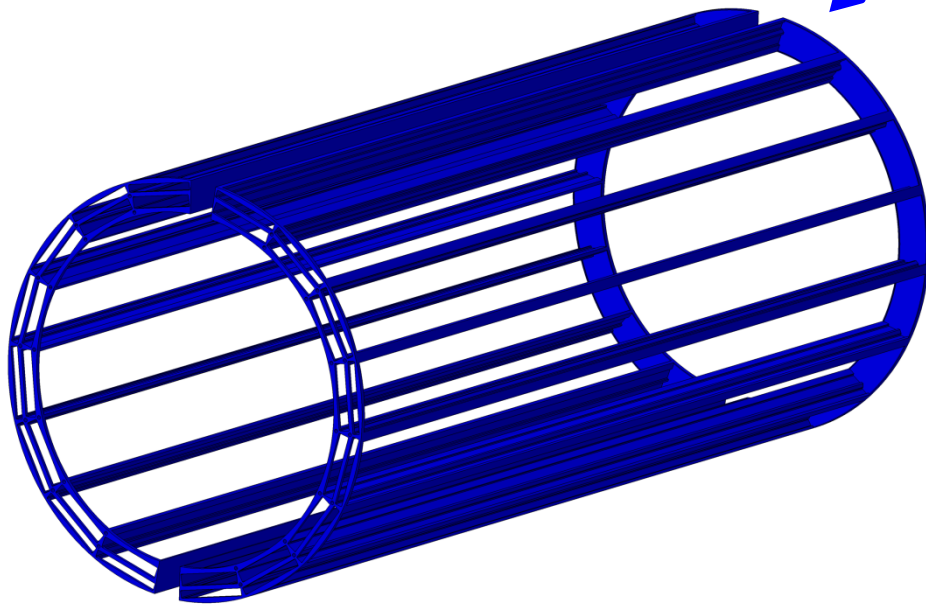


4X Centering Flange

- Each centering flange is attached to the cryostat upstream flange to allow easy installation and enable alignment of the support ring.

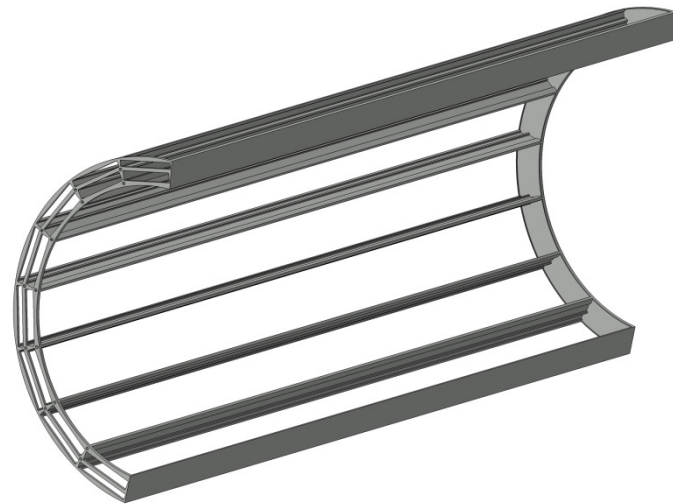


Barrel DIRC Main Components – Radiator Barrel

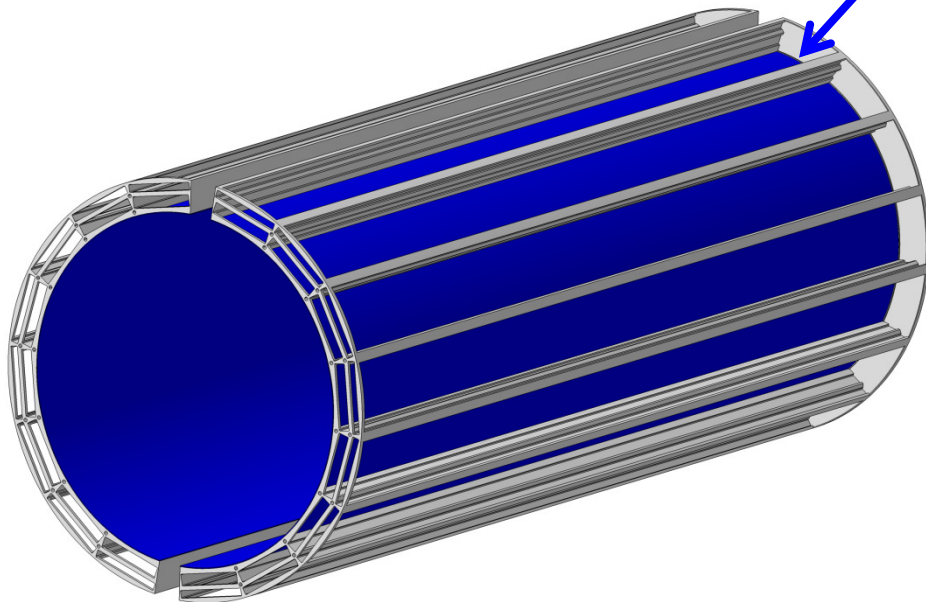


2X Radiator Barrel Support Frame

- Extruded aluminum profiles and half rings

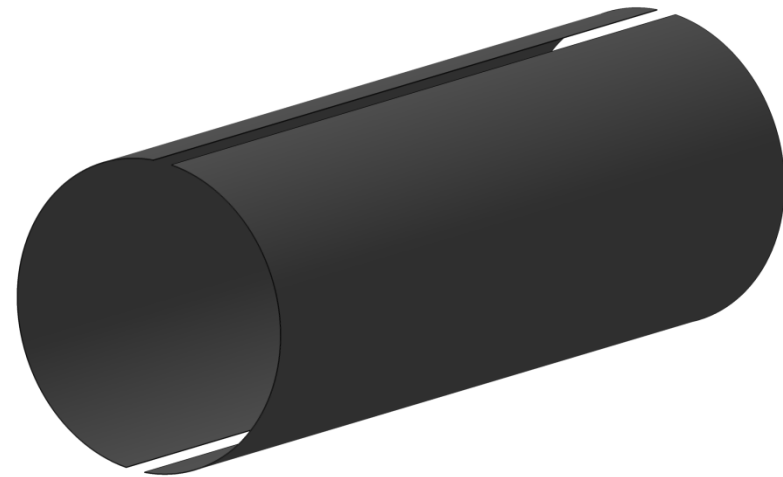


Barrel DIRC Main Components – Radiator Barrel

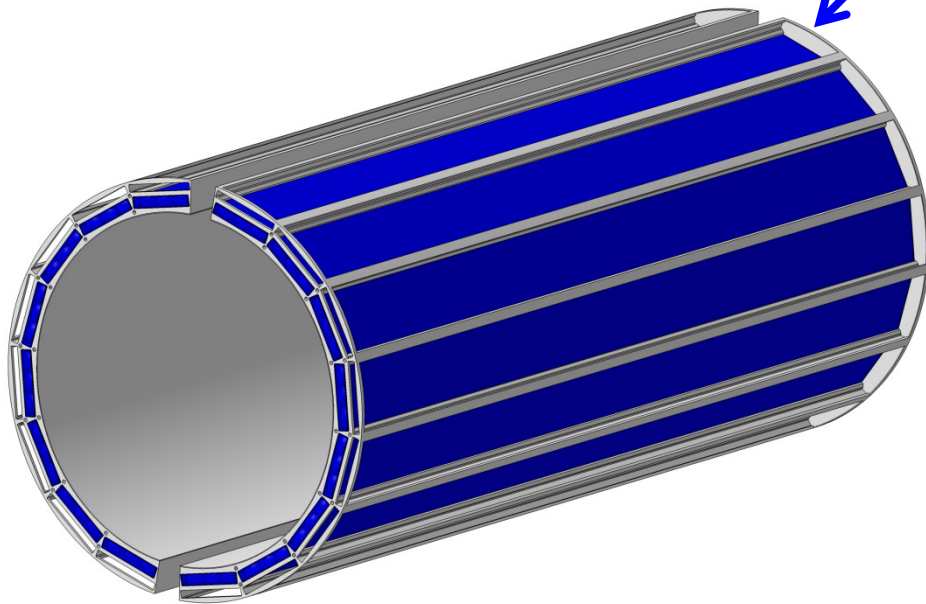


2X Inner Sheets

- To reach a high stiffness of the frame
- Thickness 1-2 mm

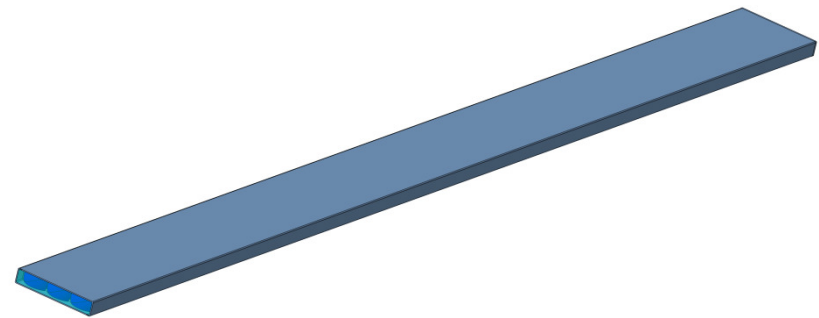


Barrel DIRC Main Components – Radiator Barrel

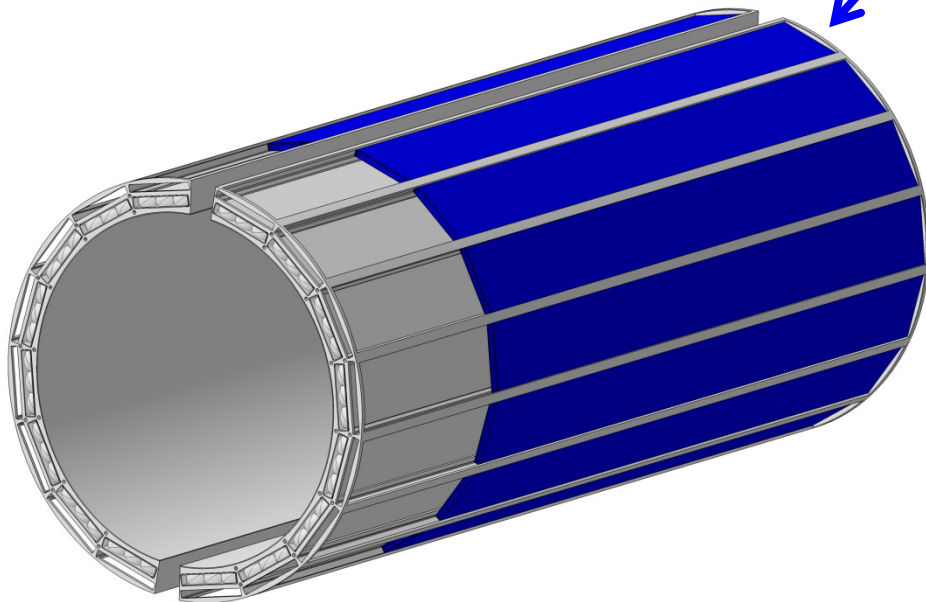


16X Bar Box including

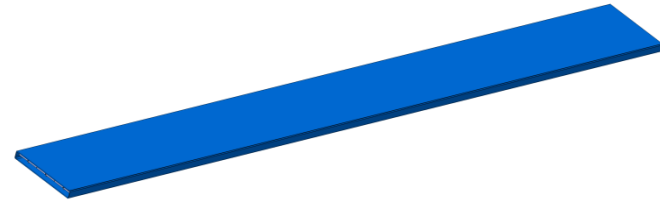
- Radiator bars
- Spring-loaded mirrors
- Block of spherical lenses
- Total weight of one box
 $\approx 20\text{kg}$



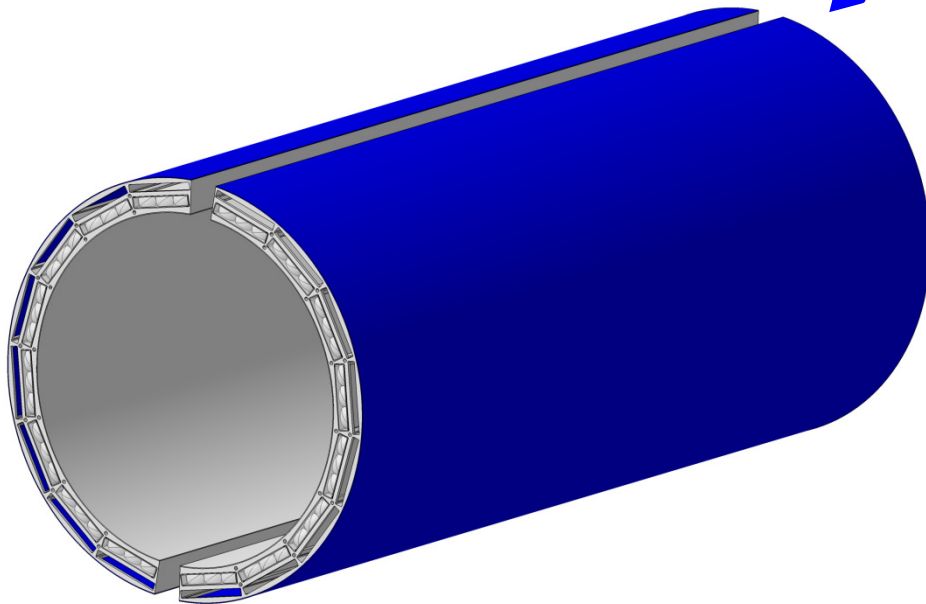
Barrel DIRC Main Components – Radiator Barrel



- 16X SciTil Box including
- SciTil super module

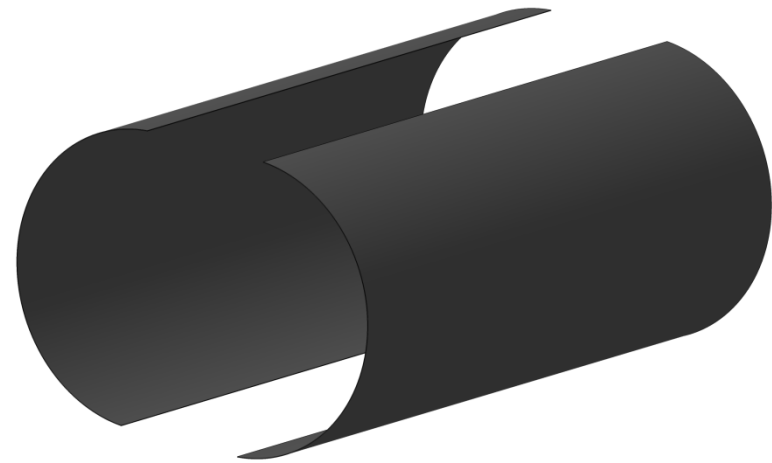


Barrel DIRC Main Components – Radiator Barrel

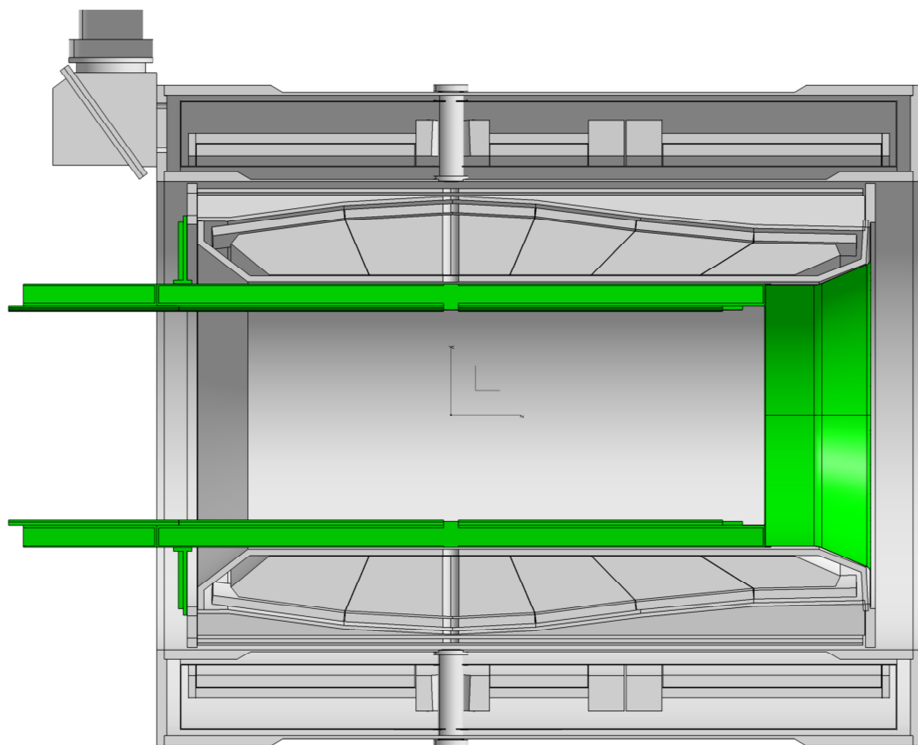


2X Outer Sheets

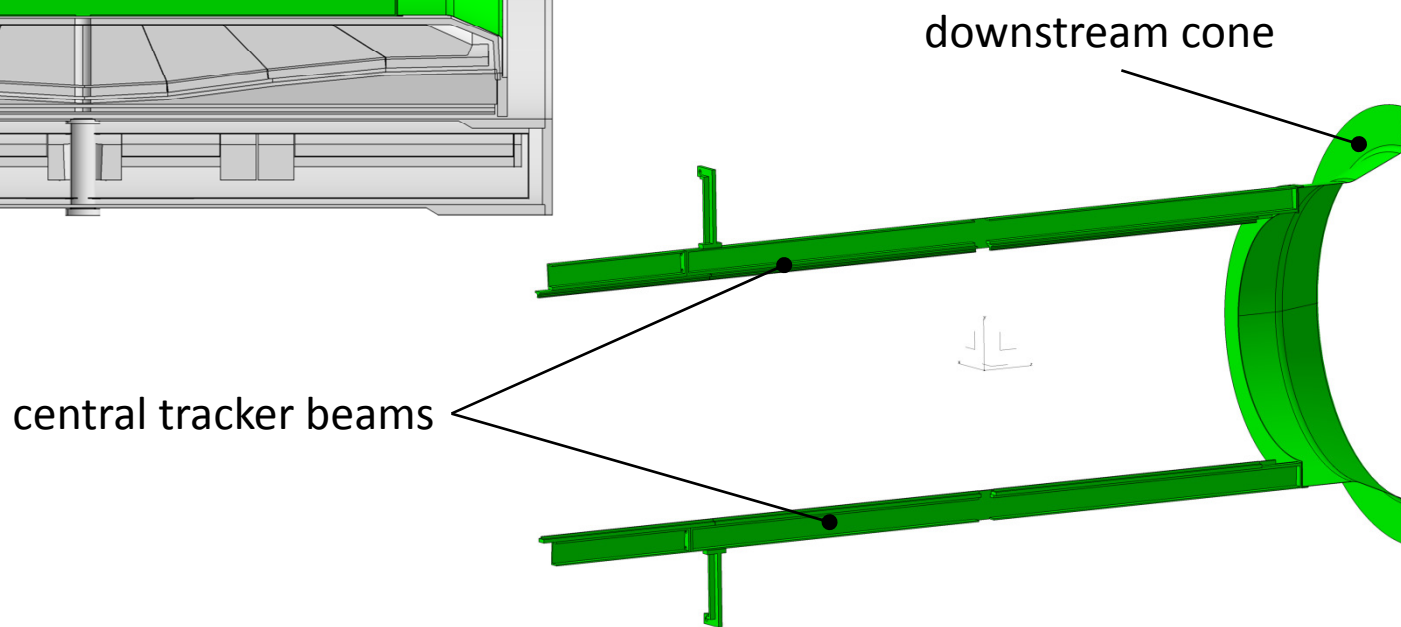
- To reach a high stiffness of the frame
- Thickness 1-2 mm



Installation Procedure Radiator Barrel

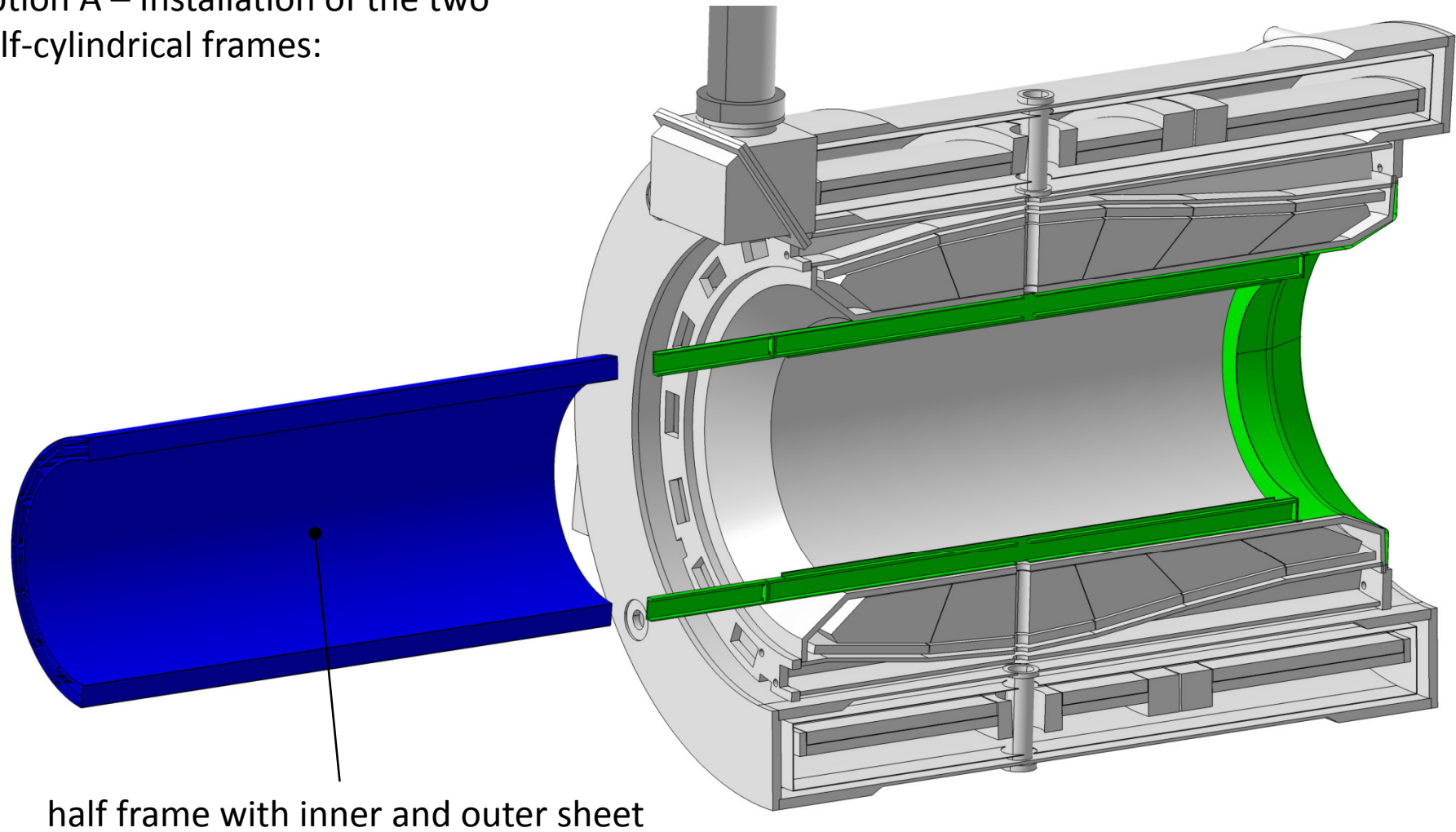


Radiator barrel attachment structure



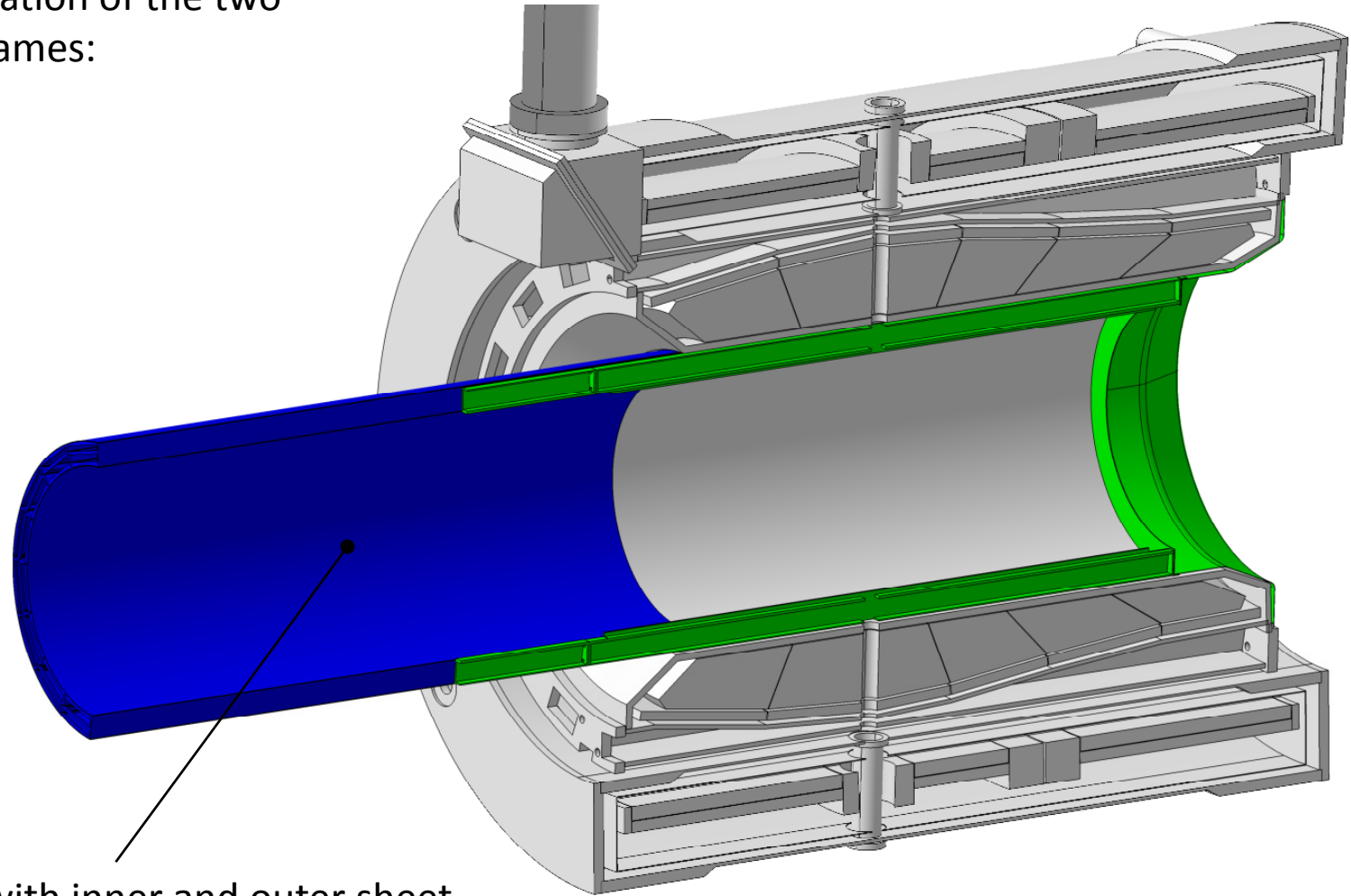
Installation Procedure Radiator Barrel

Option A – Installation of the two half-cylindrical frames:



Installation Procedure Radiator Barrel

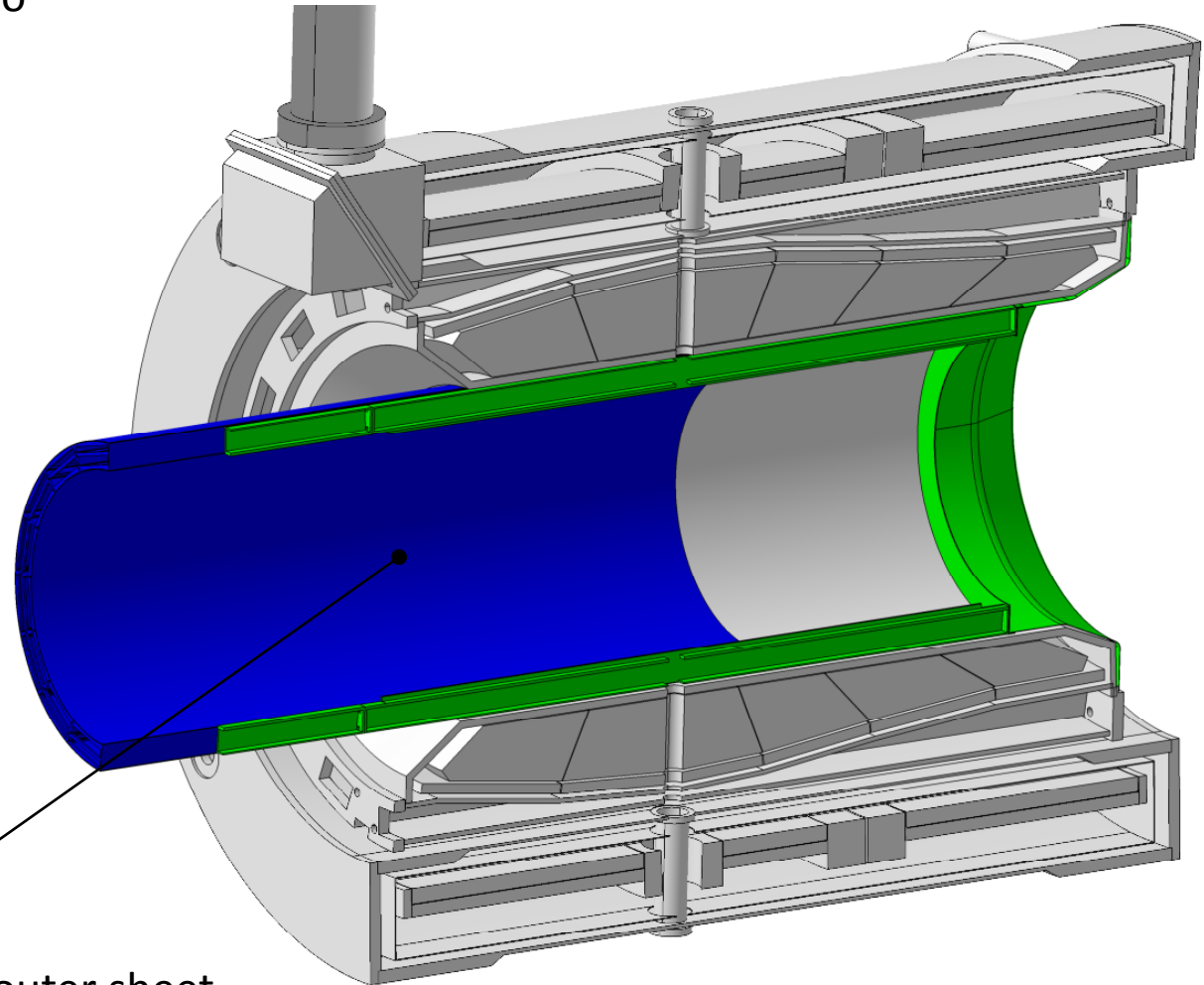
Option A – Installation of the two half-cylindrical frames:



half frame with inner and outer sheet

Installation Procedure Radiator Barrel

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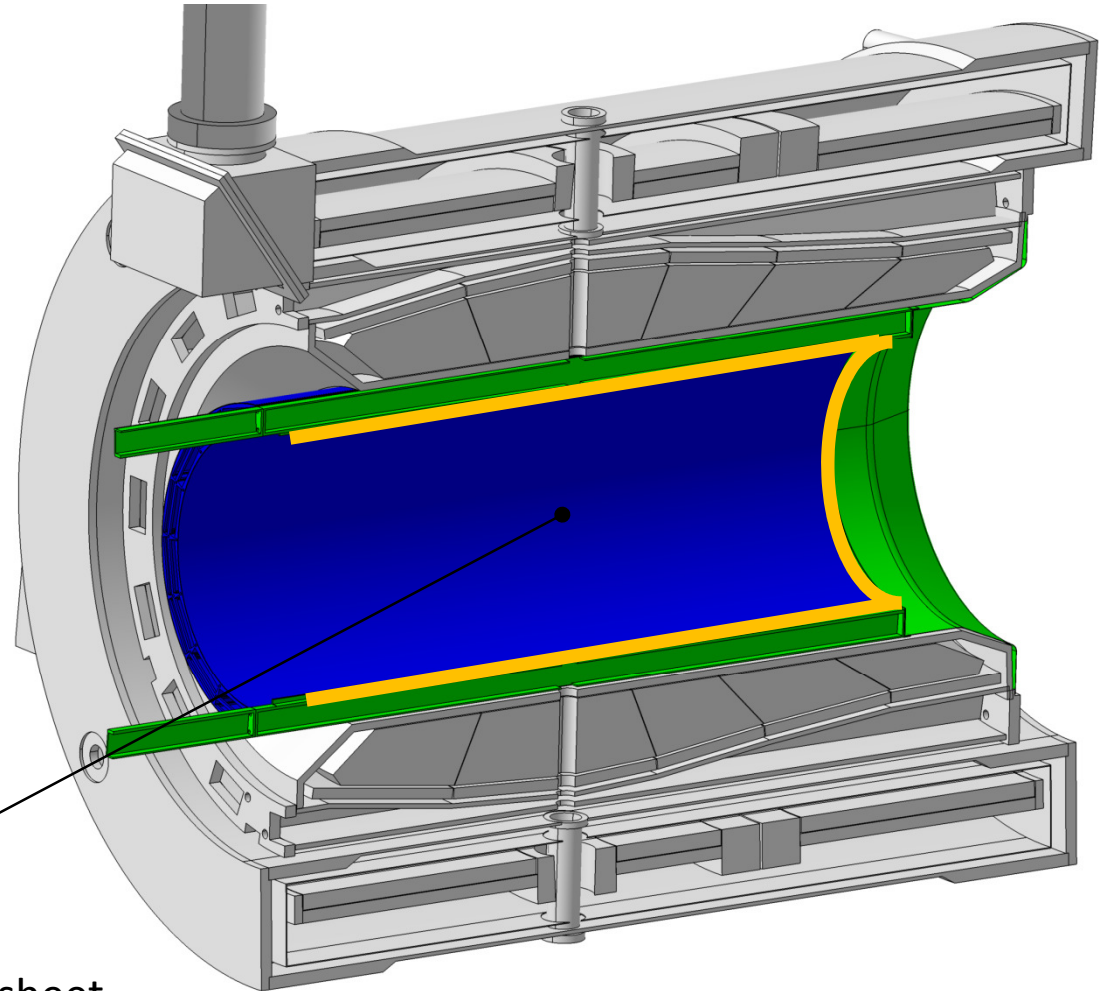


half frame with inner and outer sheet

Installation Procedure Radiator Barrel

Option A – Installation of the two half-cylindrical frames:

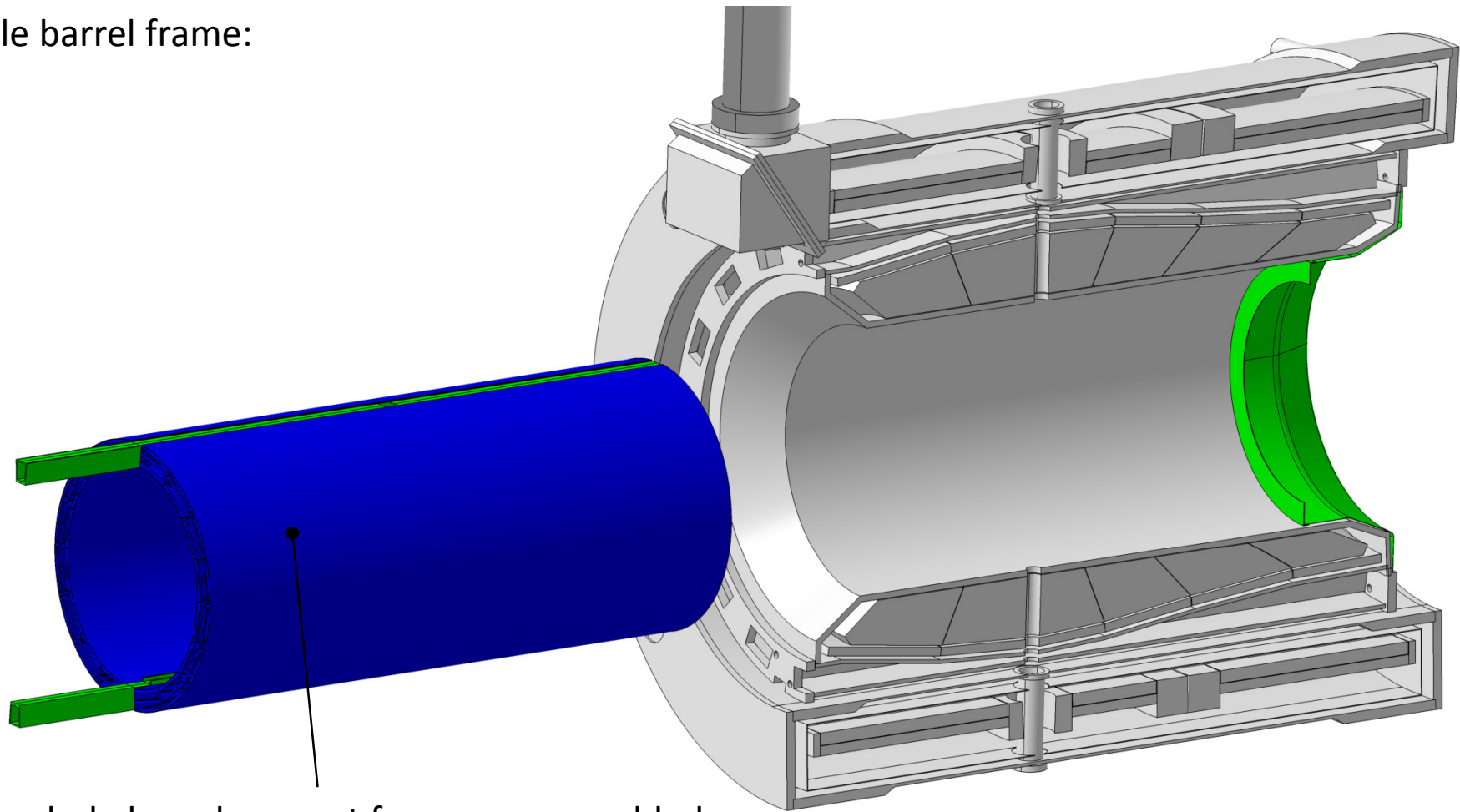
Access to the central tracker beams and the upstream cone is needed to mount the frames.



half frame with inner and outer sheet

Installation Procedure Radiator Barrel

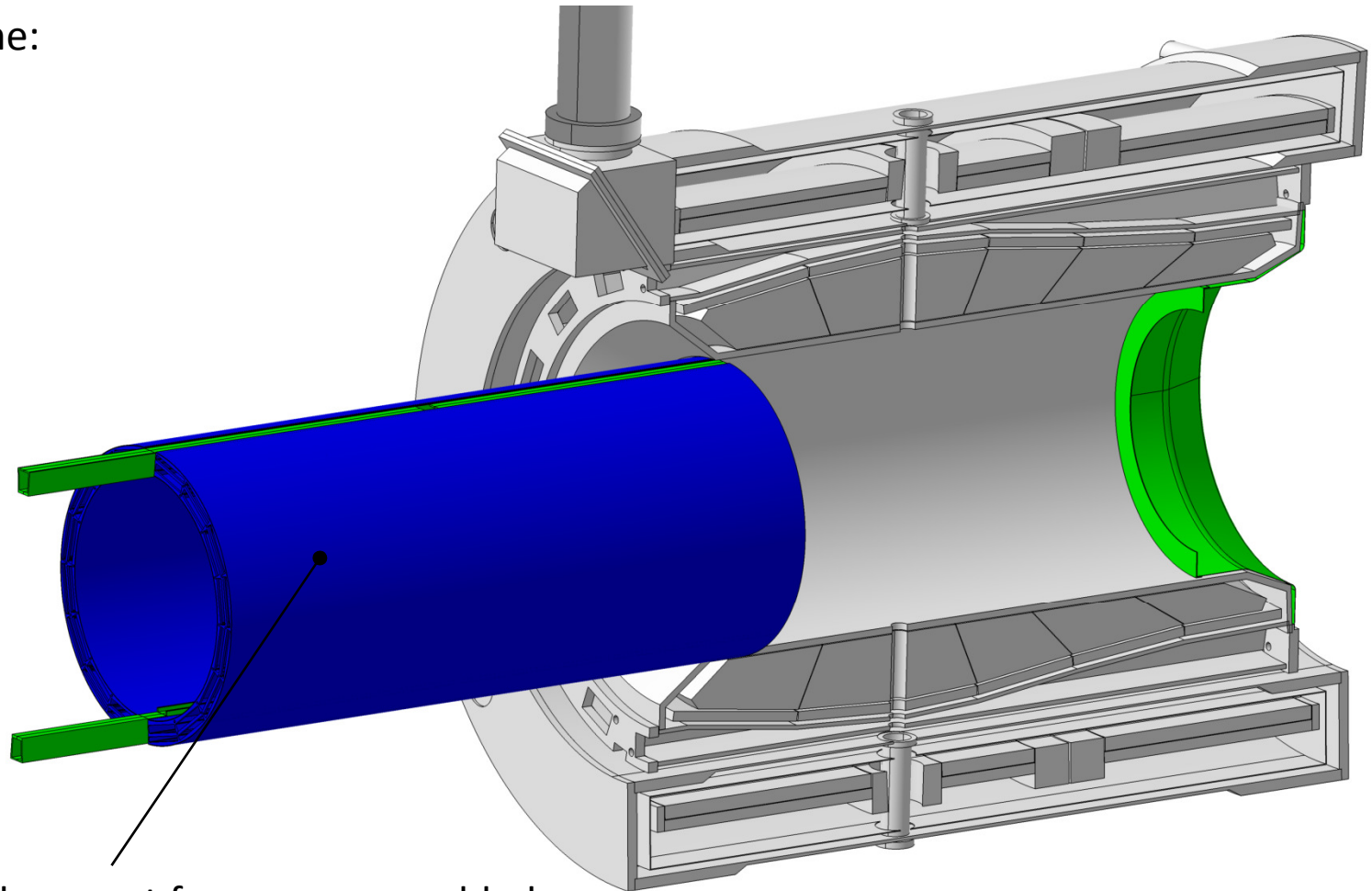
Option B – Installation of the whole barrel frame:



whole barrel support frame preassembled
on central tracker beams

Installation Procedure Radiator Barrel

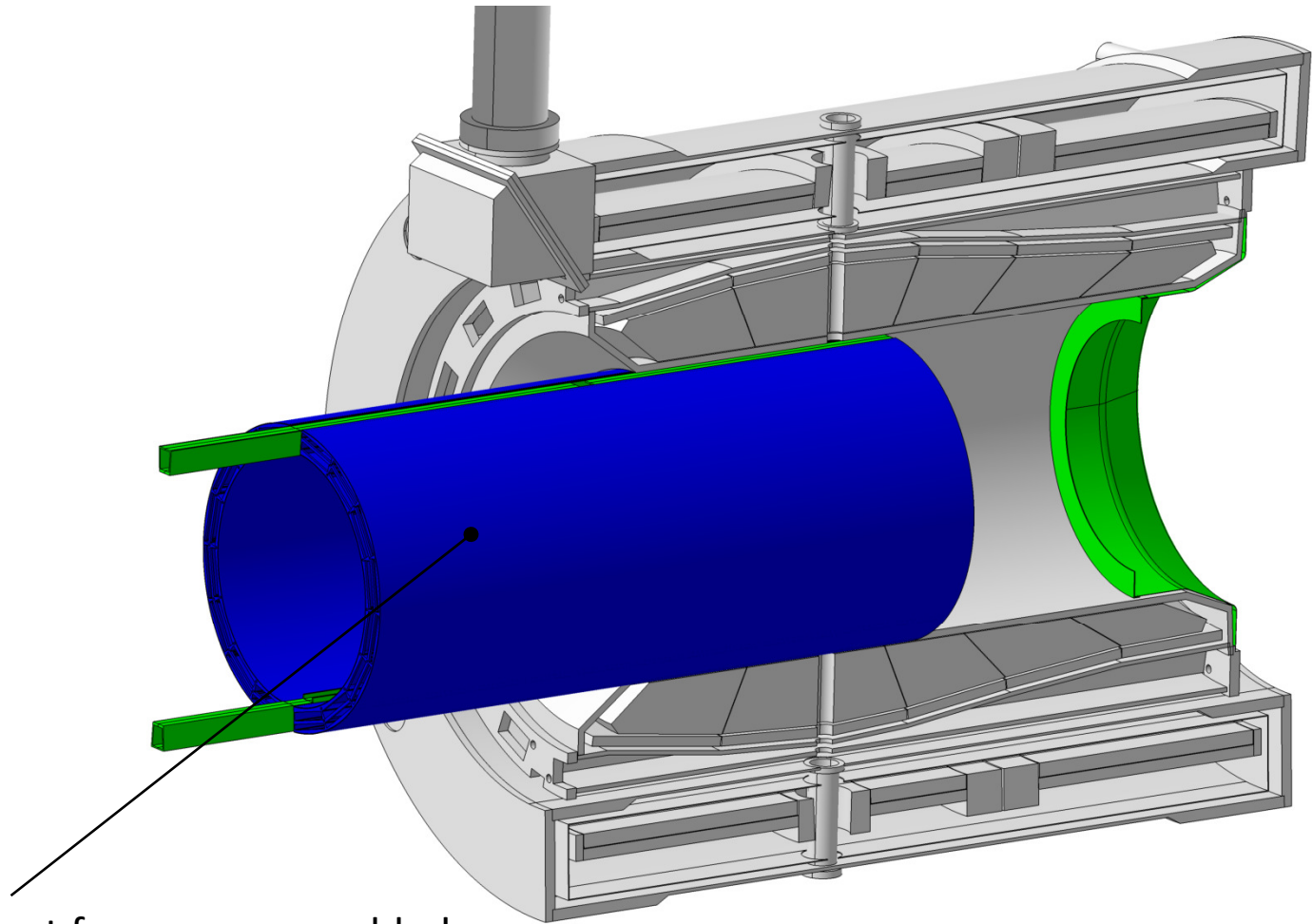
Option B – Installation of the whole barrel frame:



whole barrel support frame preassembled
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Installation Procedure Radiator Barrel

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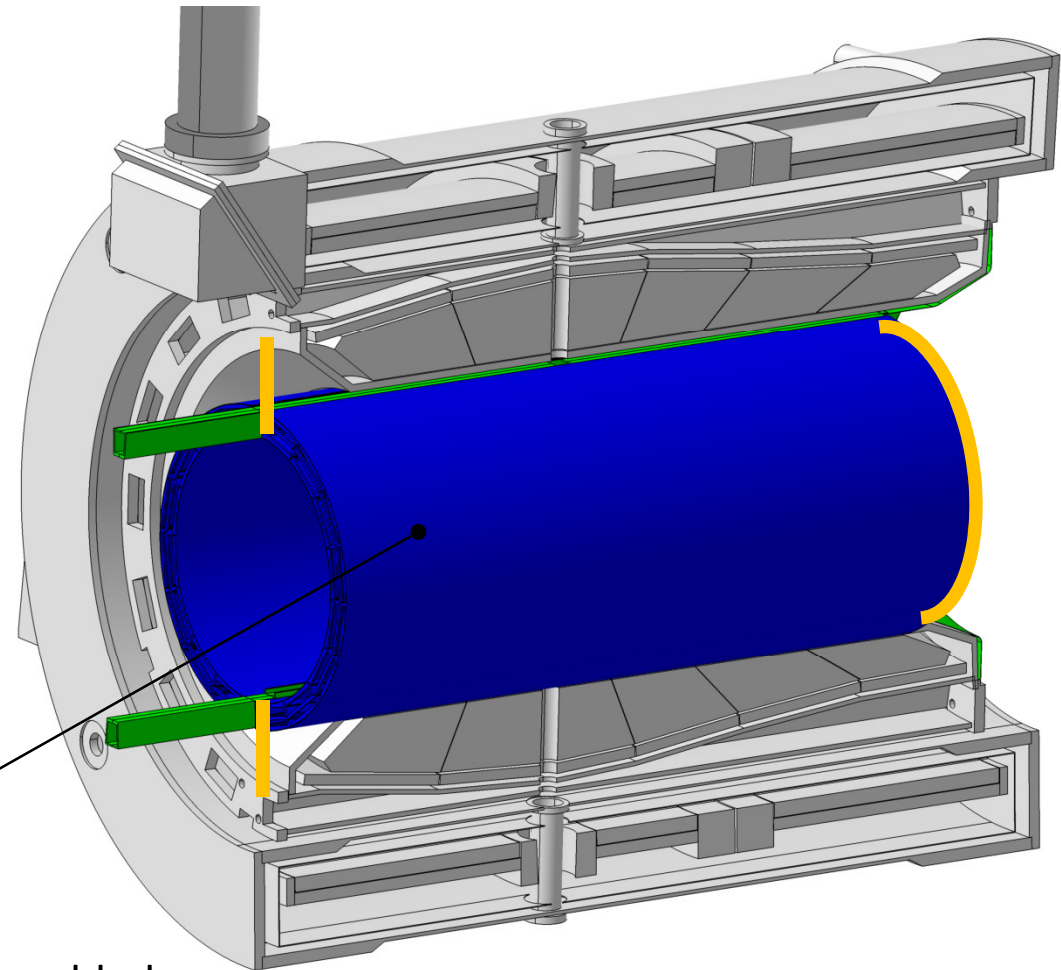


whole barrel support frame preassembled
on central tracker beams

Installation Procedure Radiator Barrel

Option B – Installation of the whole barrel frame:

No access inside the barrel needed to mount the frames. Central tracker beams can be integrated in the radiator barrel.

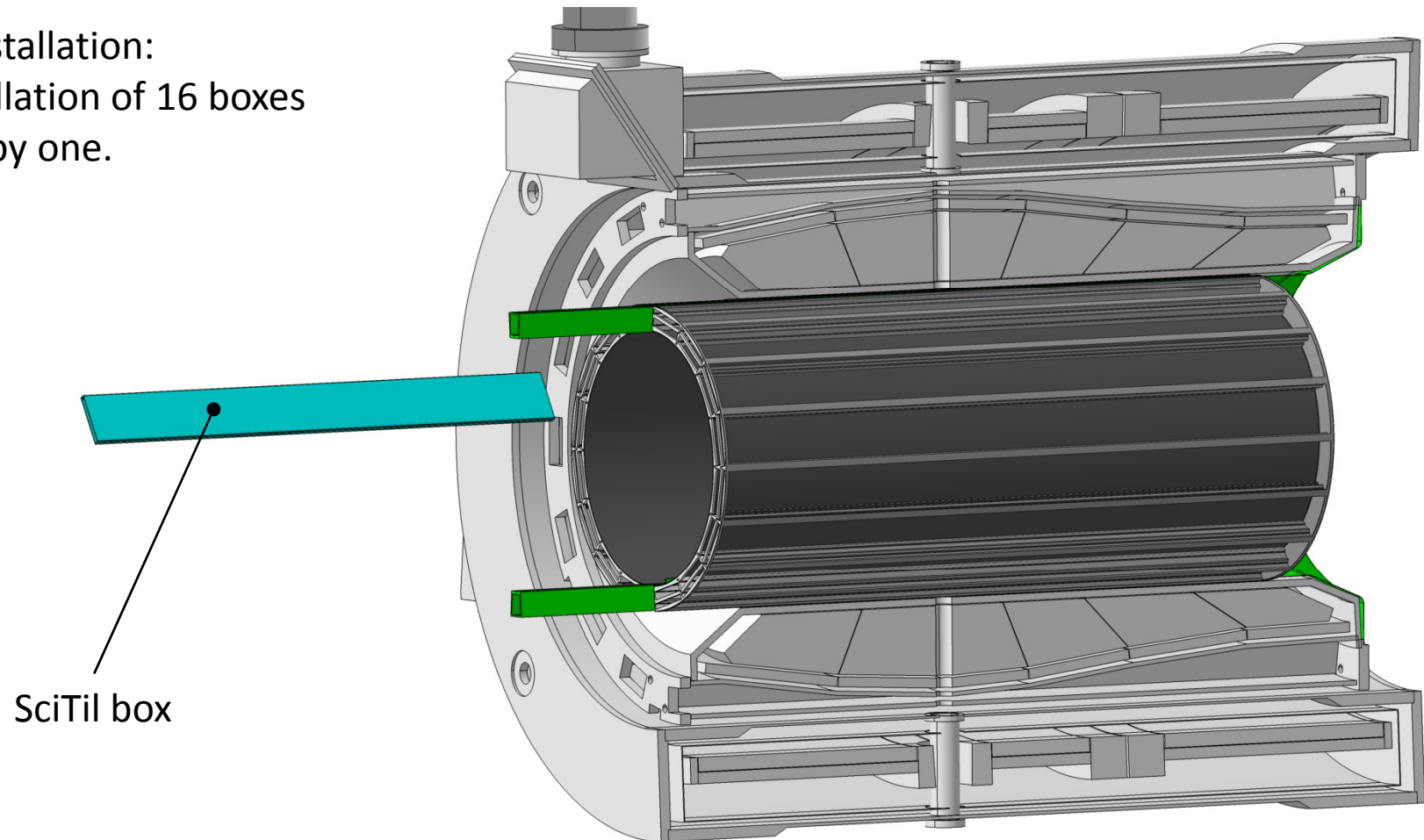


whole barrel support frame preassembled on central tracker beams

Installation Procedure Radiator Barrel

SciTil installation:

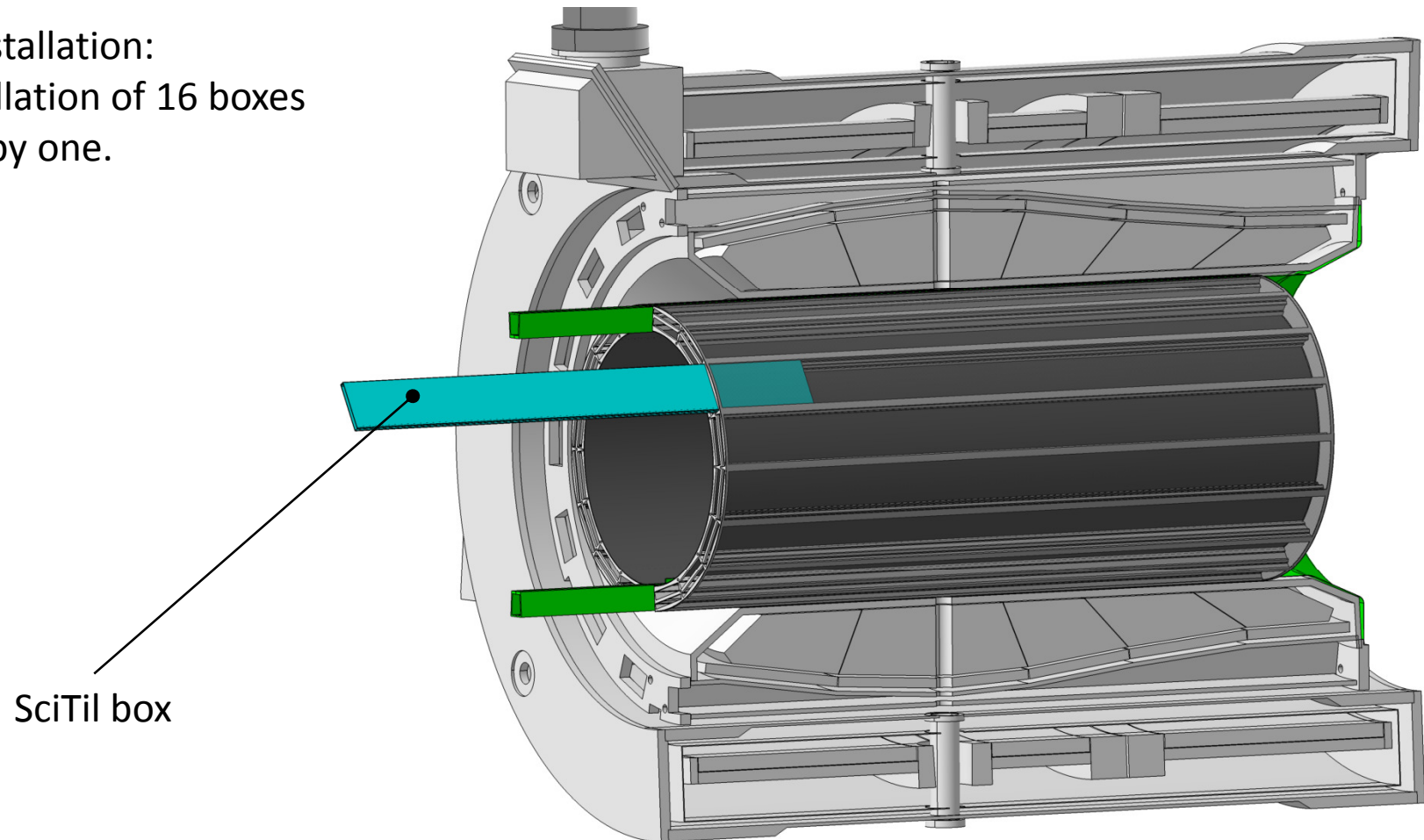
- Installation of 16 boxes one by one.



Installation Procedure Radiator Barrel

SciTil installation:

- Installation of 16 boxes one by one.

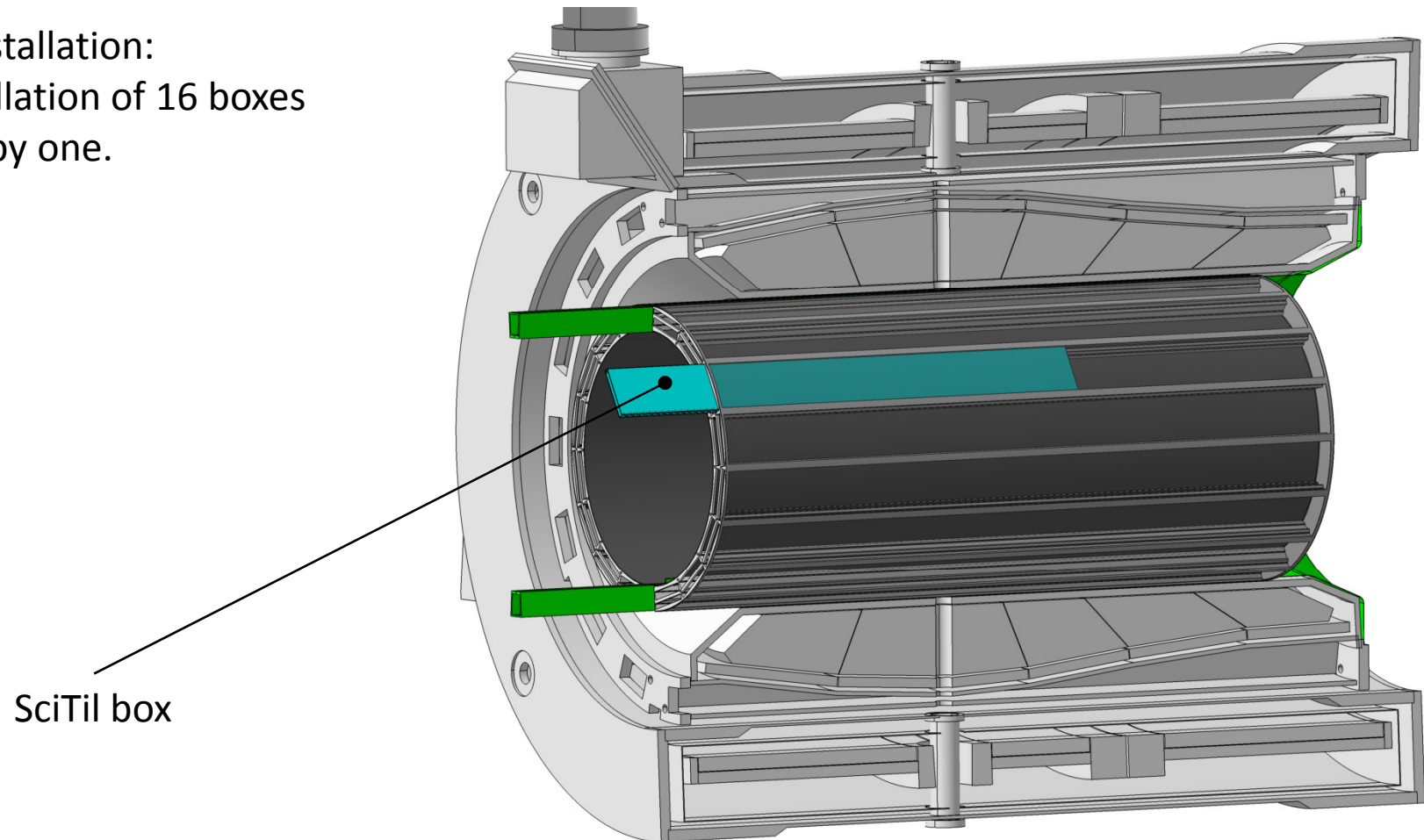


SciTil box

Installation Procedure Radiator Barrel

SciTil installation:

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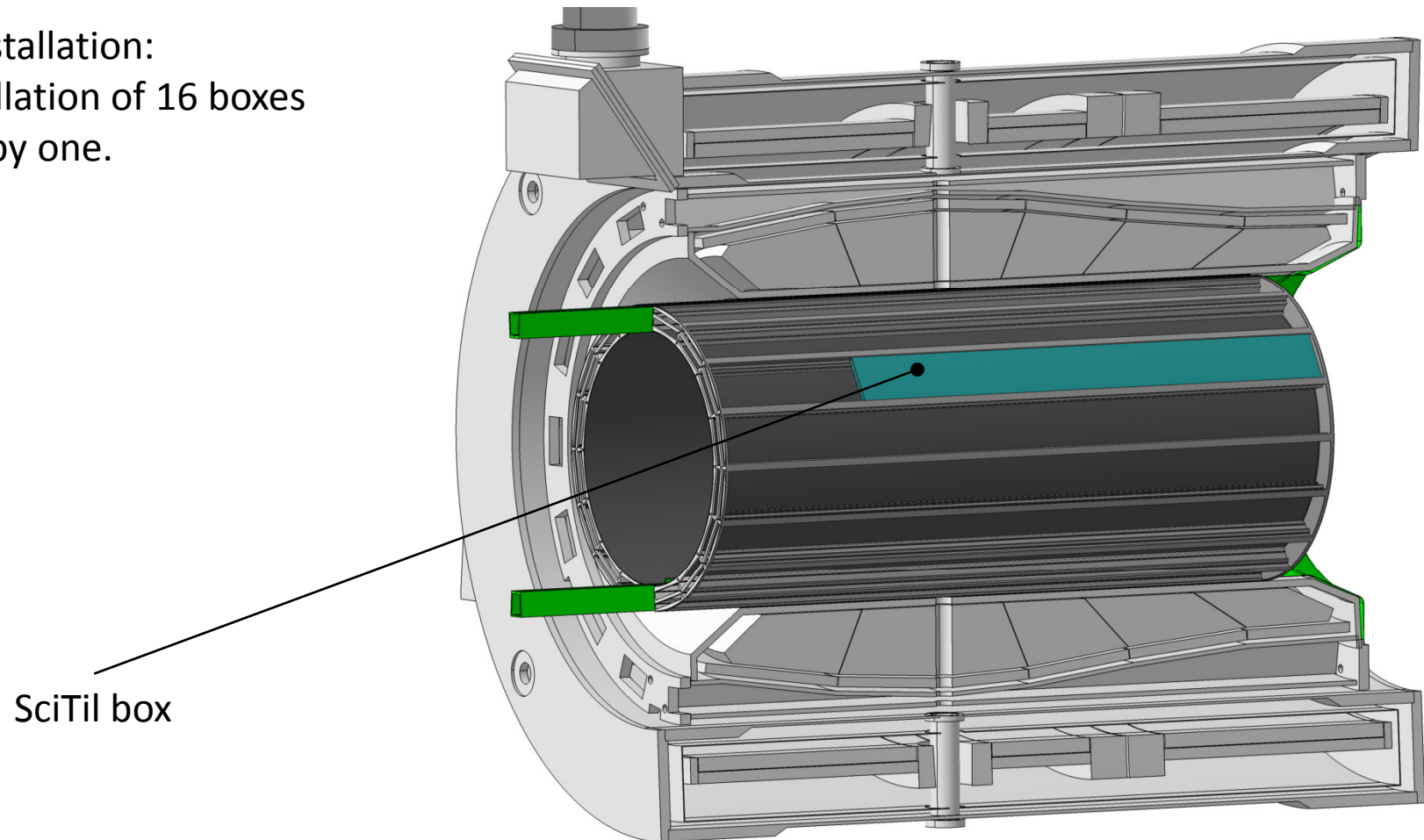


SciTil box

Installation Procedure Radiator Barrel

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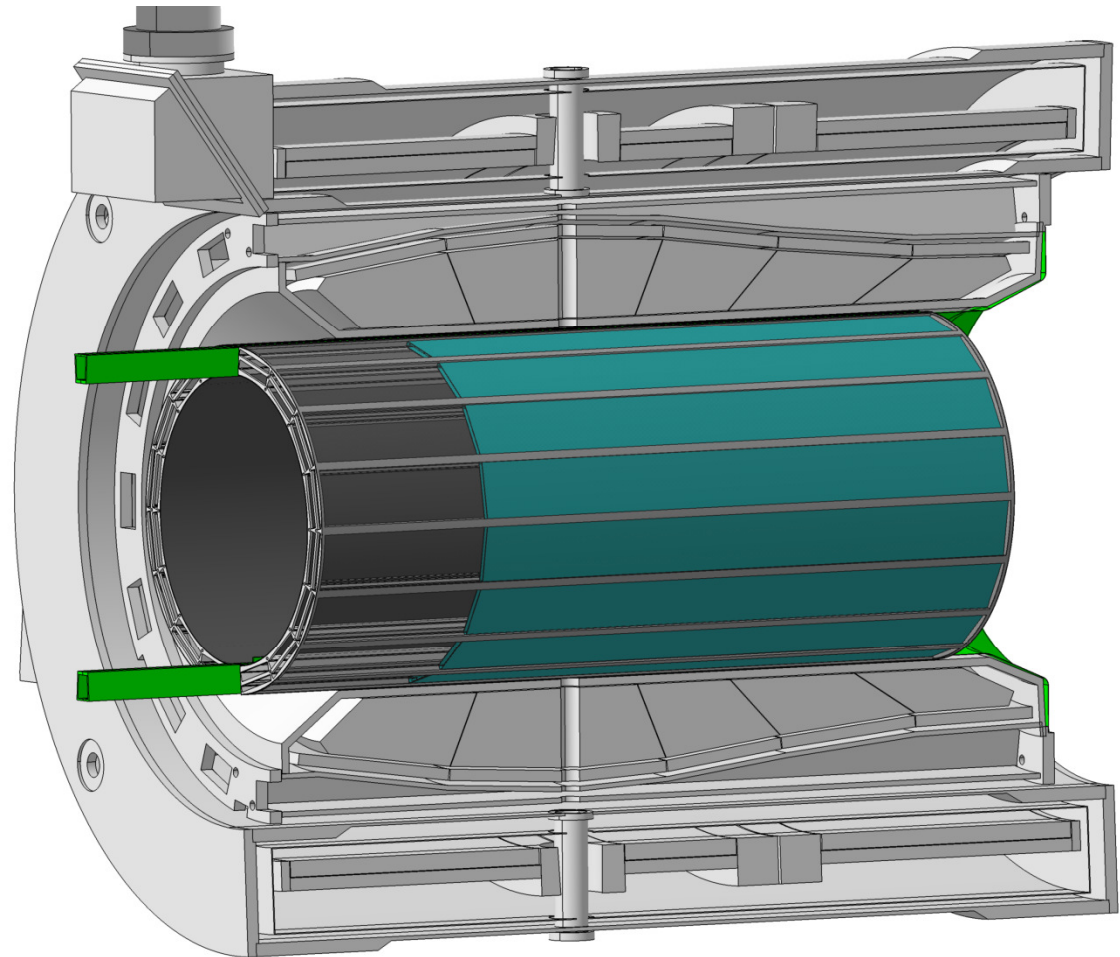


SciTil box

Installation Procedure Radiator Barrel

SciTil installation:

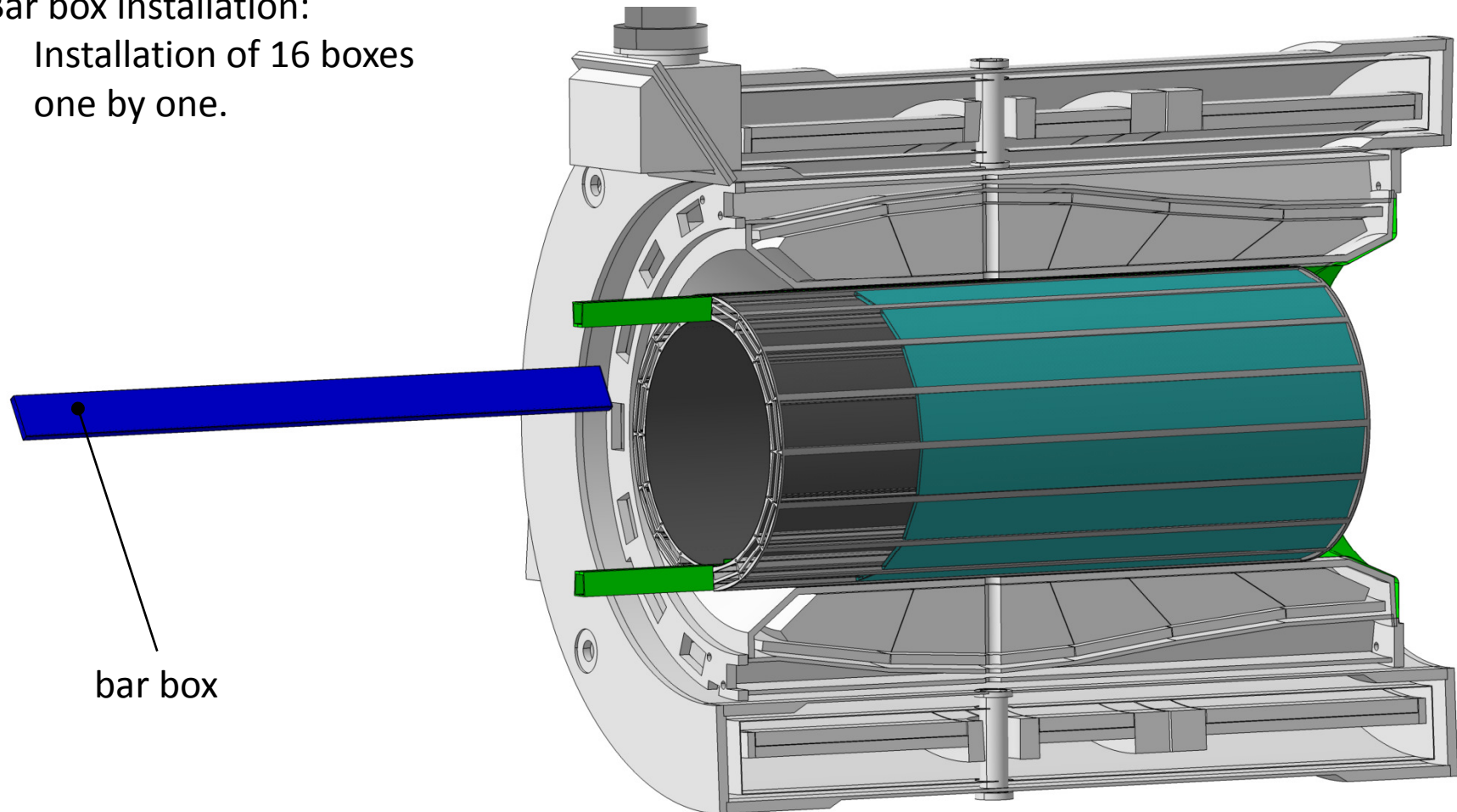
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Installation Procedure Radiator Barrel

Bar box installation:

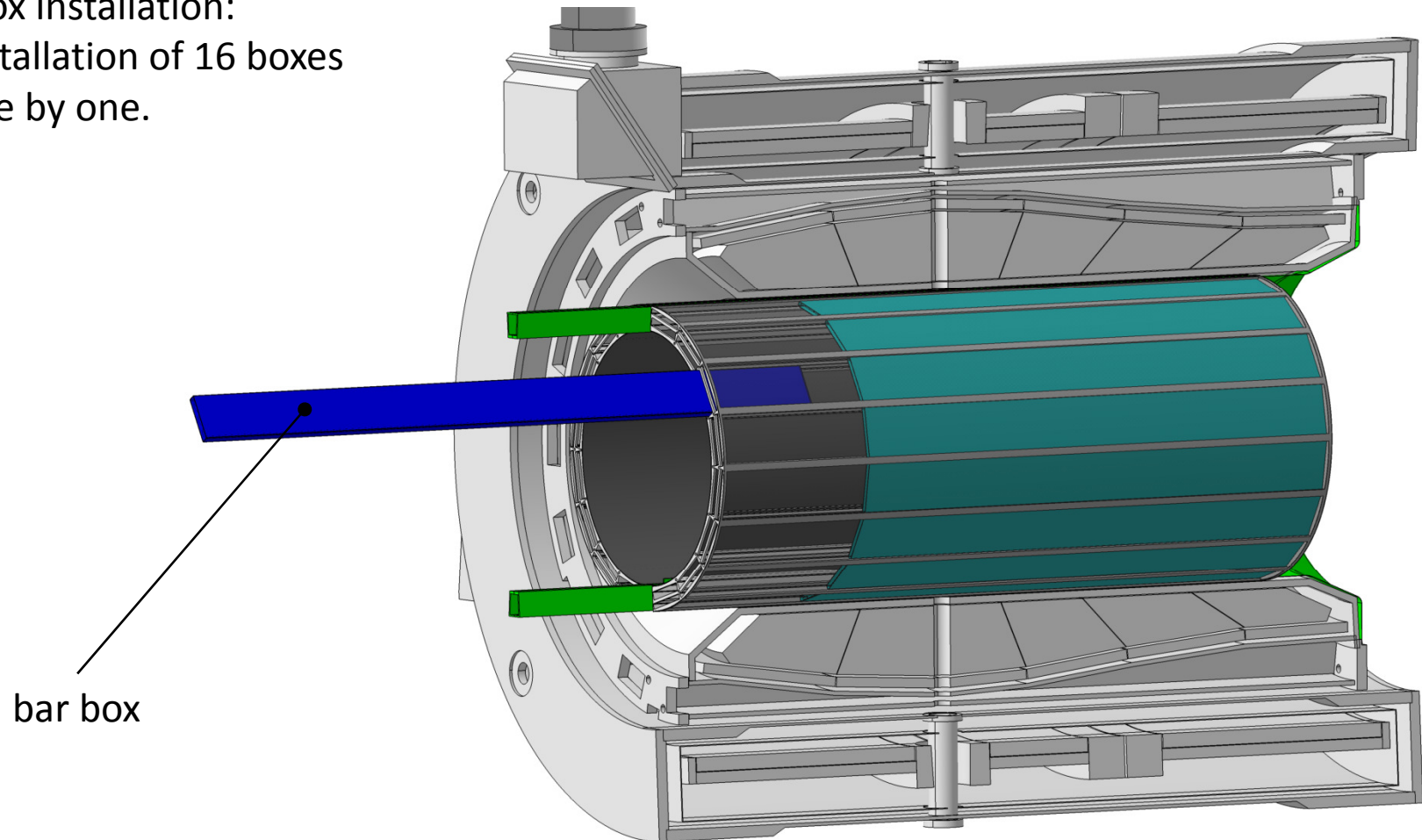
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Installation Procedure Radiator Barrel

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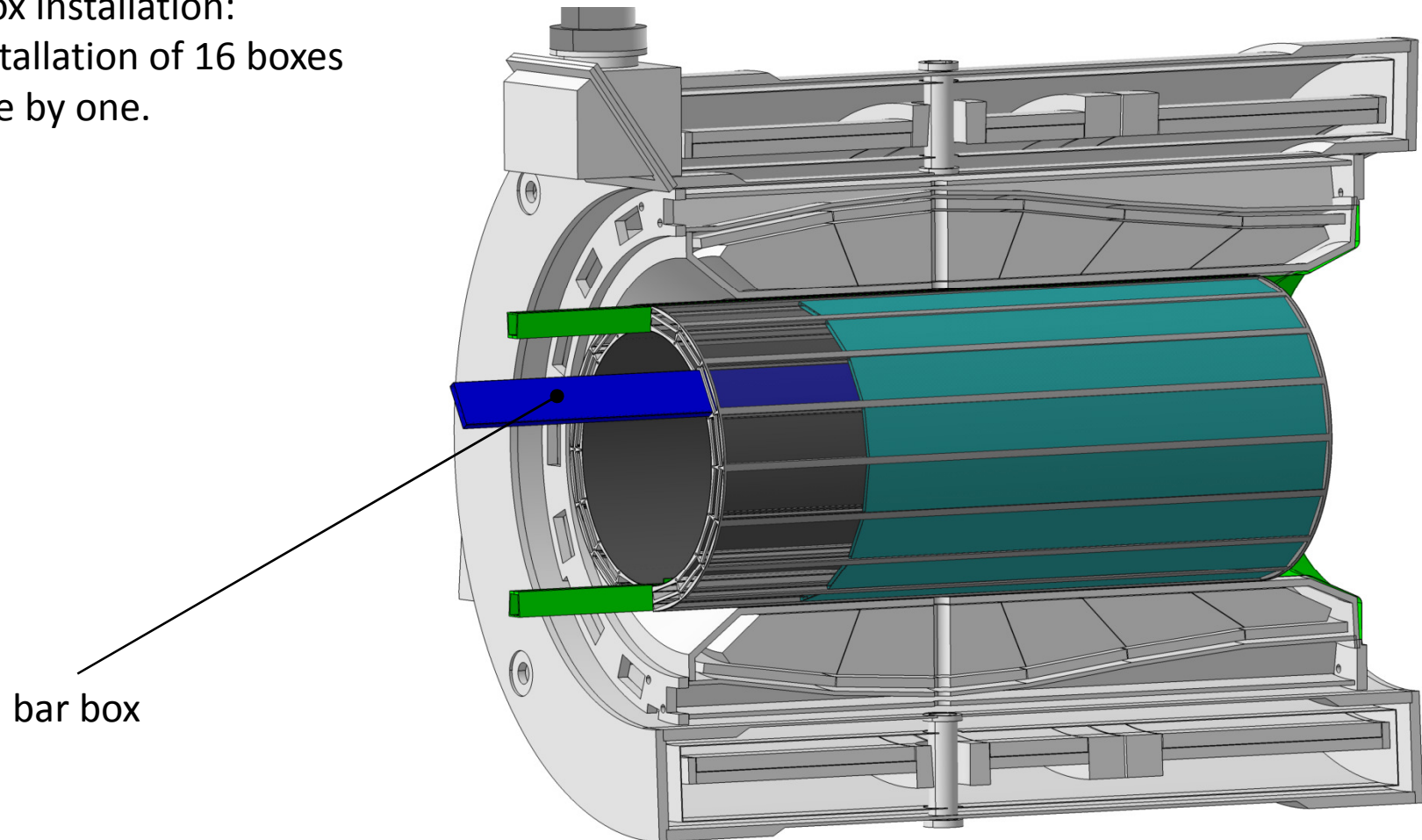
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Installation Procedure Radiator Barrel

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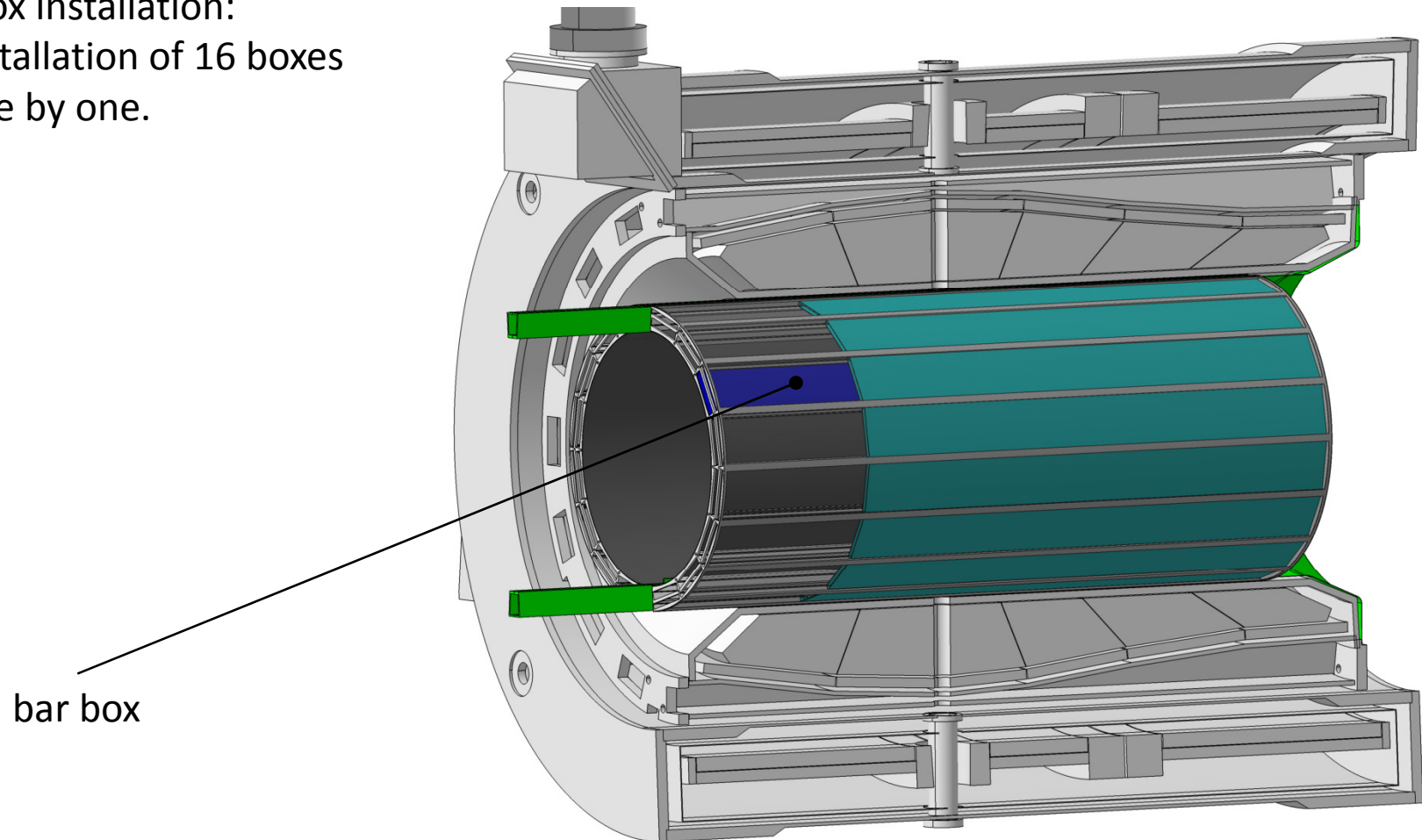


bar box

Installation Procedure Radiator Barrel

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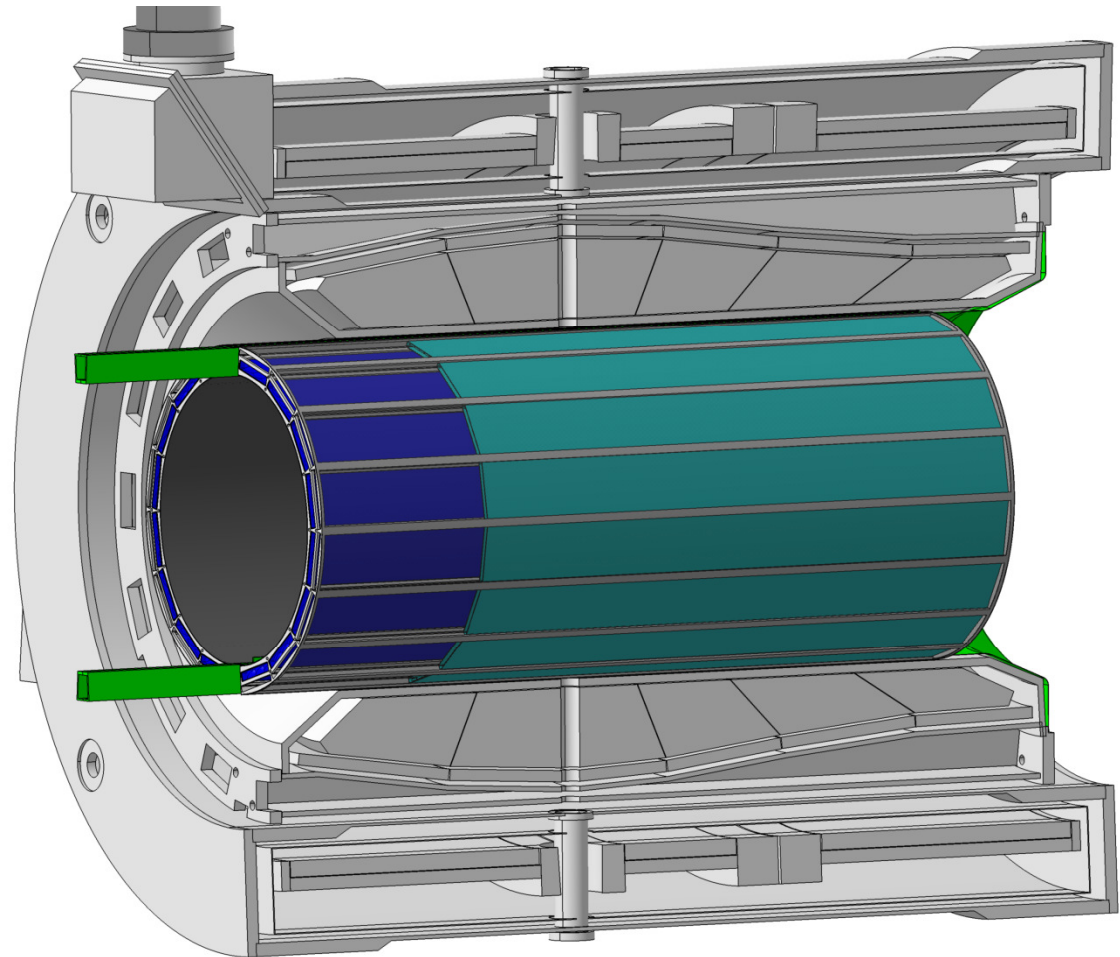


bar box

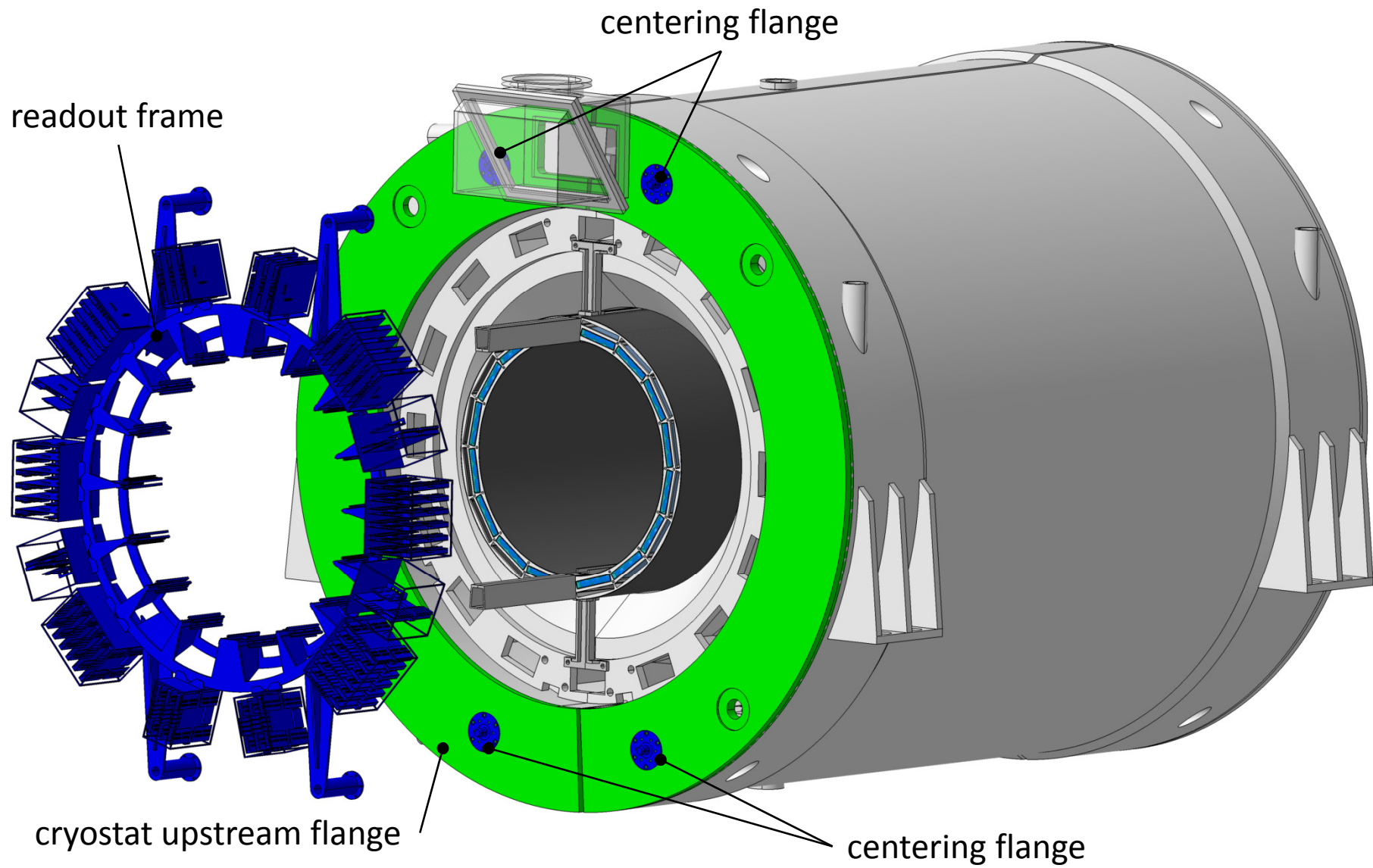
Installation Procedure Radiator Barrel

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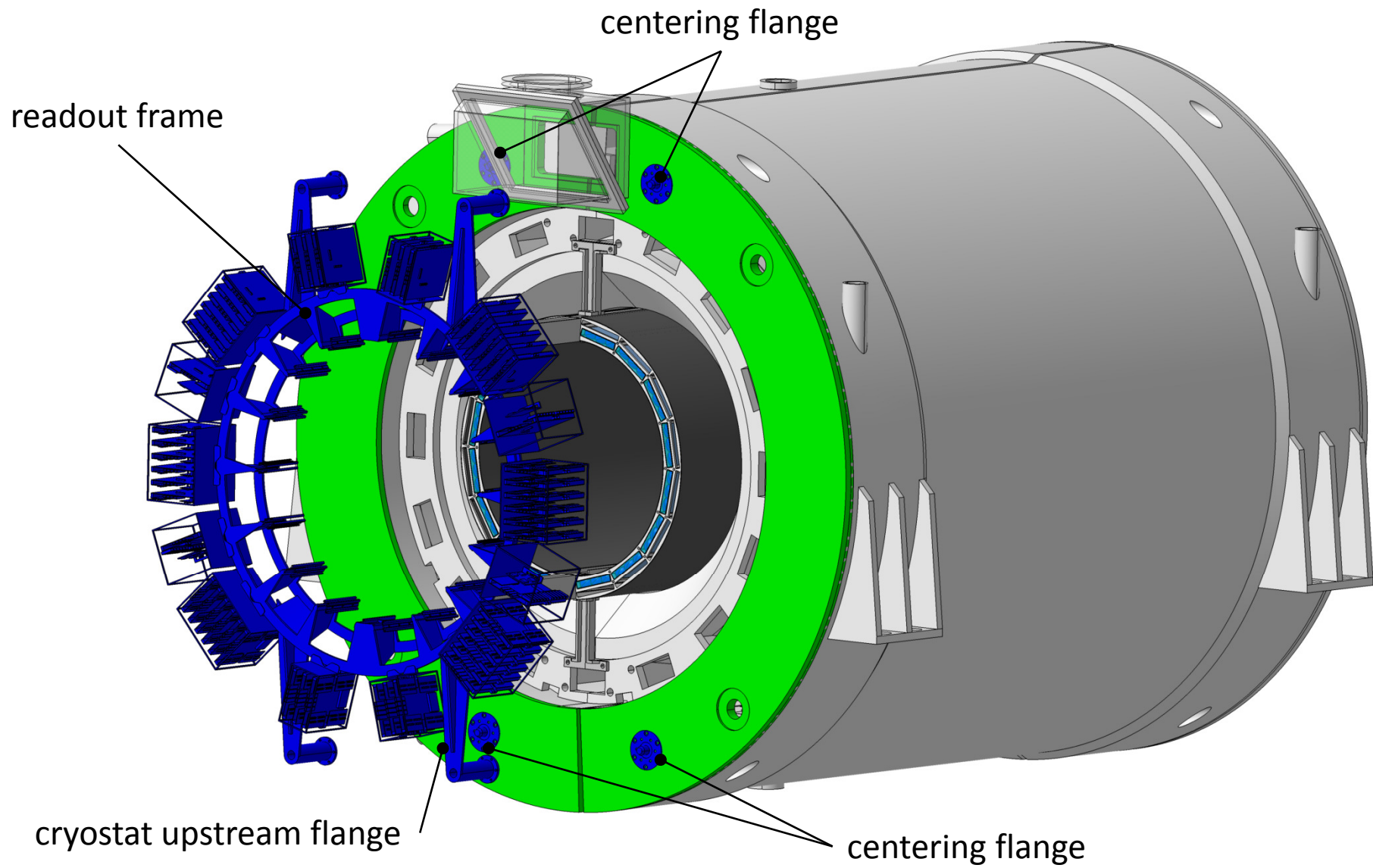
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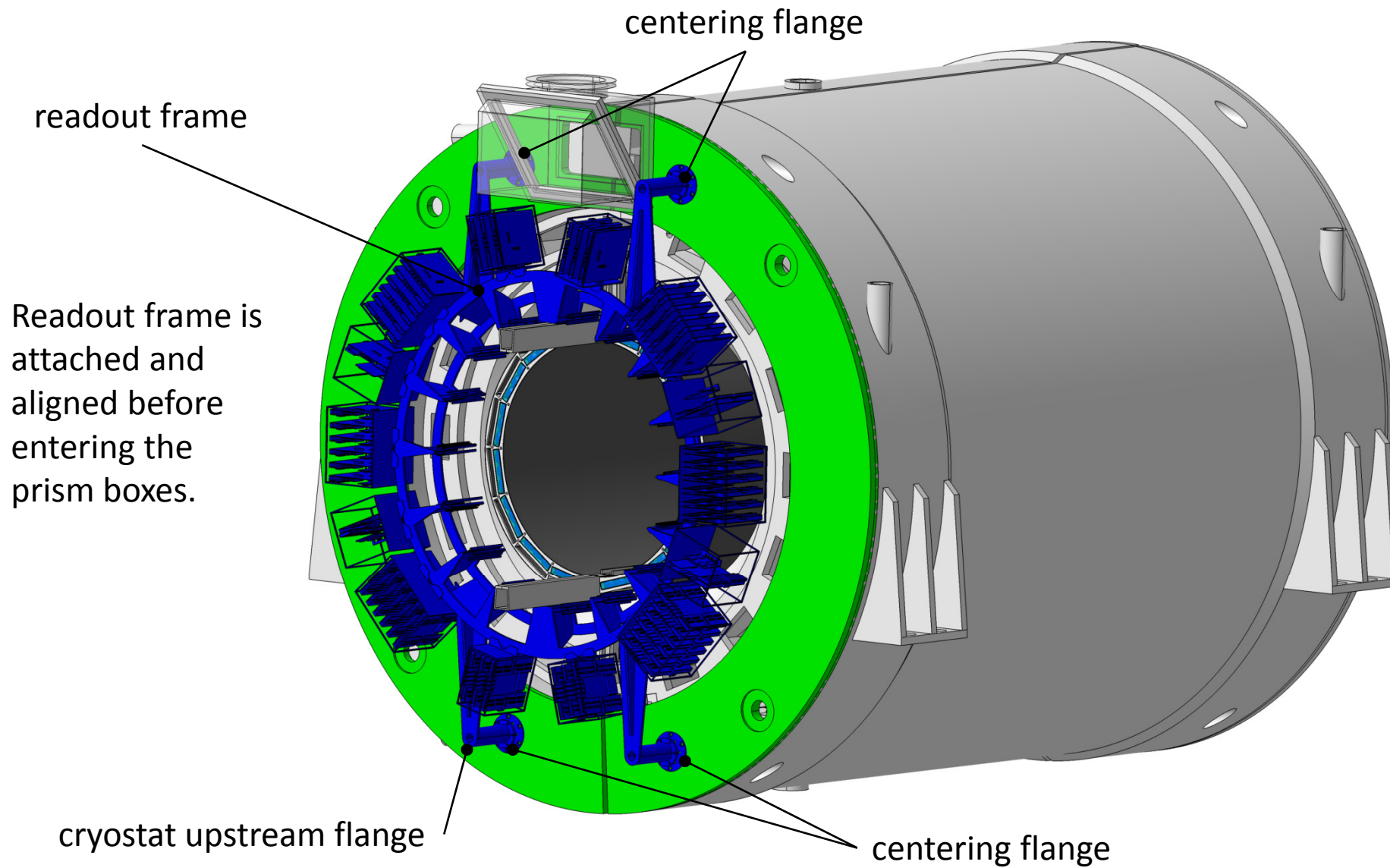
Installation Procedure Readout Unit



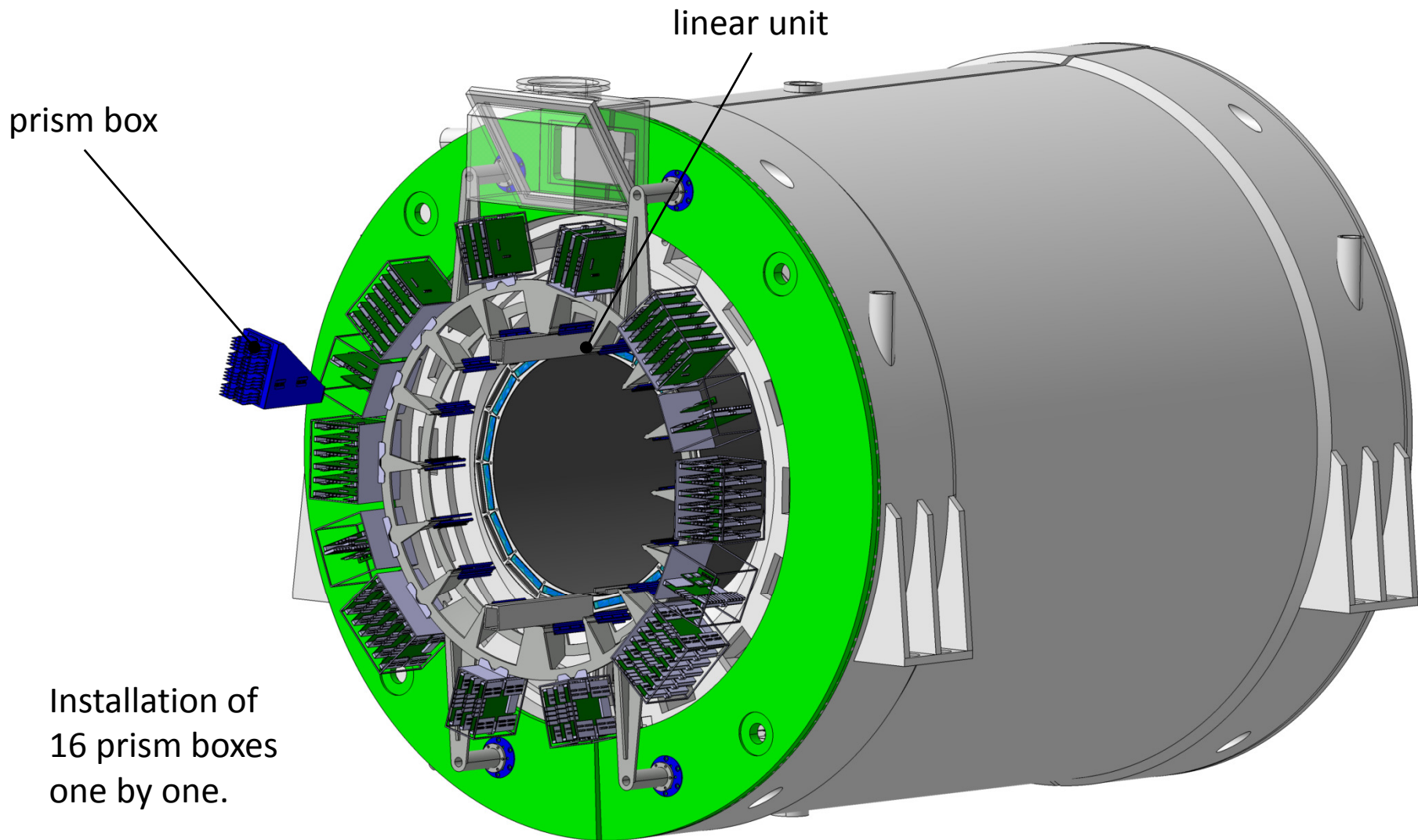
Installation Procedure Readout Unit



Installation Procedure Readout Unit

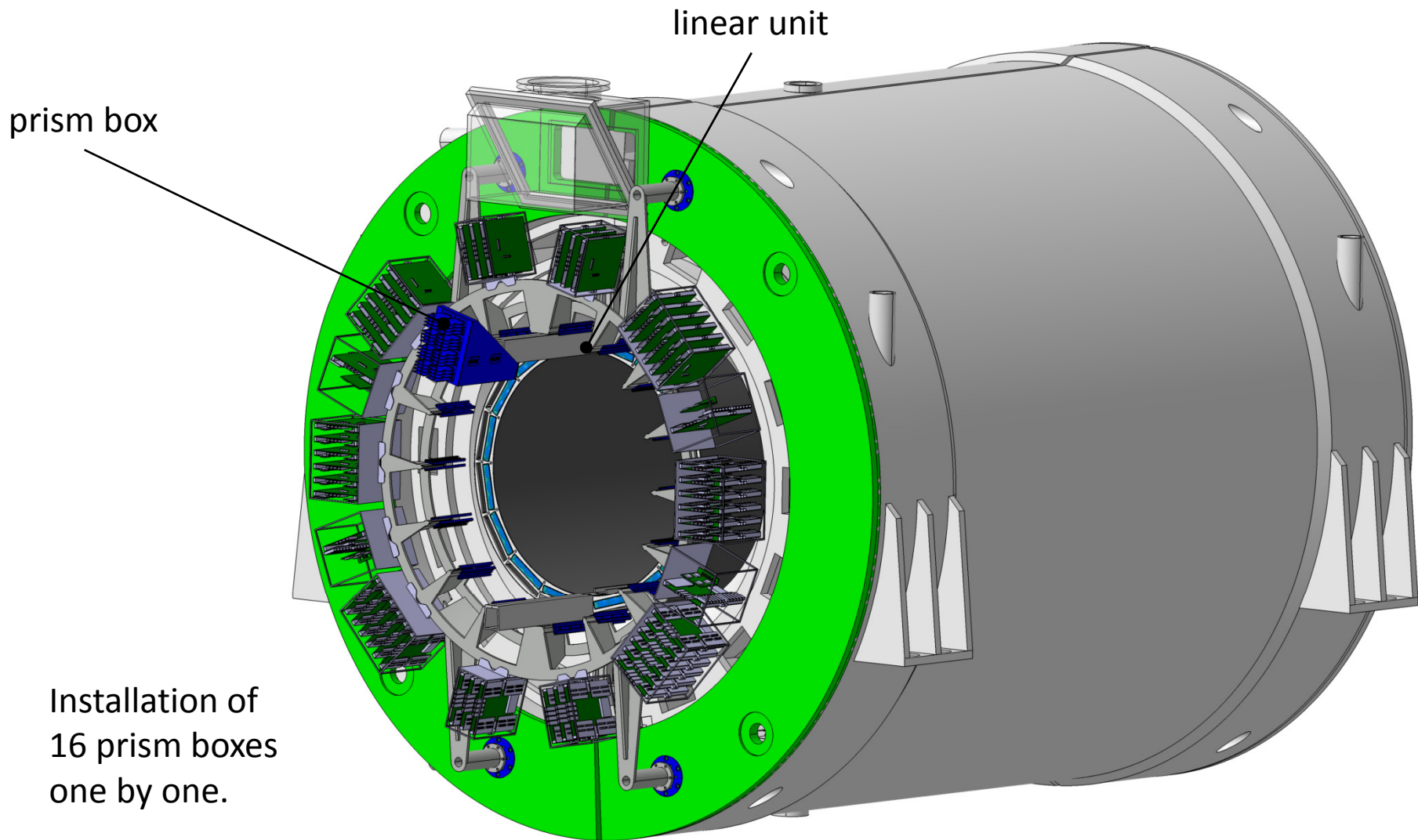


Installation Procedure Readout Unit



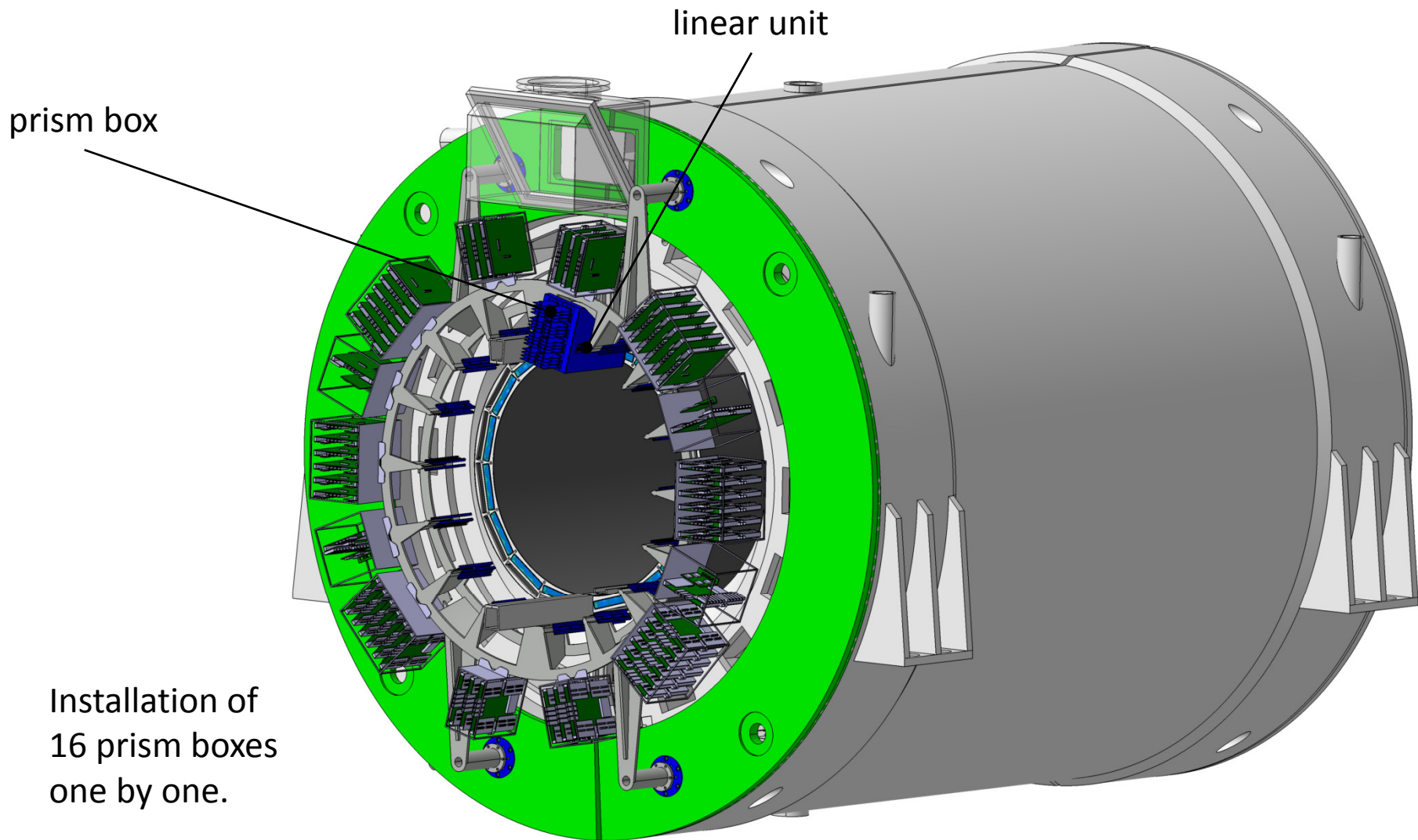
Installation of
16 prism boxes
one by one.

Installation Procedure Readout Unit



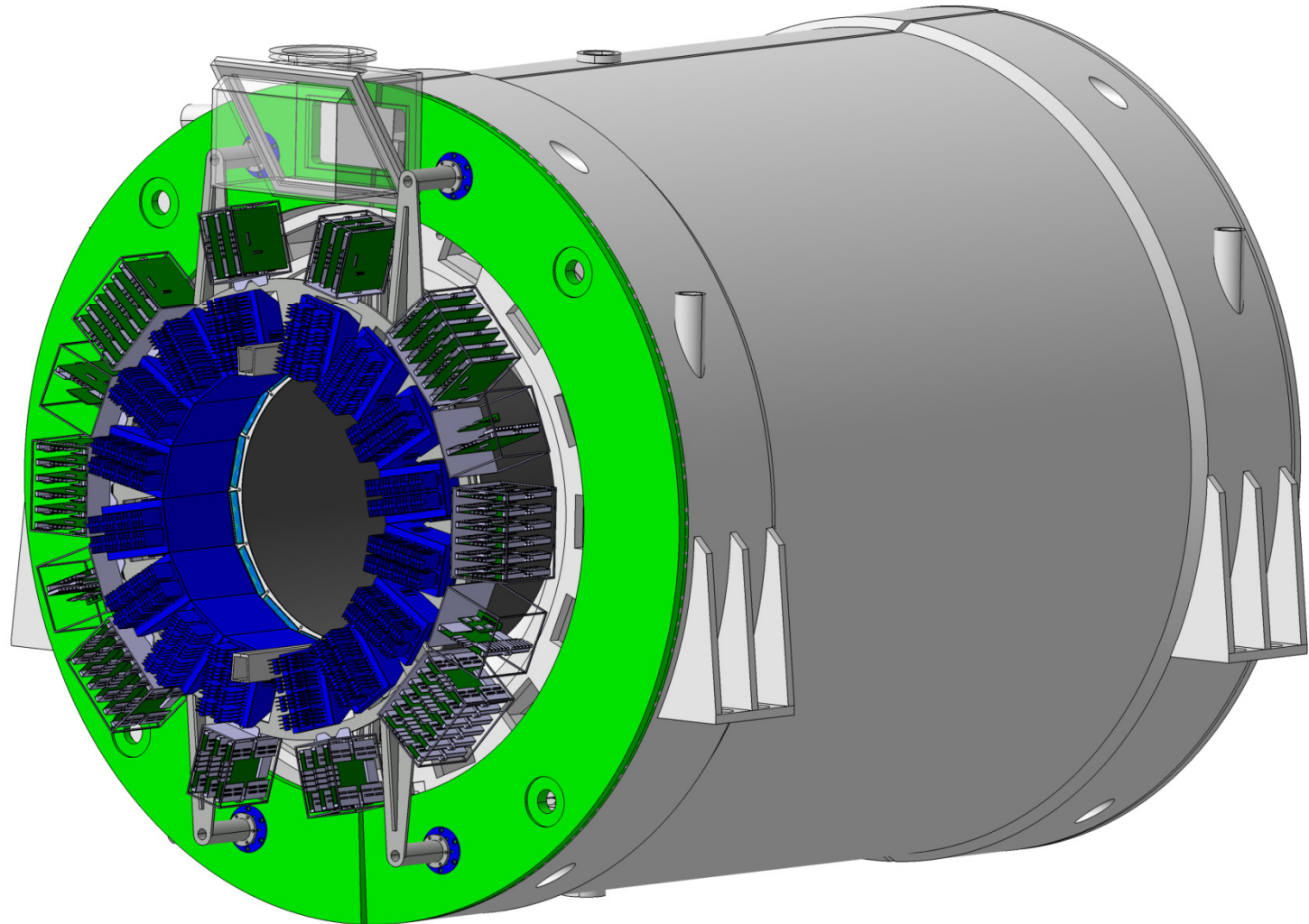
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Installation Procedure Readout Unit



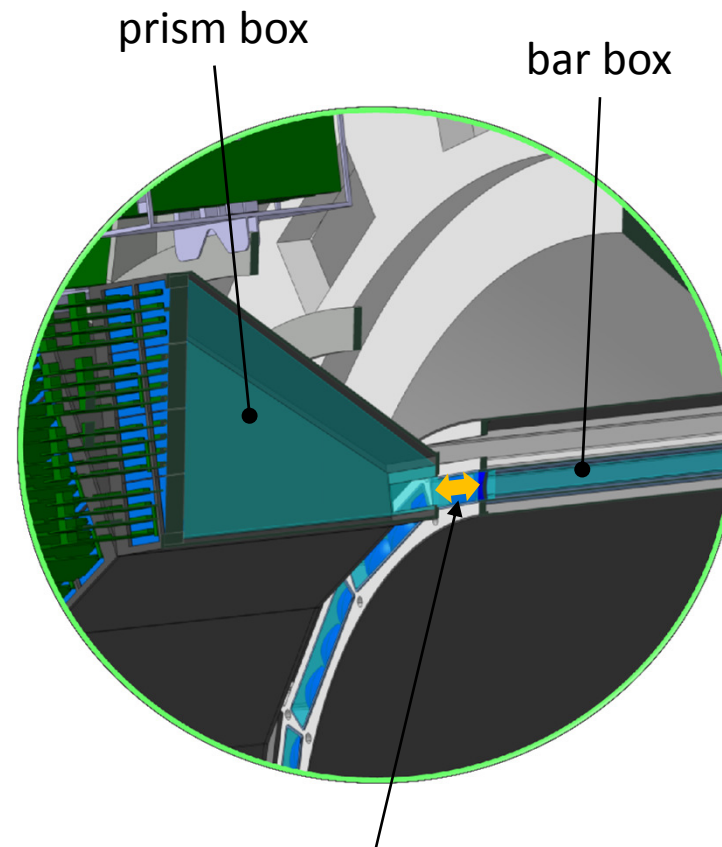
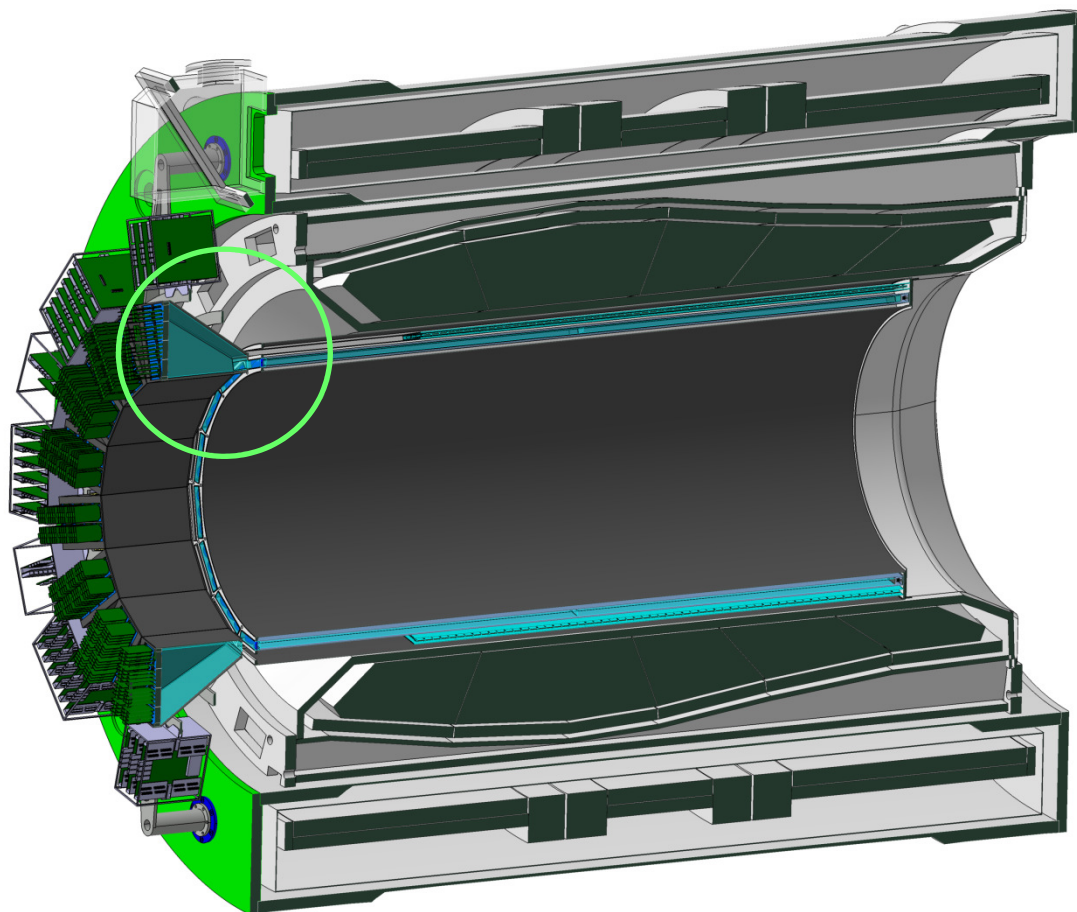
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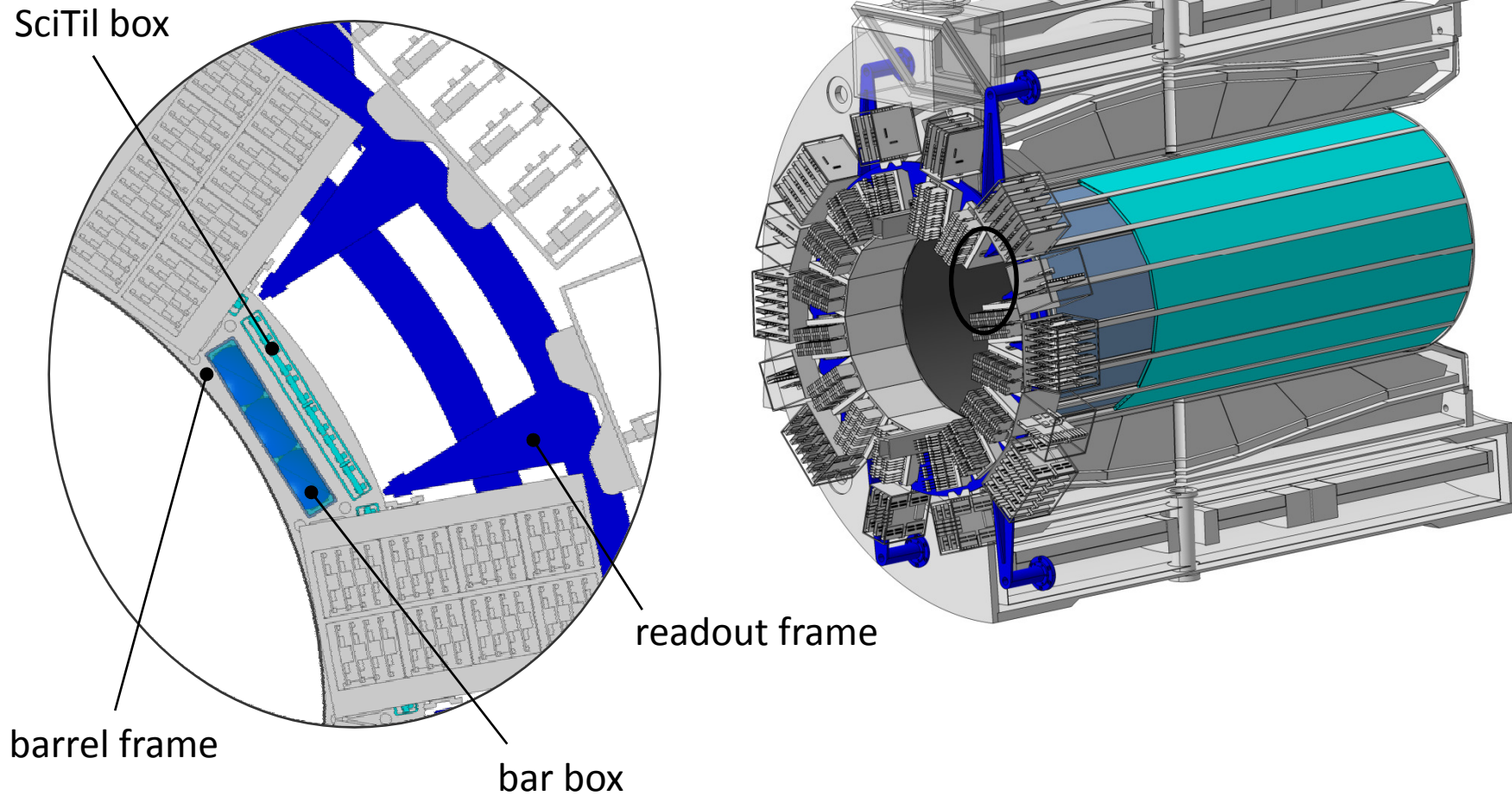
Installation Procedure Readout Unit



Gap of 3-4 cm to allow a step by step coupling process of each prism box and bar box.

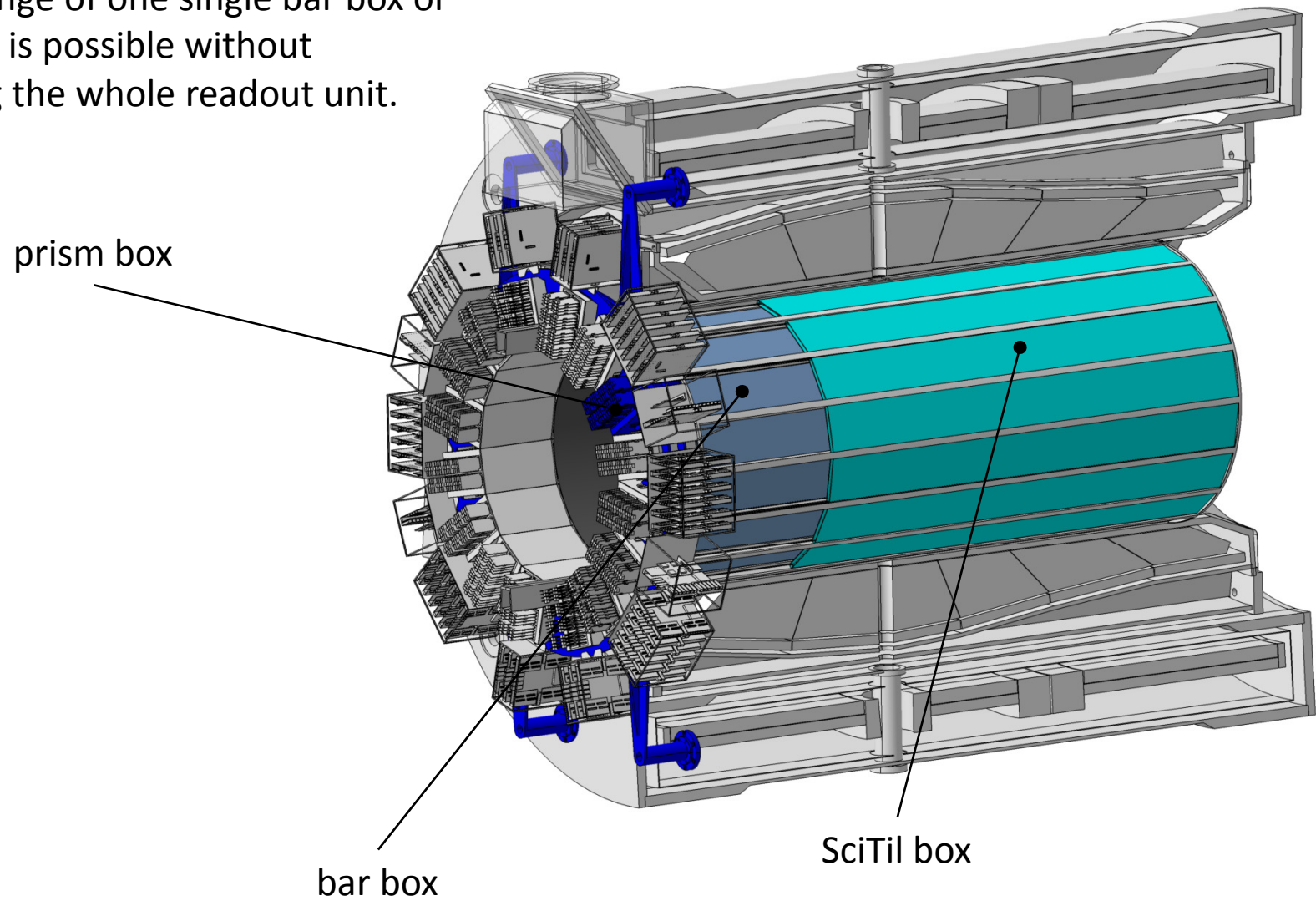
Intervention Procedures

Intervention procedure to exchange single components, electronics, etc. ...



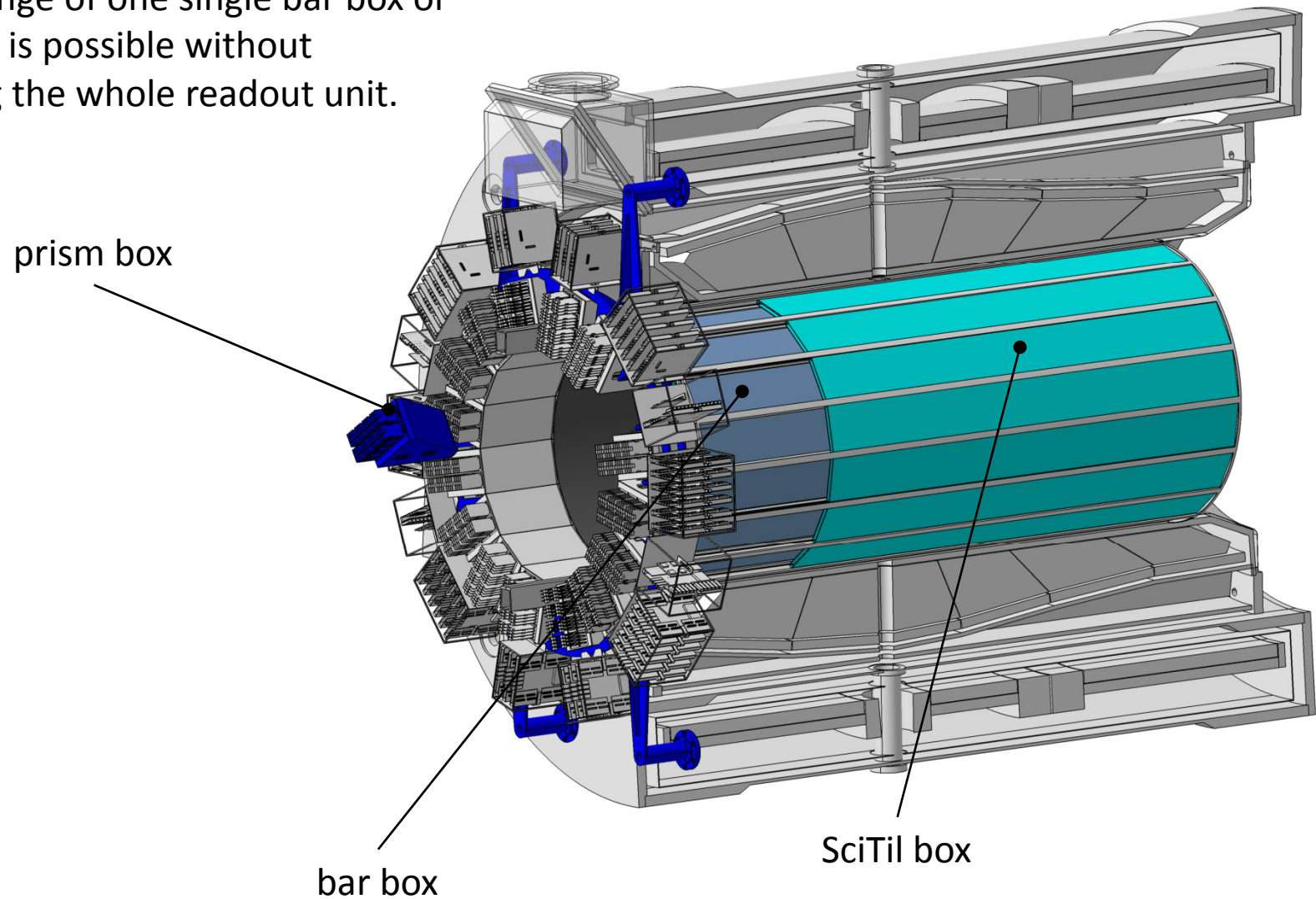
Intervention Procedures

An exchange of one single bar box or SciTil box is possible without removing the whole readout unit.



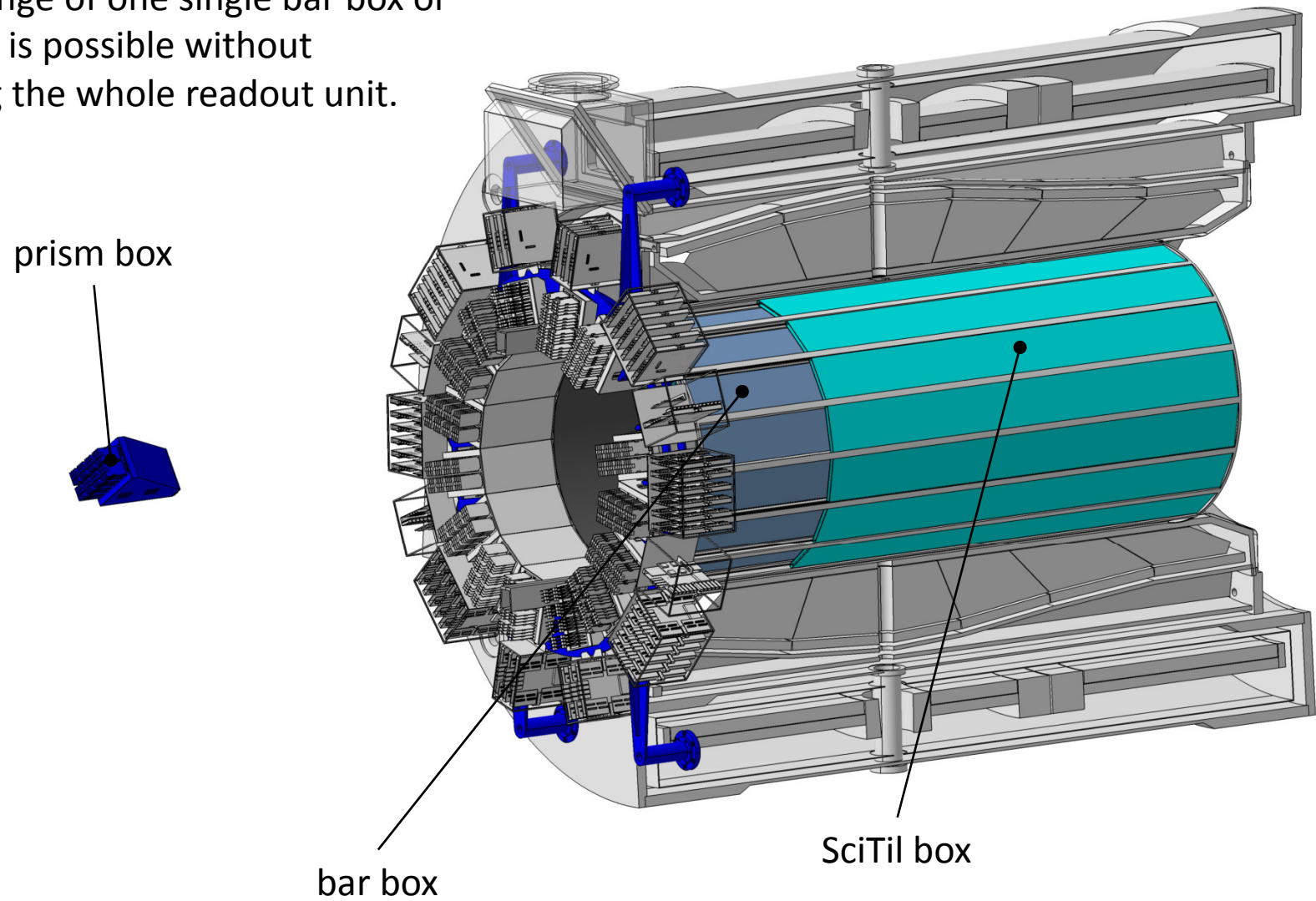
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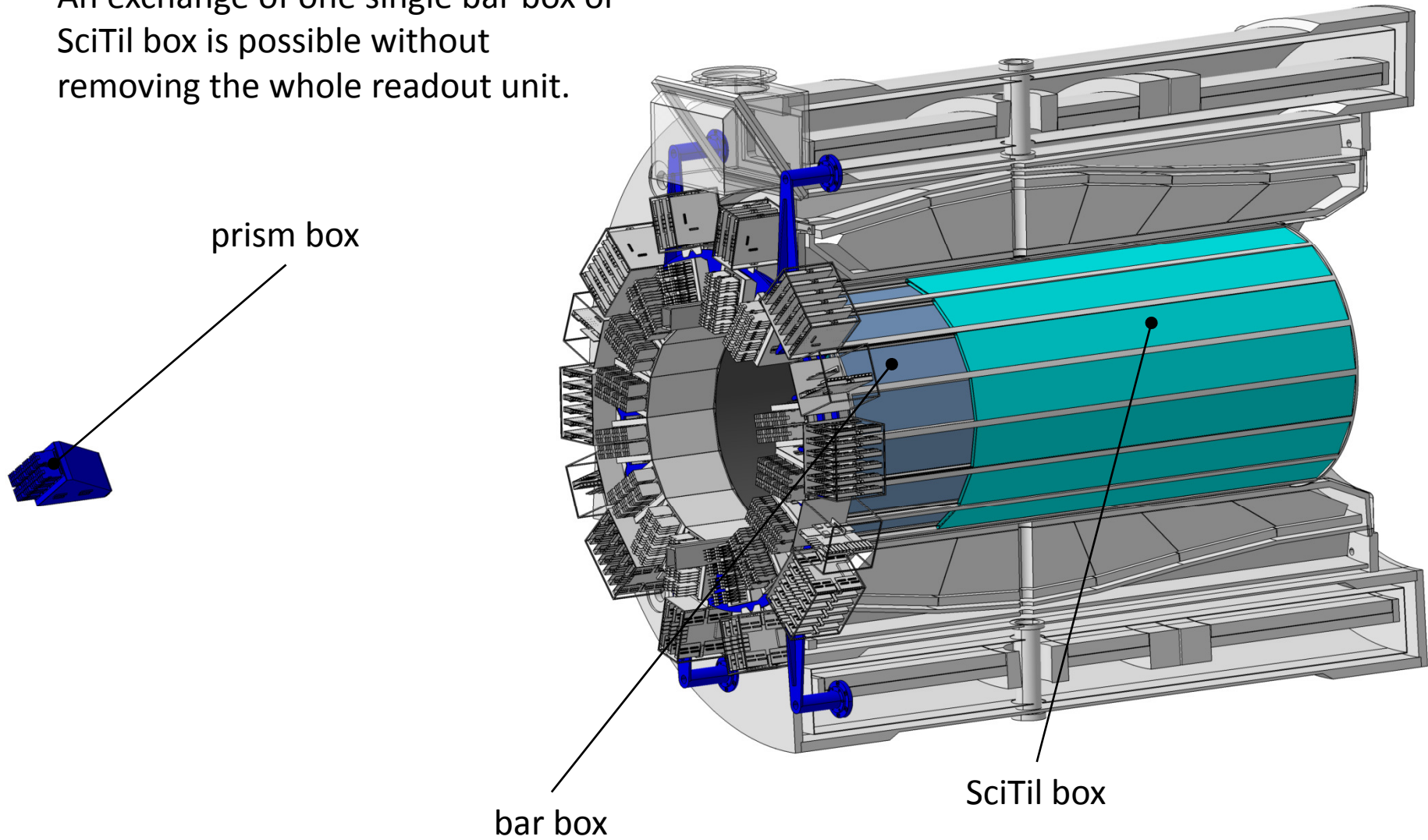
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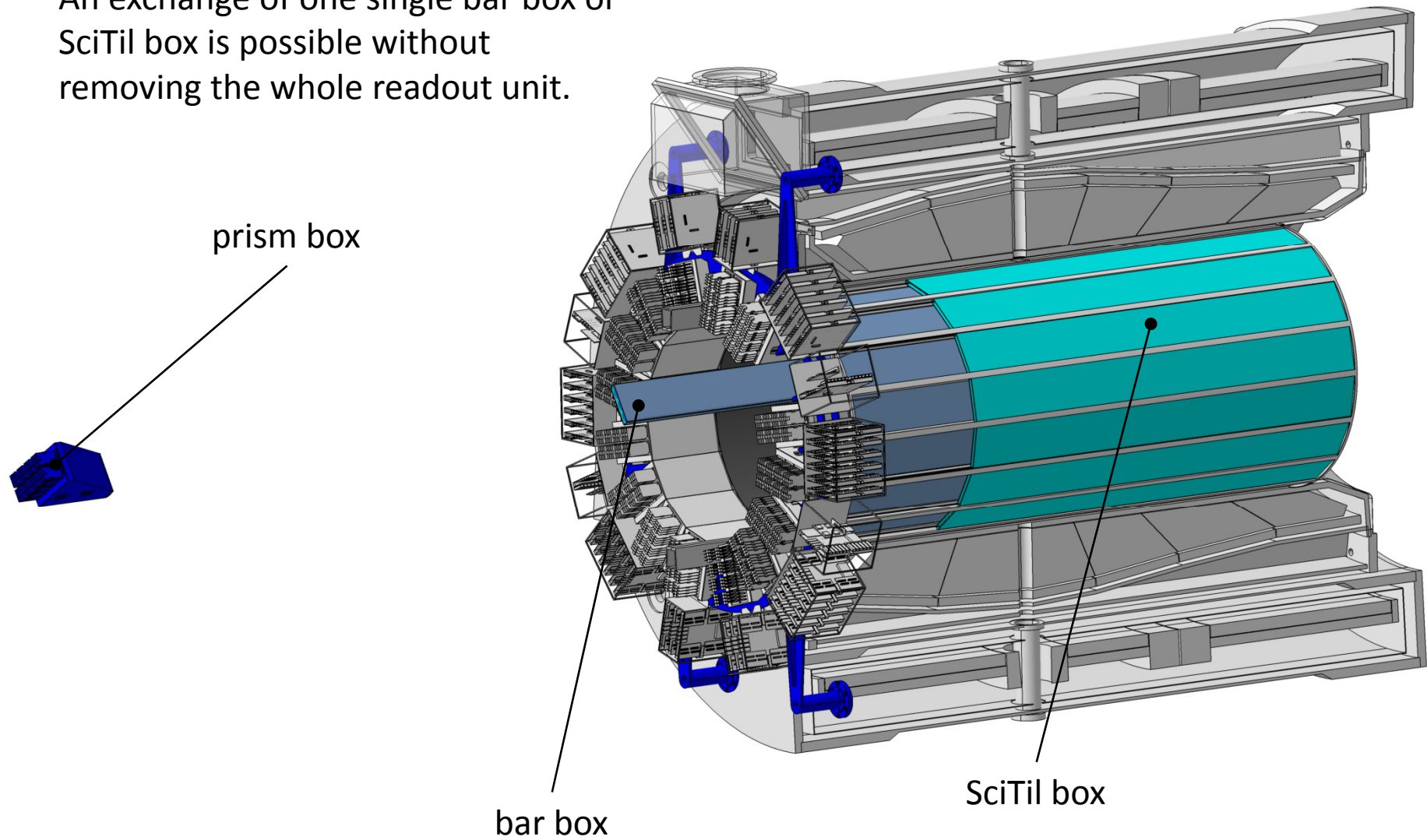
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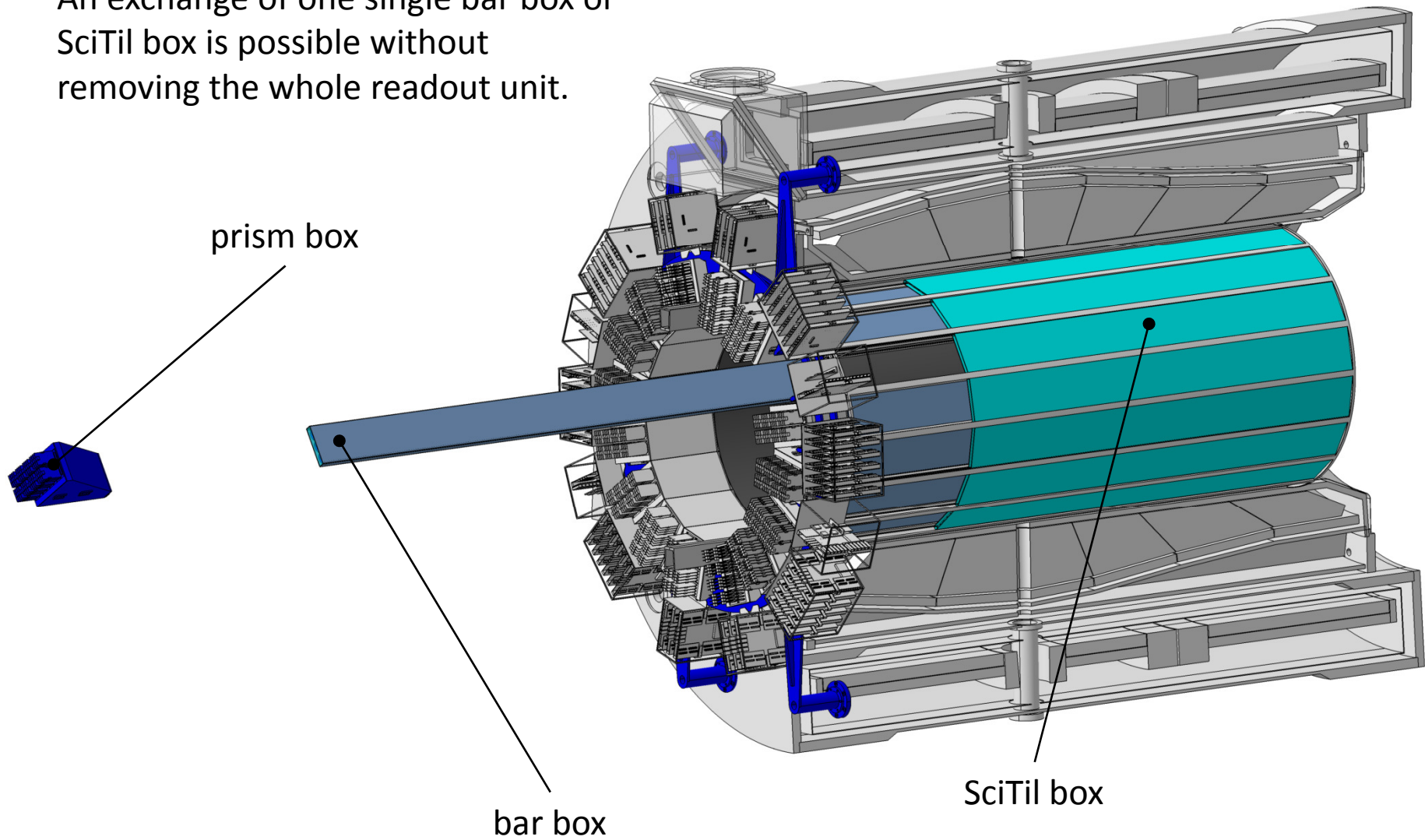
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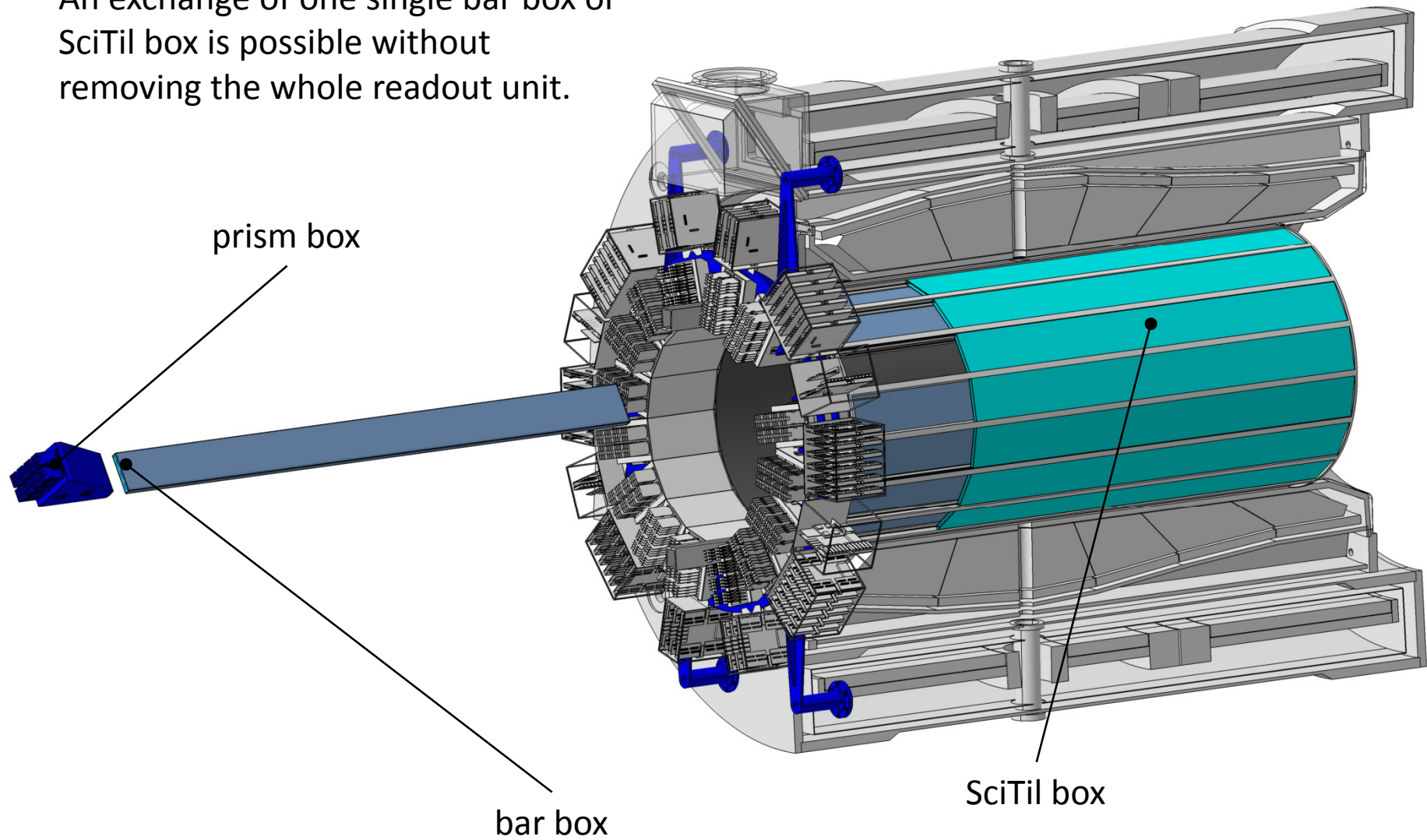
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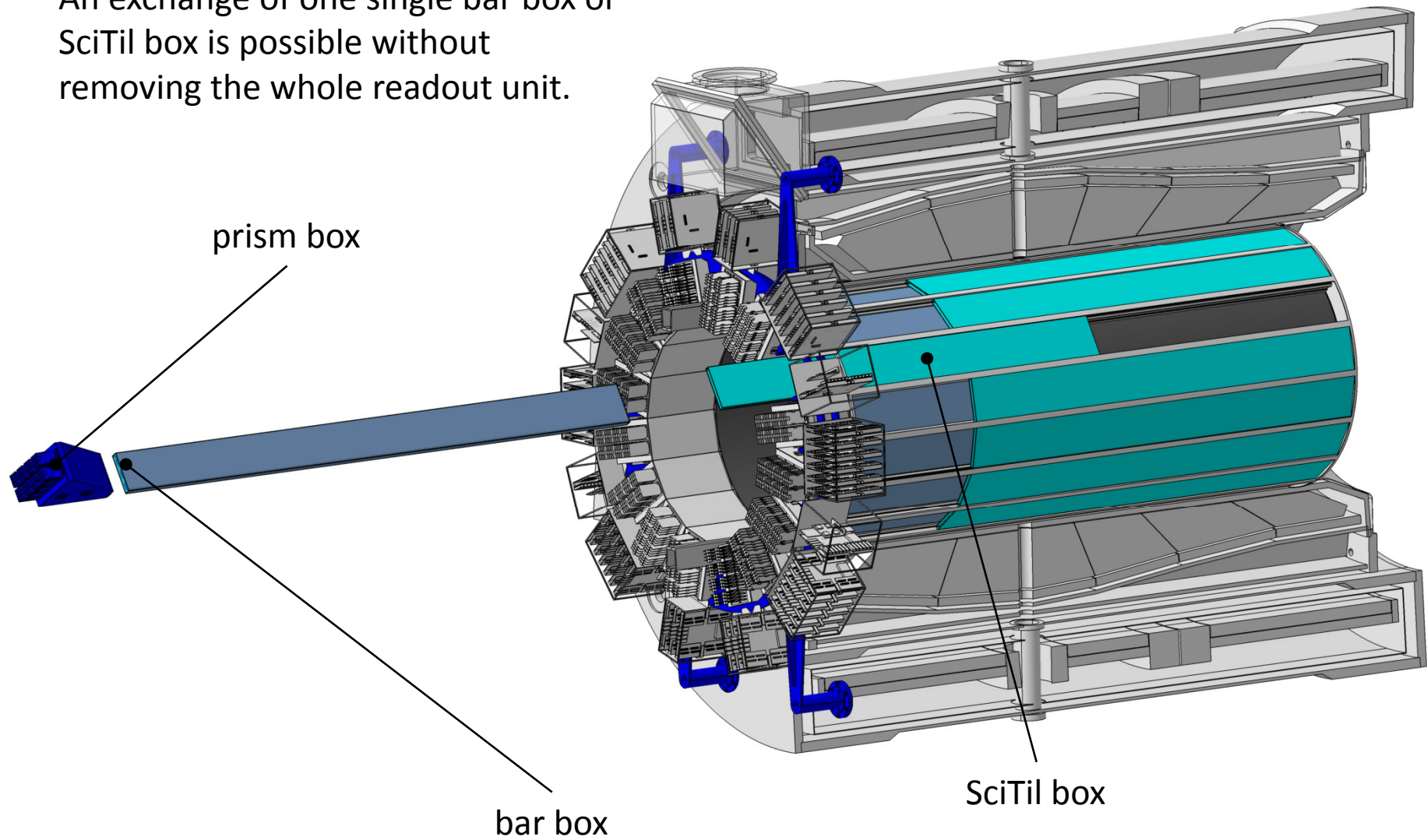
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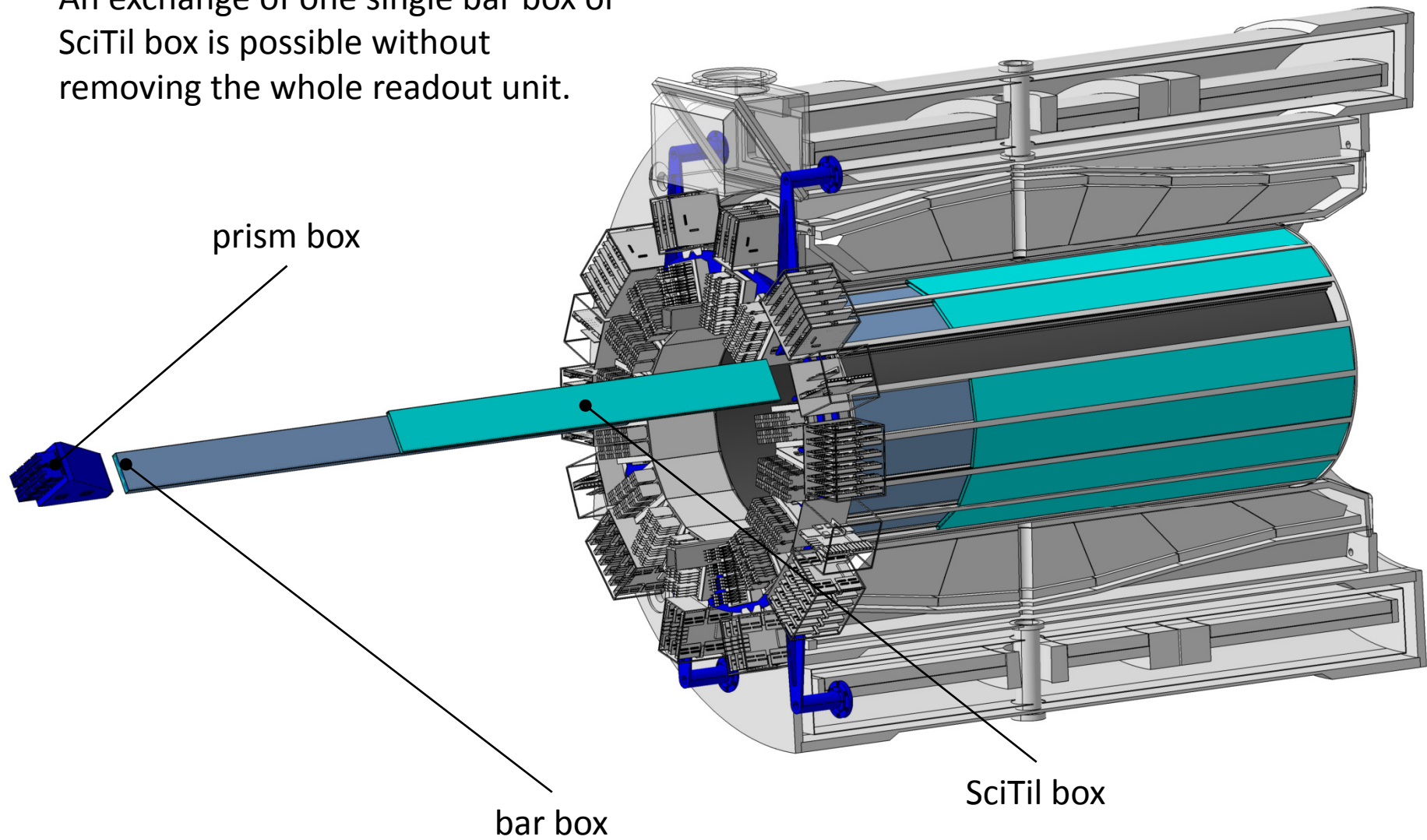
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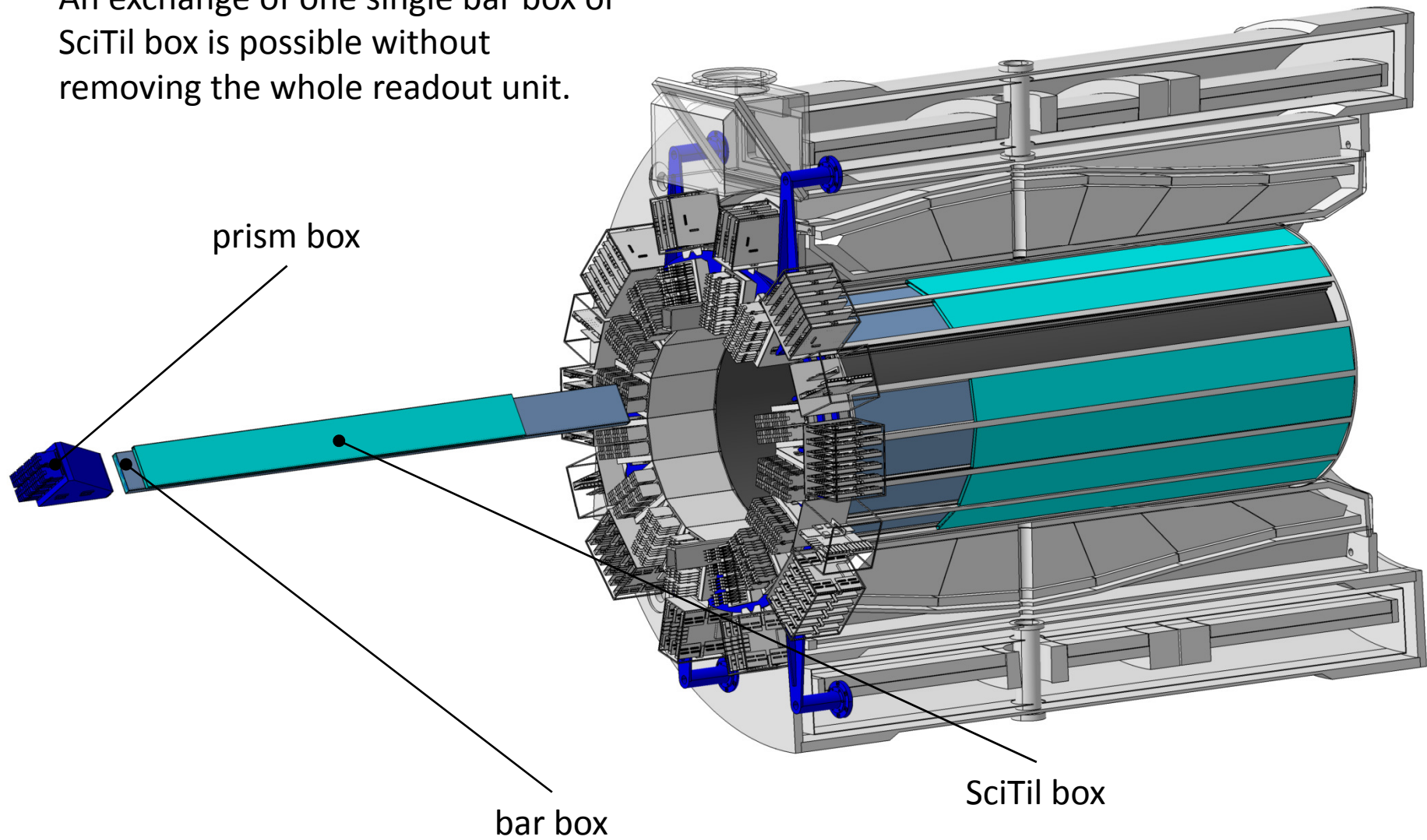
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Intervention Procedures

An exchange of one single bar box or SciTil box is possible without removing the whole readout unit.



Summary & Outlook

- Many things are in progress at the moment (DIRICH backplane ordered, coupling tests in progress, outgassing tests for screening materials start soon).
- We need to define and confirm an installation procedure to start with the production design.