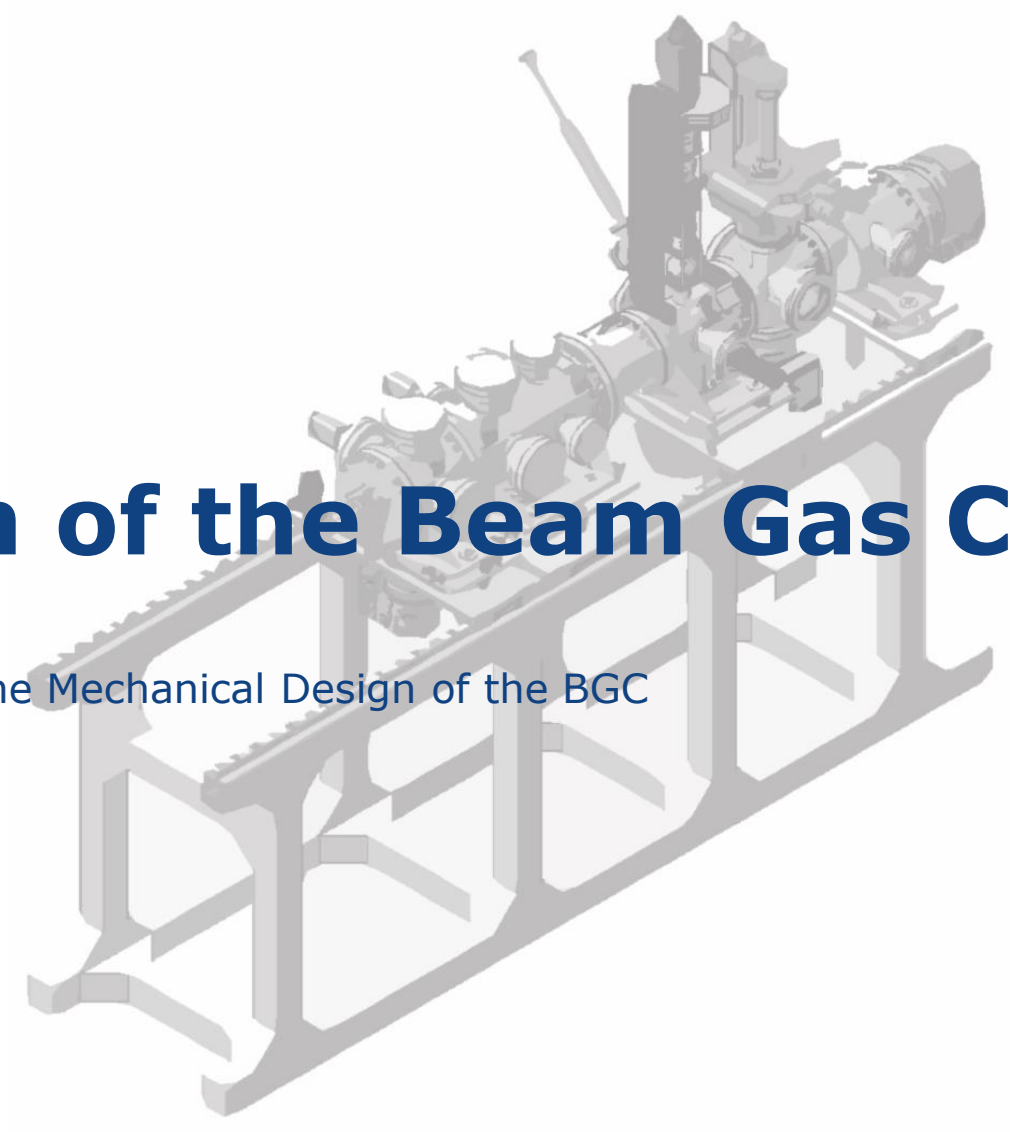

CERN



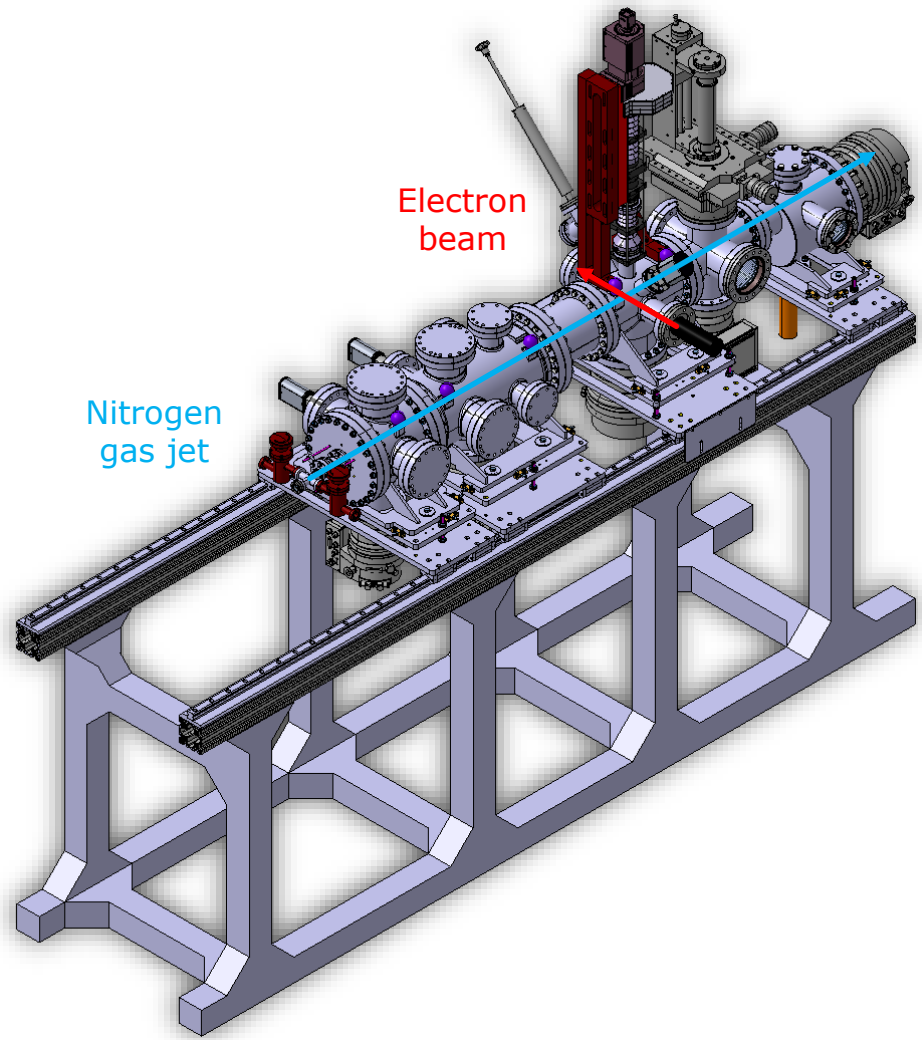
Design of the Beam Gas Curtain

Introduction of the Mechanical Design of the BGC

BGC: First prototype design

1. Elements of the BGC system
2. Changes to the existing system
3. Agreed interfaces between the systems
4. Alignment of the system
5. Vacuum system and expected pressures
6. Flexibility of the system
7. Integration of the system

1. Elements of the BGC system



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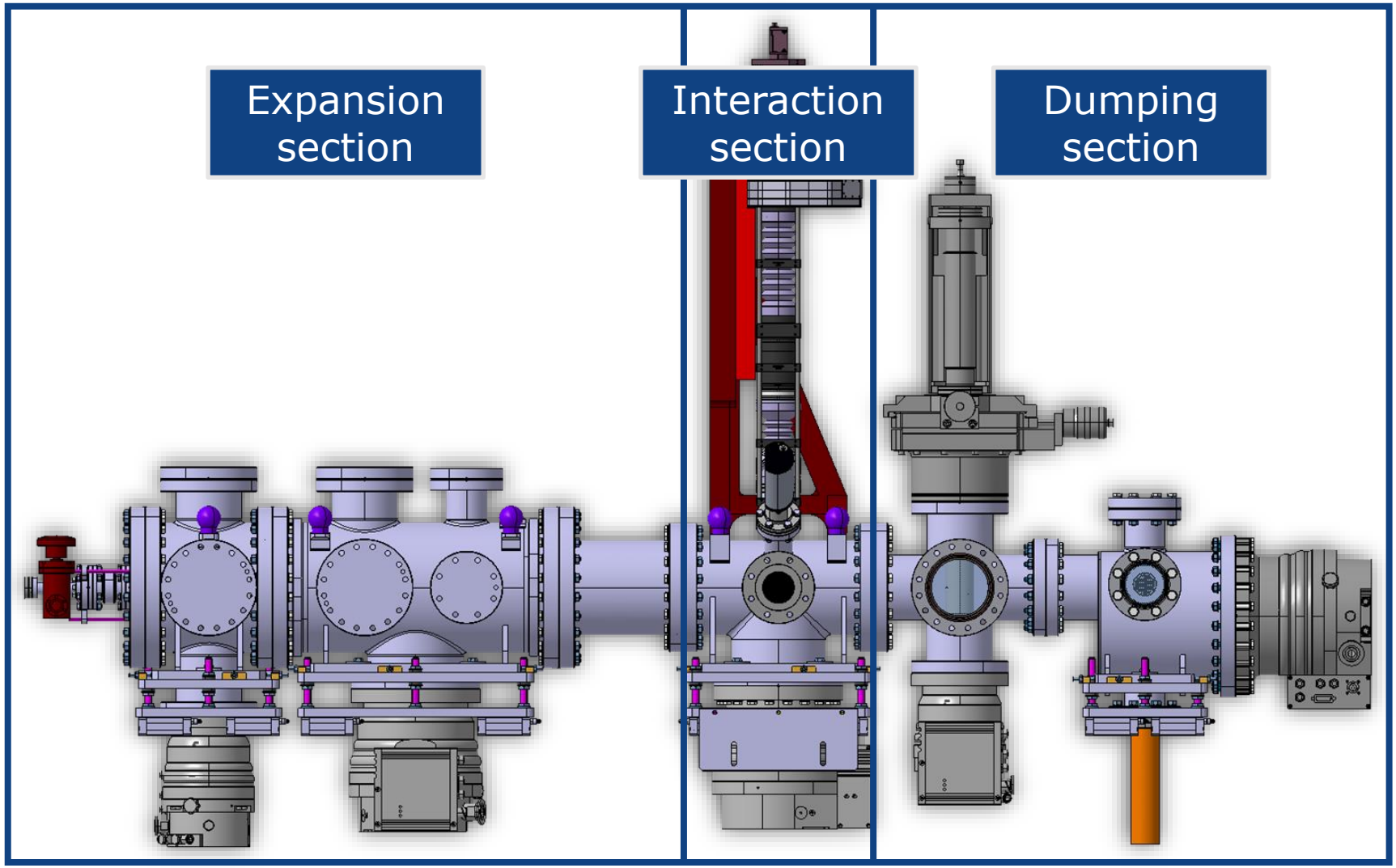

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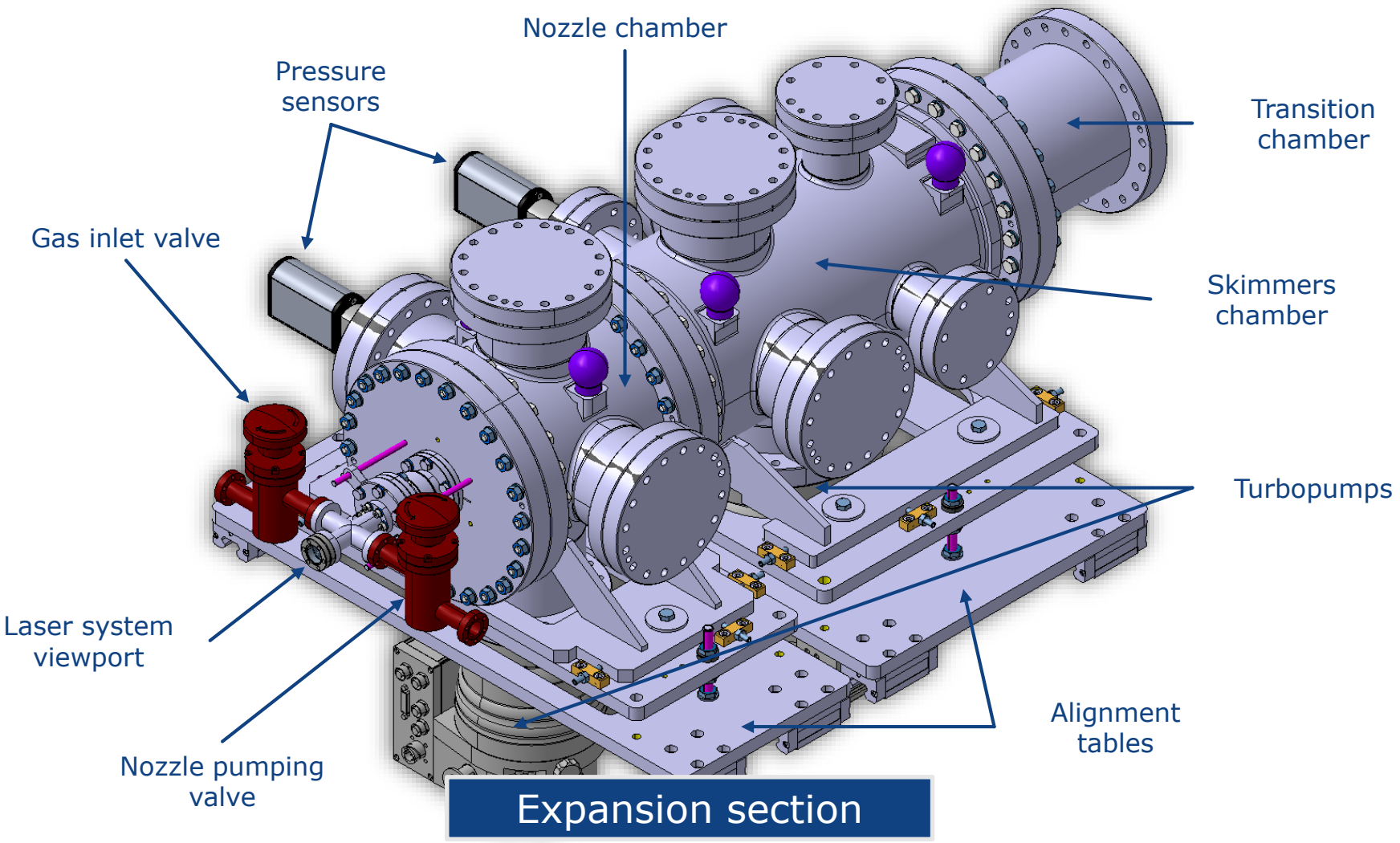

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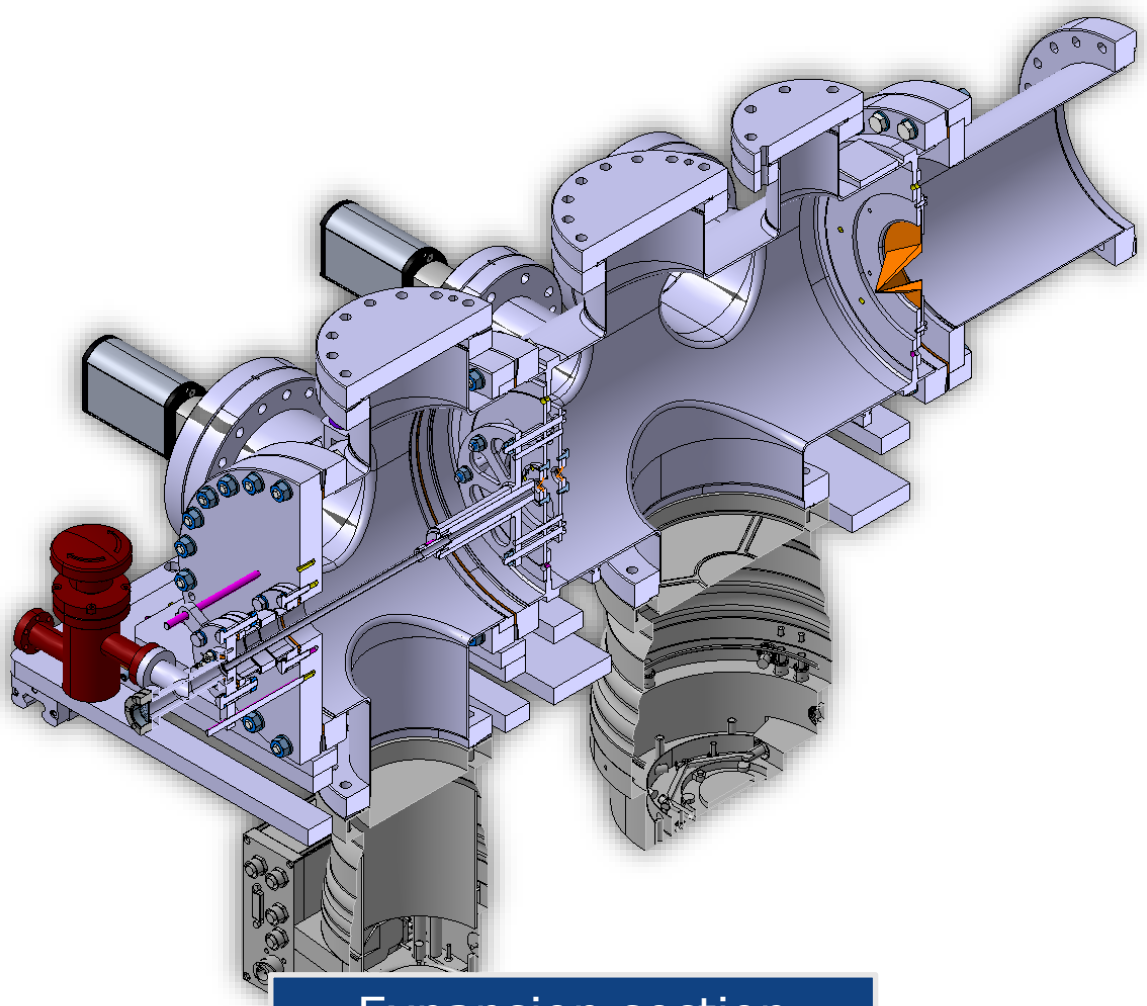
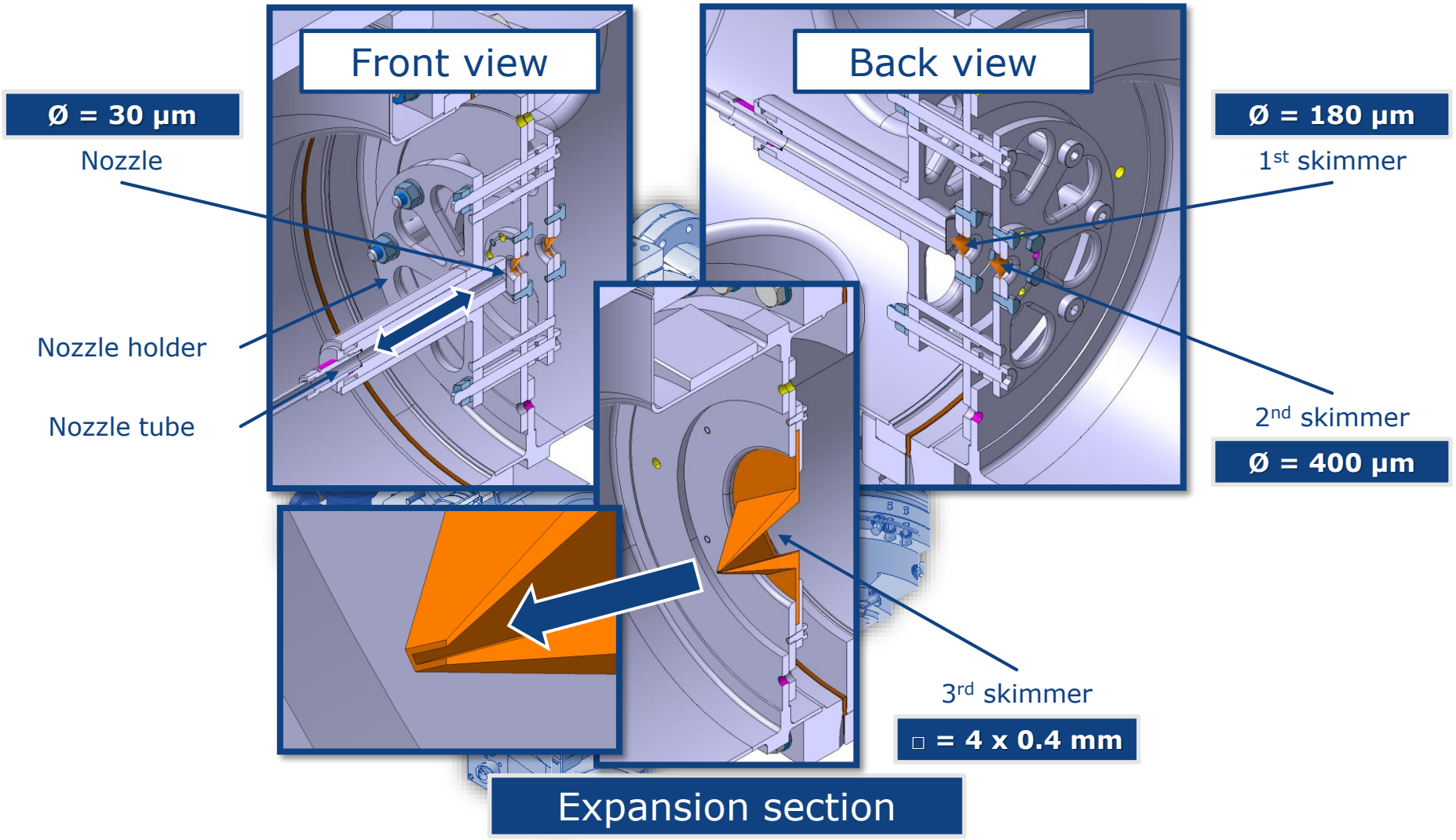


Expansion section

1. Elements of the BGC system



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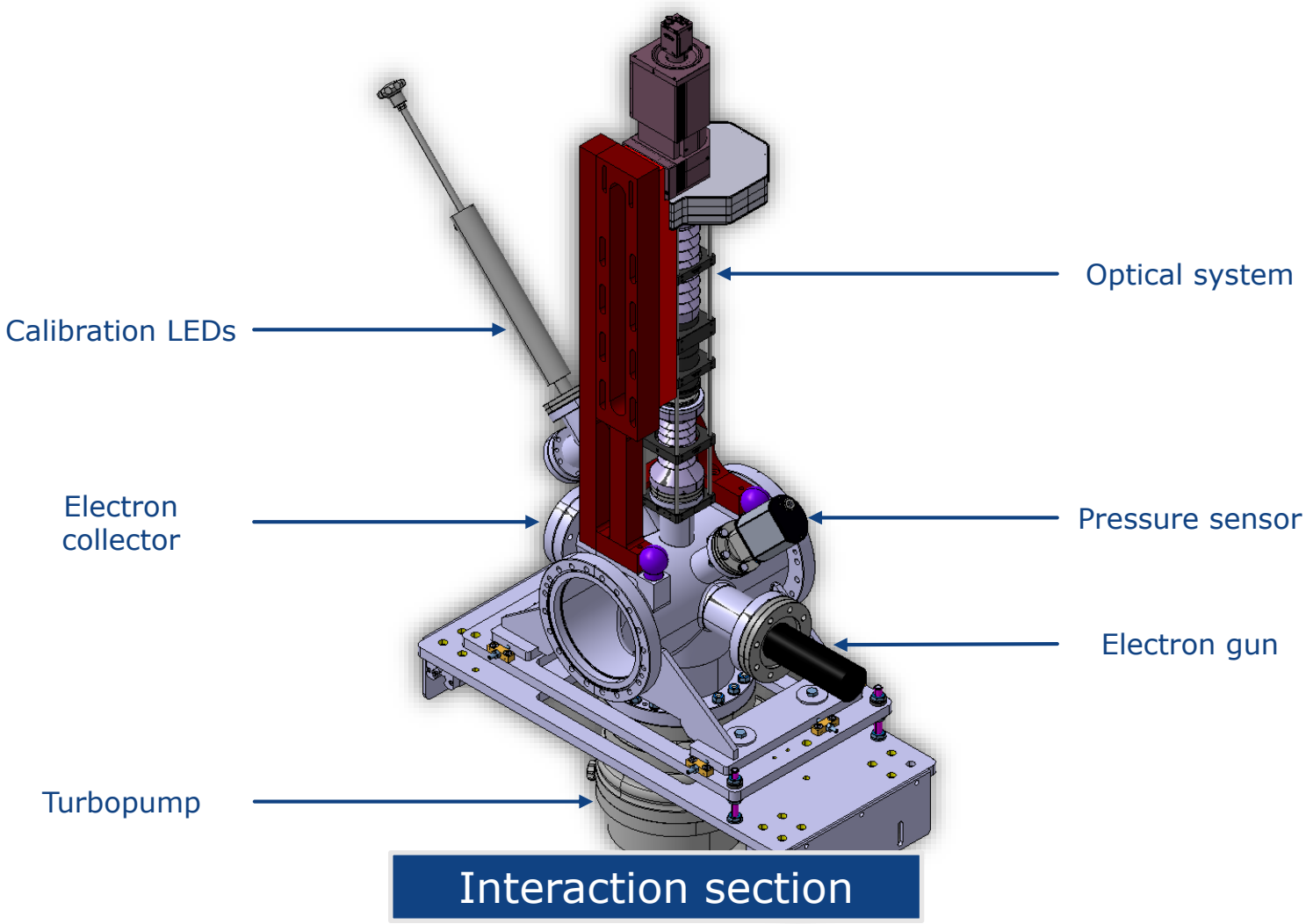

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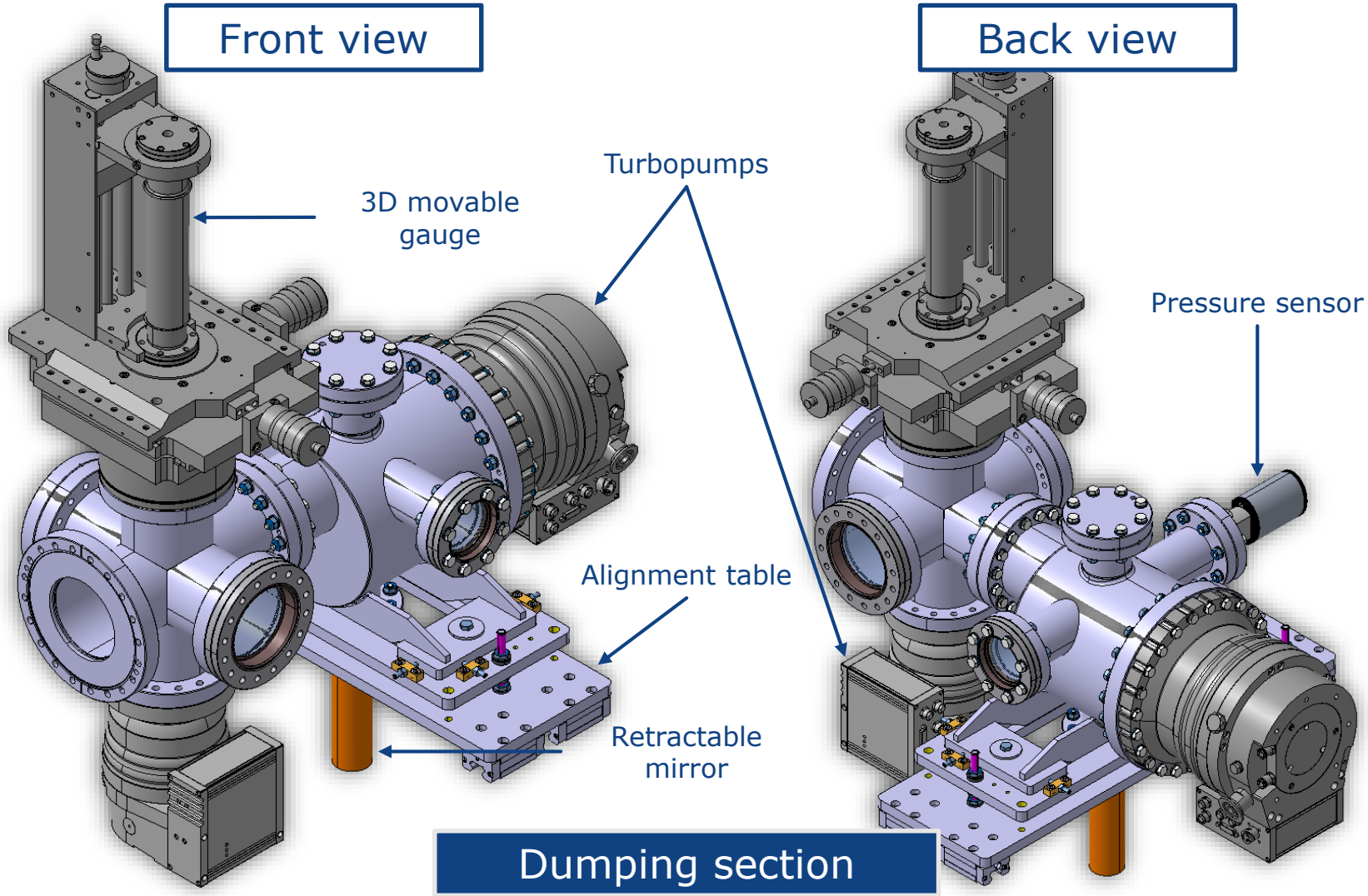

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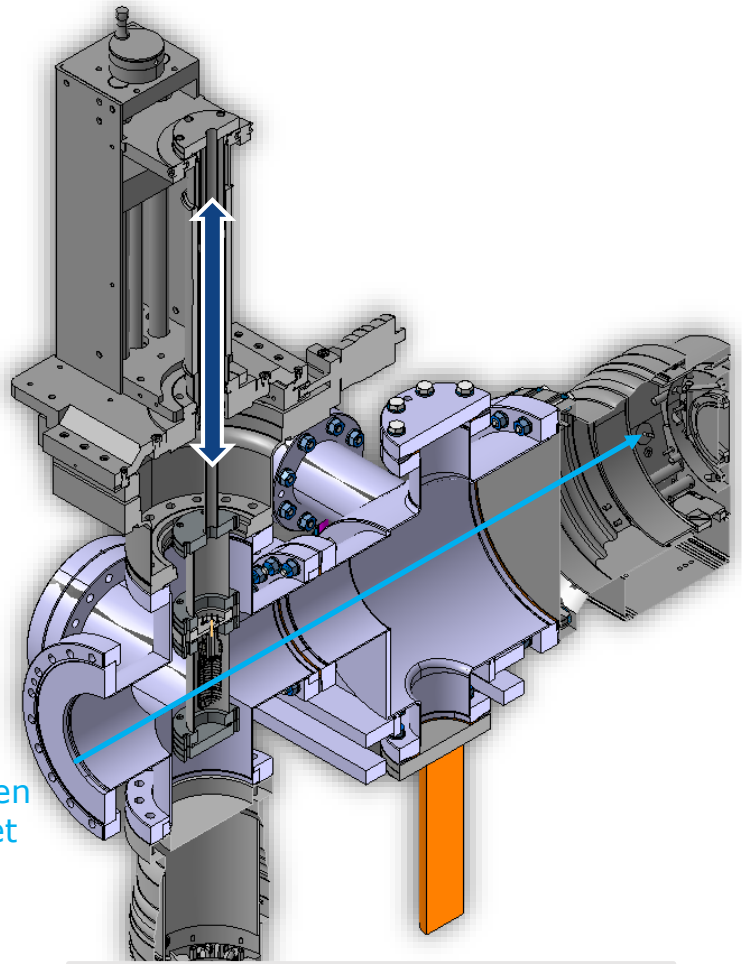


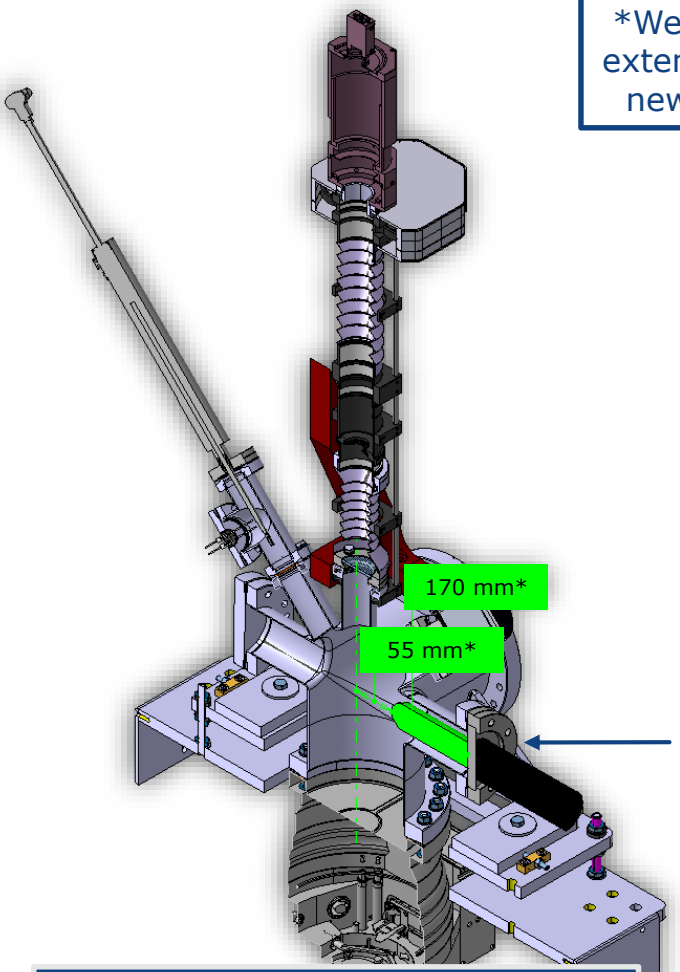
Dumping section

2. Changes to the existing system

- Fully bakeable system up to a minimum of 200 °C
- Alignment of the skimmers at metrology
- Lower vacuum background pressure expected
- Expected pressure of 10^{-9} mbar without gas jet
- Fast pressure recovery after opening
- Flexible system in case we want to change the skimmers
- If we want to integrate the system in a setup with magnets, we would only need to change the interaction chamber

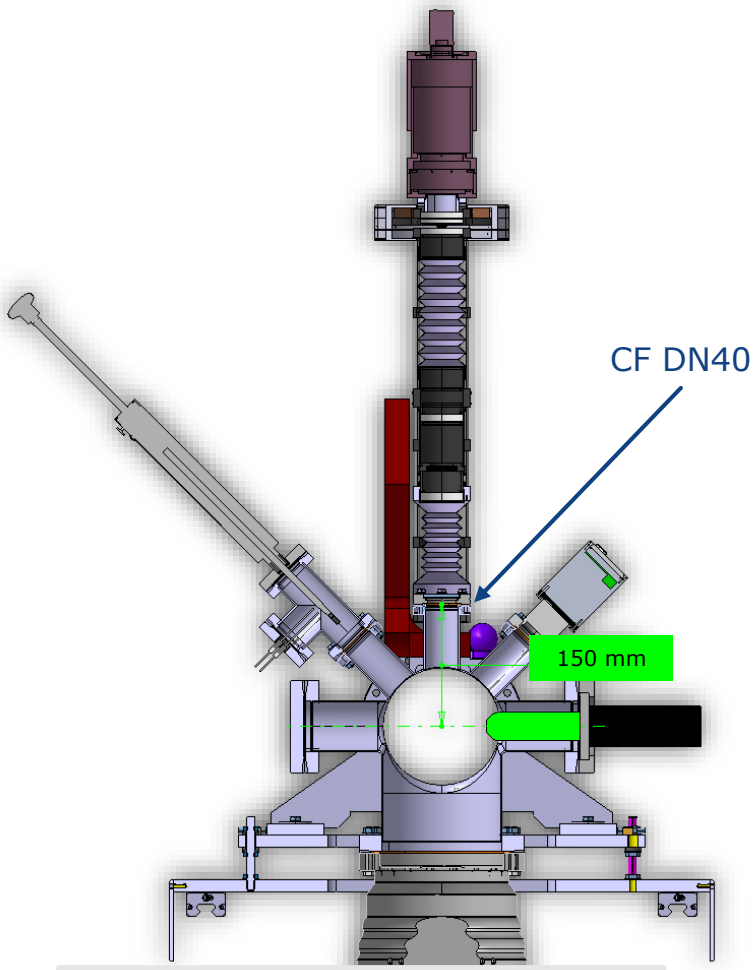
3. Agreed interfaces between the systems

*We would need to add a 115 mm extension vacuum pipe to cover the new electron gun's requirements



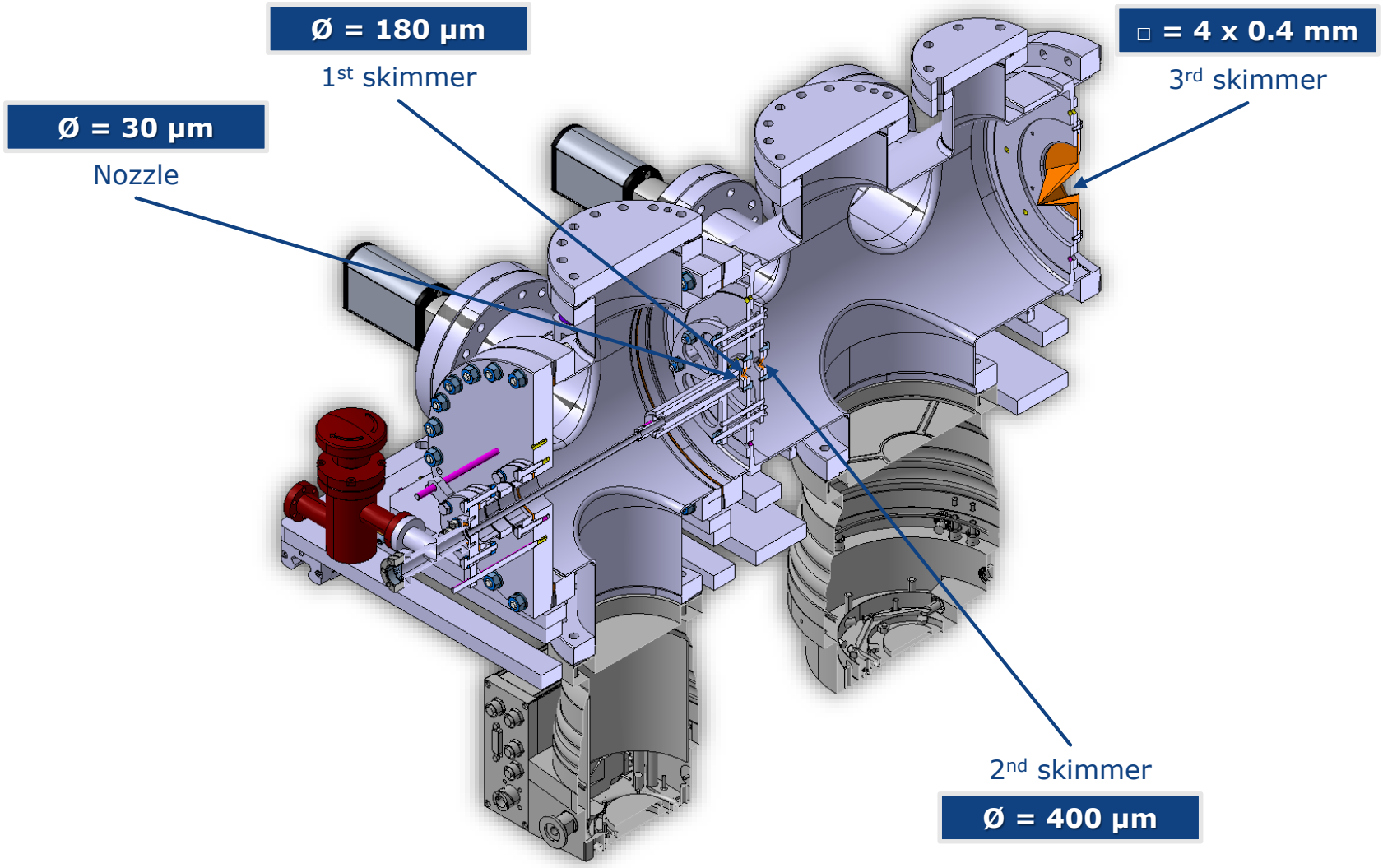
Electron gun

3. Agreed interfaces between the systems



Optical system

4. Alignment of the system



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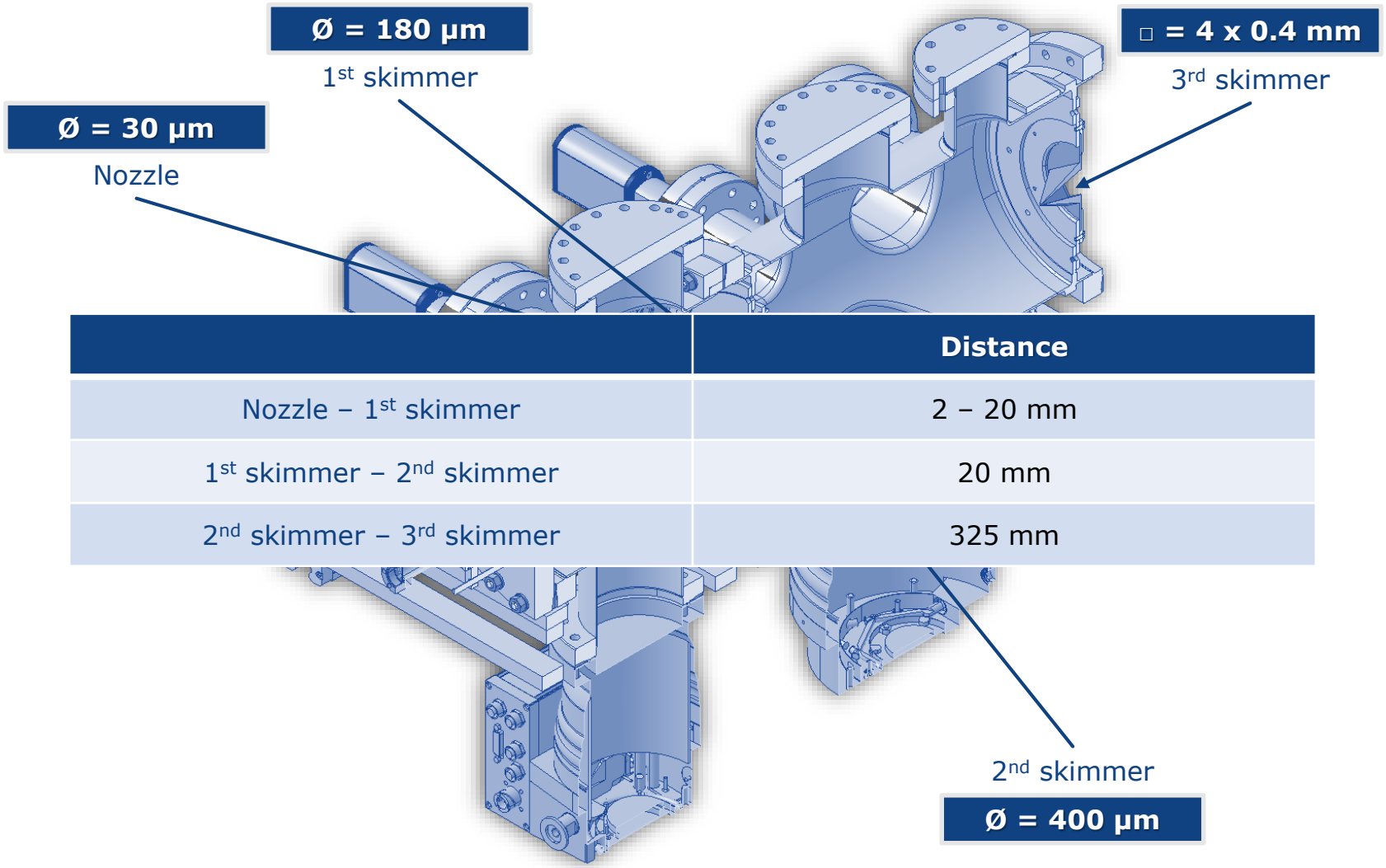
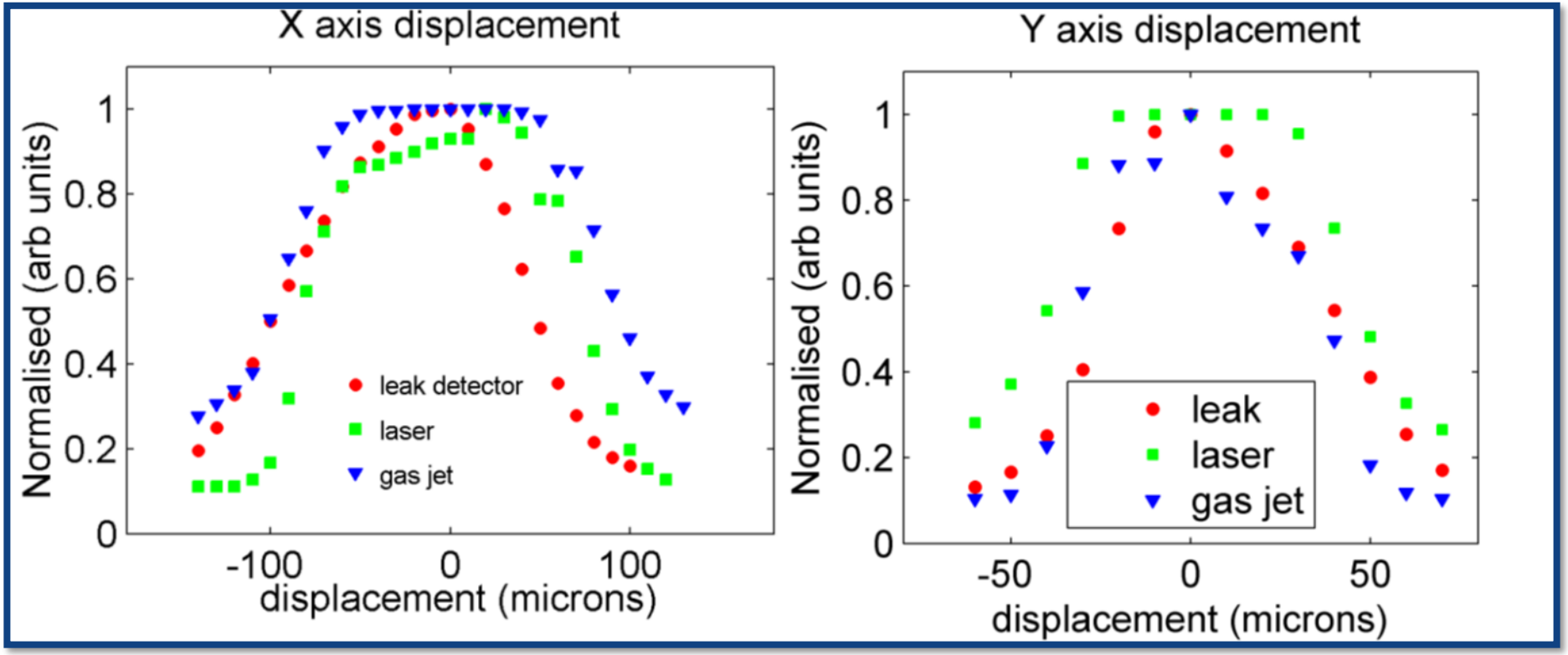


	Distance
Nozzle – 1st skimmer	2 – 20 mm
1st skimmer – 2nd skimmer	20 mm
2nd skimmer – 3rd skimmer	325 mm

4. Alignment of the system



Source: V. Tzoganis

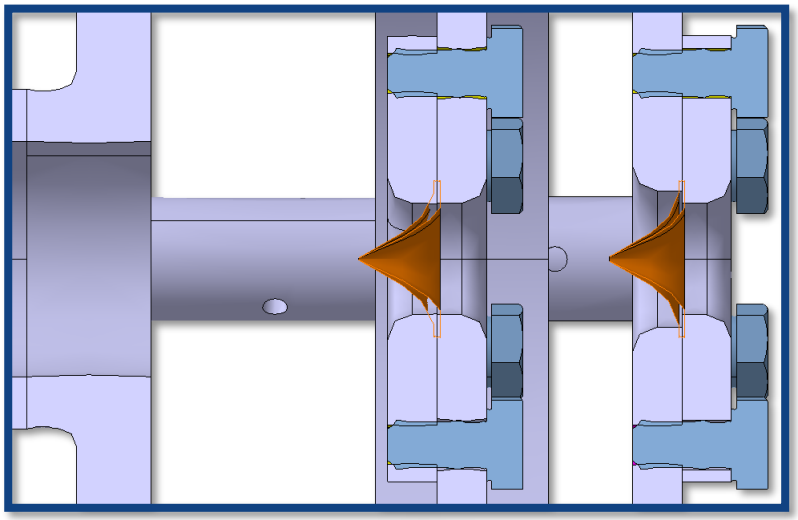
4. Alignment of the system

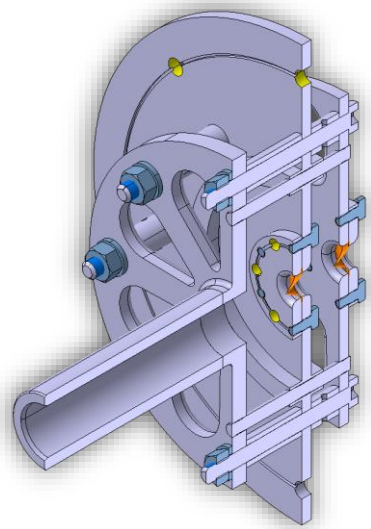
1. Align the nozzle holder to the 1st and the 2nd skimmer in a metrology environment

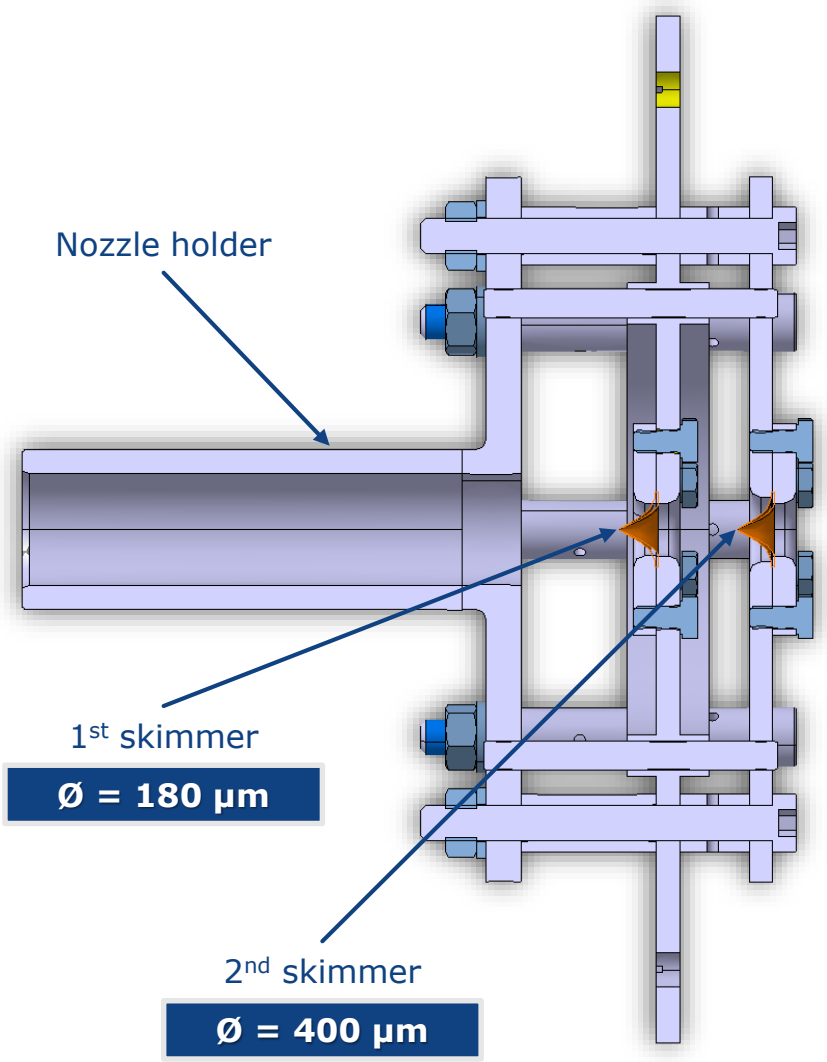
2. Mount the assembly to the skimmers chamber (possibility to note the internal centre line to external targets)

3. The nozzle tube must have a really good manufacturing concentricity

4. Alignment of the system







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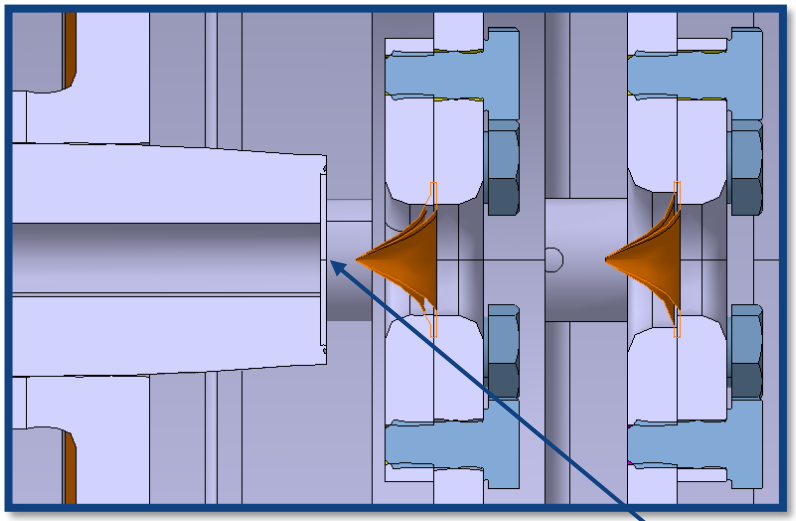
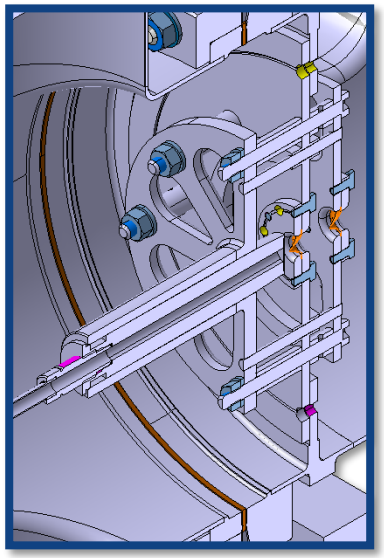
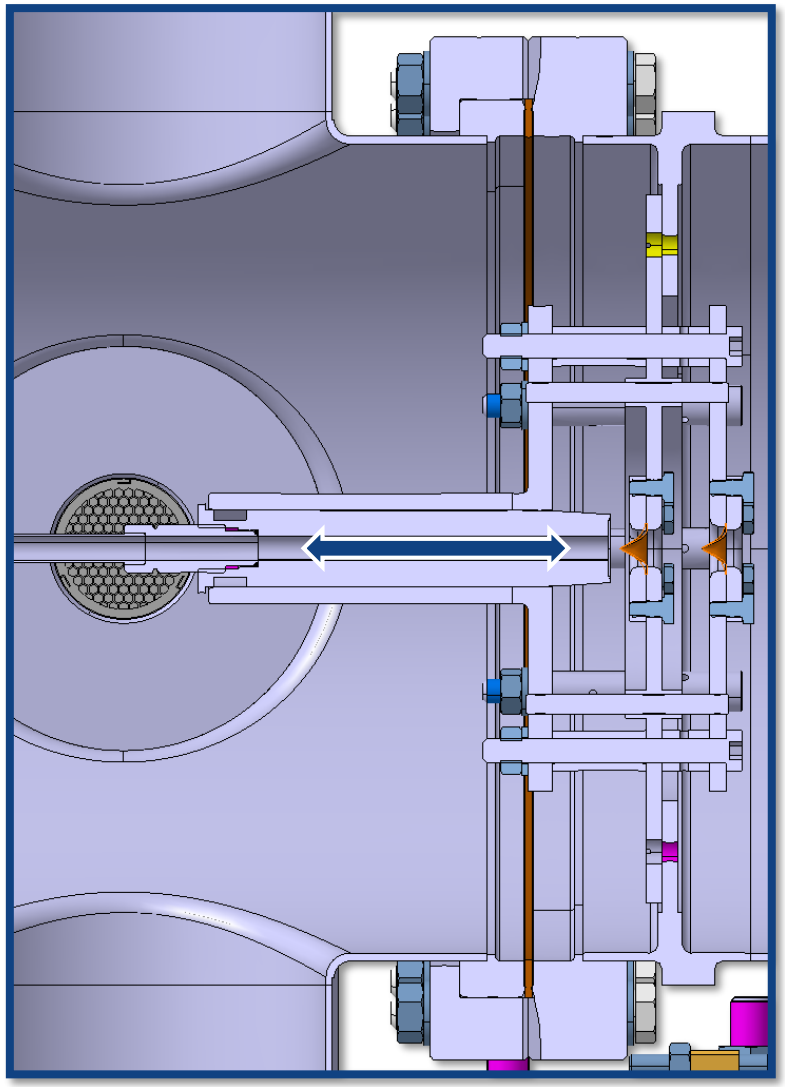




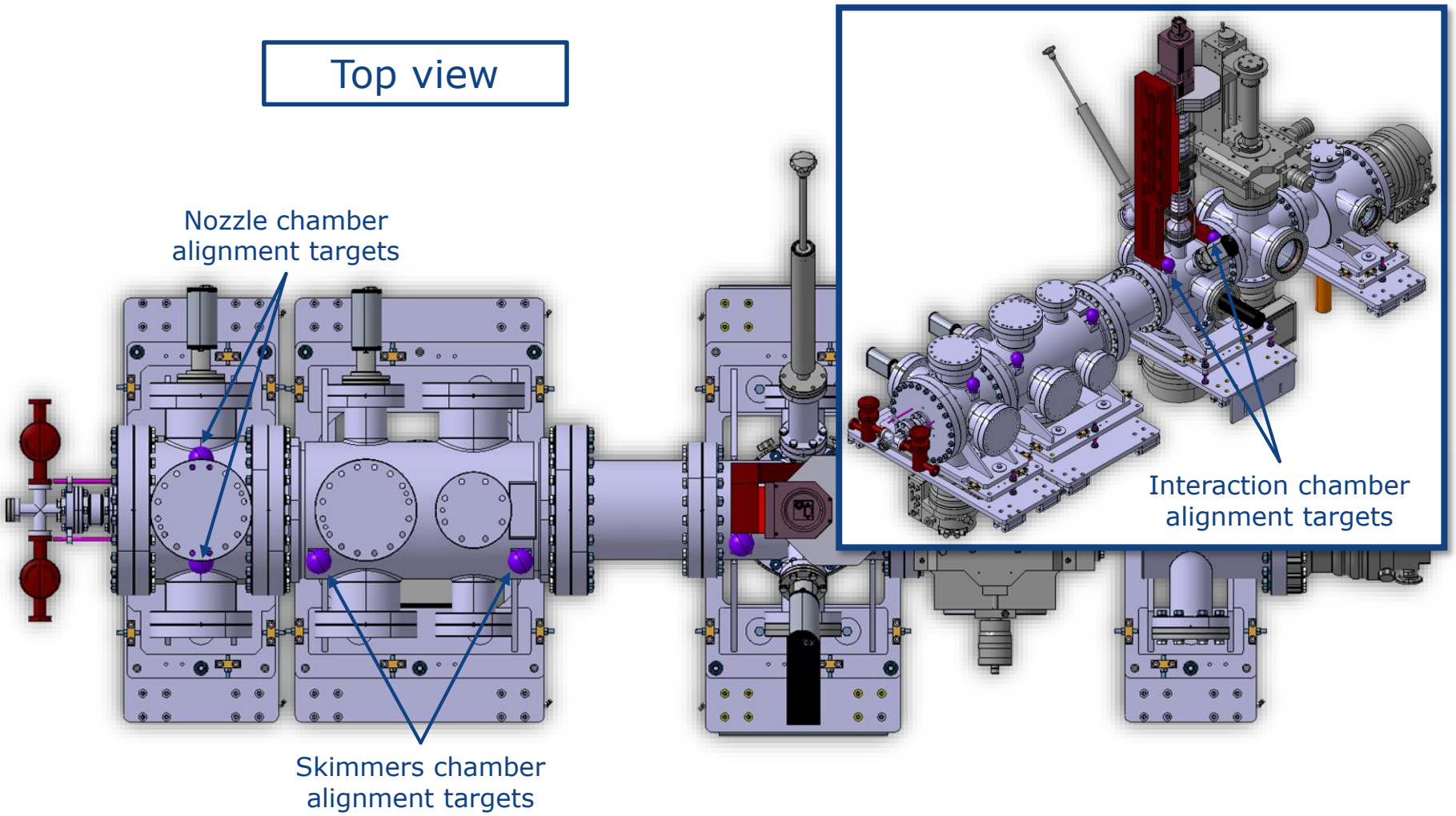
Nozzle

Ø = 30 µm



4. Alignment of the system

Top view



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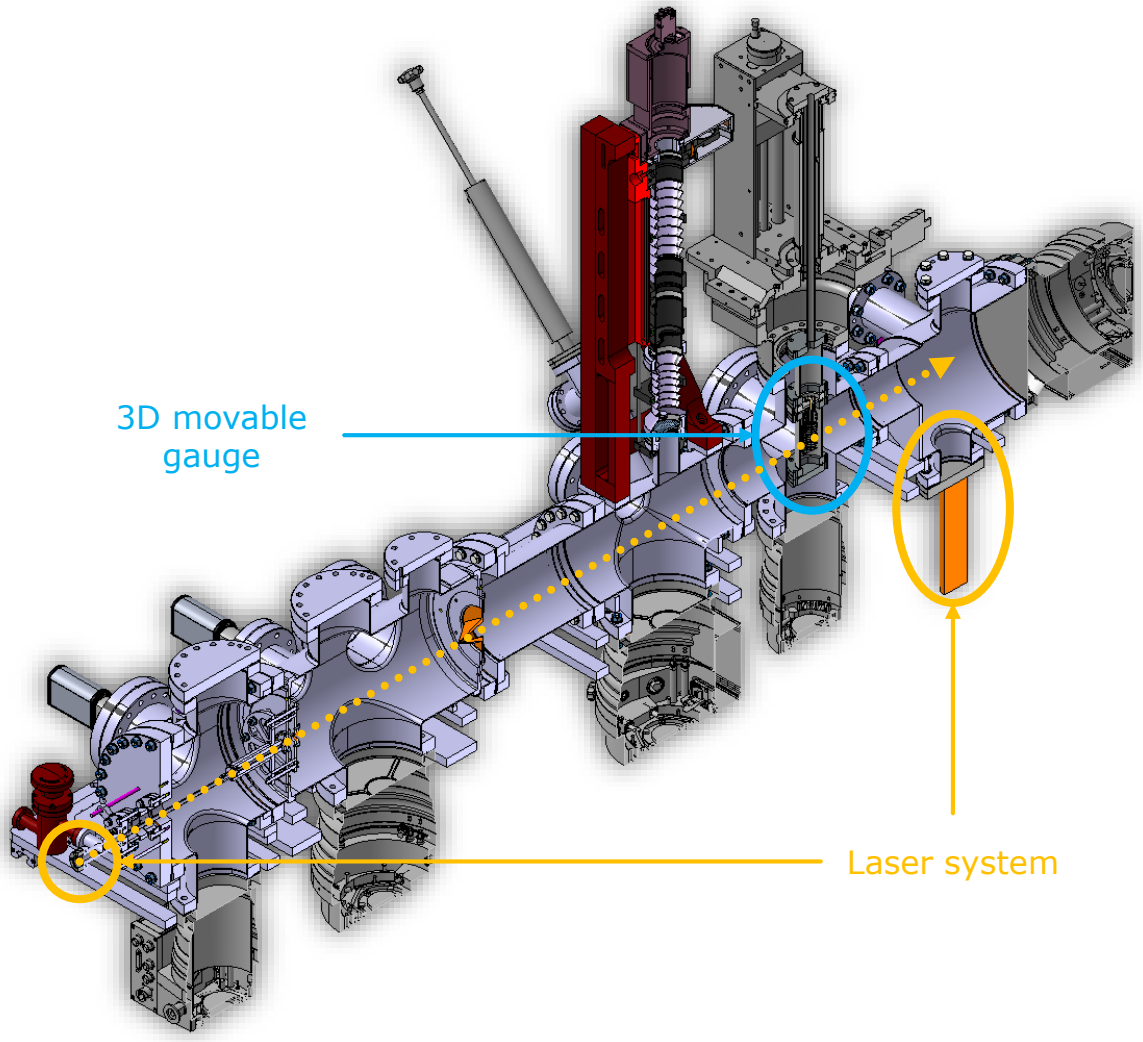


4. Alignment of the system

3D printing is not an option

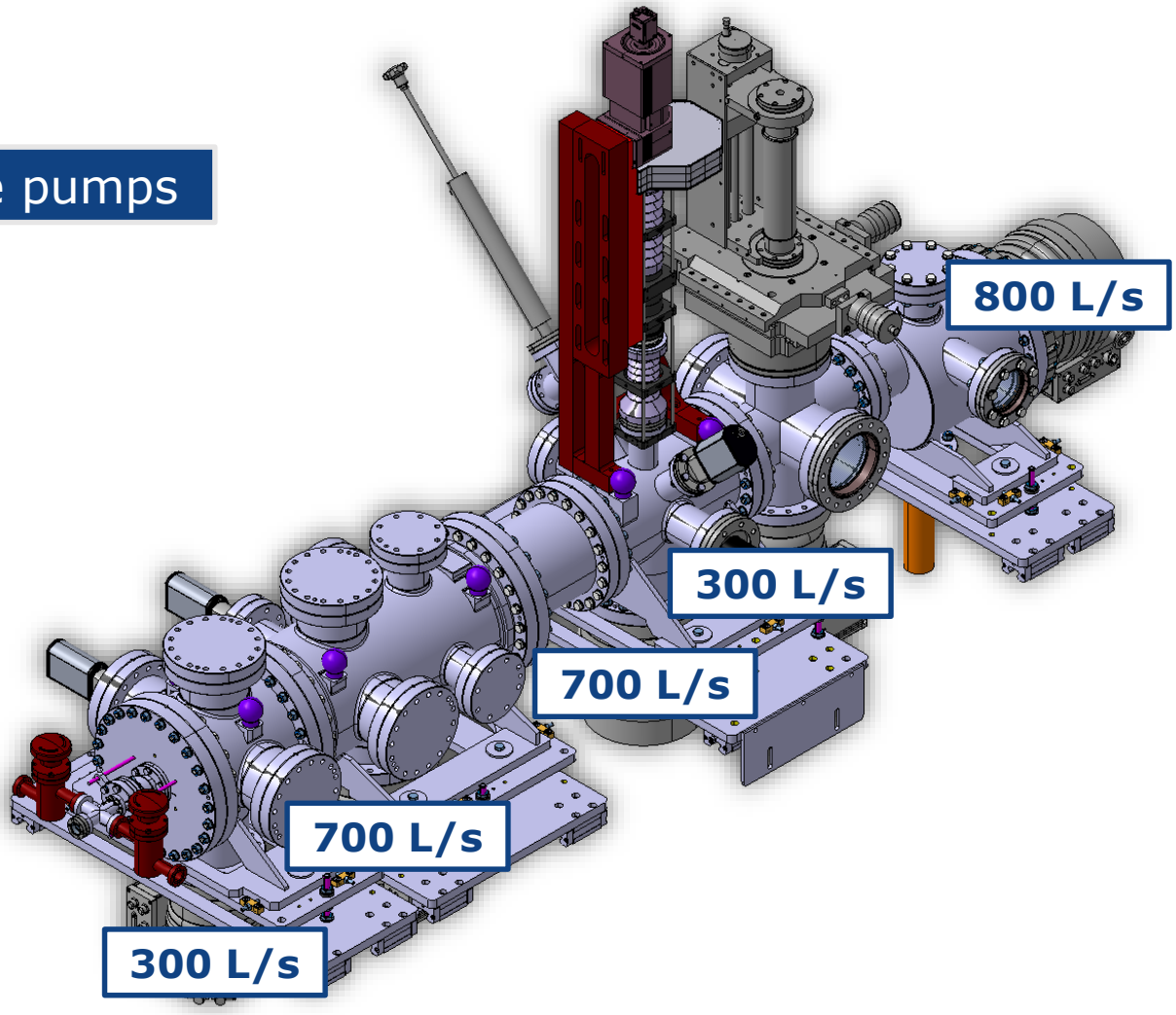
- Alignment of Beam Gas Curtain (BGC) test plates
- **EDMS 1708792 v.1**

Starting investigation on how to align three elements in the micron range

- Analysis of Additive Manufacturing Technologies for the Beam Gas Curtain (BGC) instrument
- **EDMS 1708789 v.1**

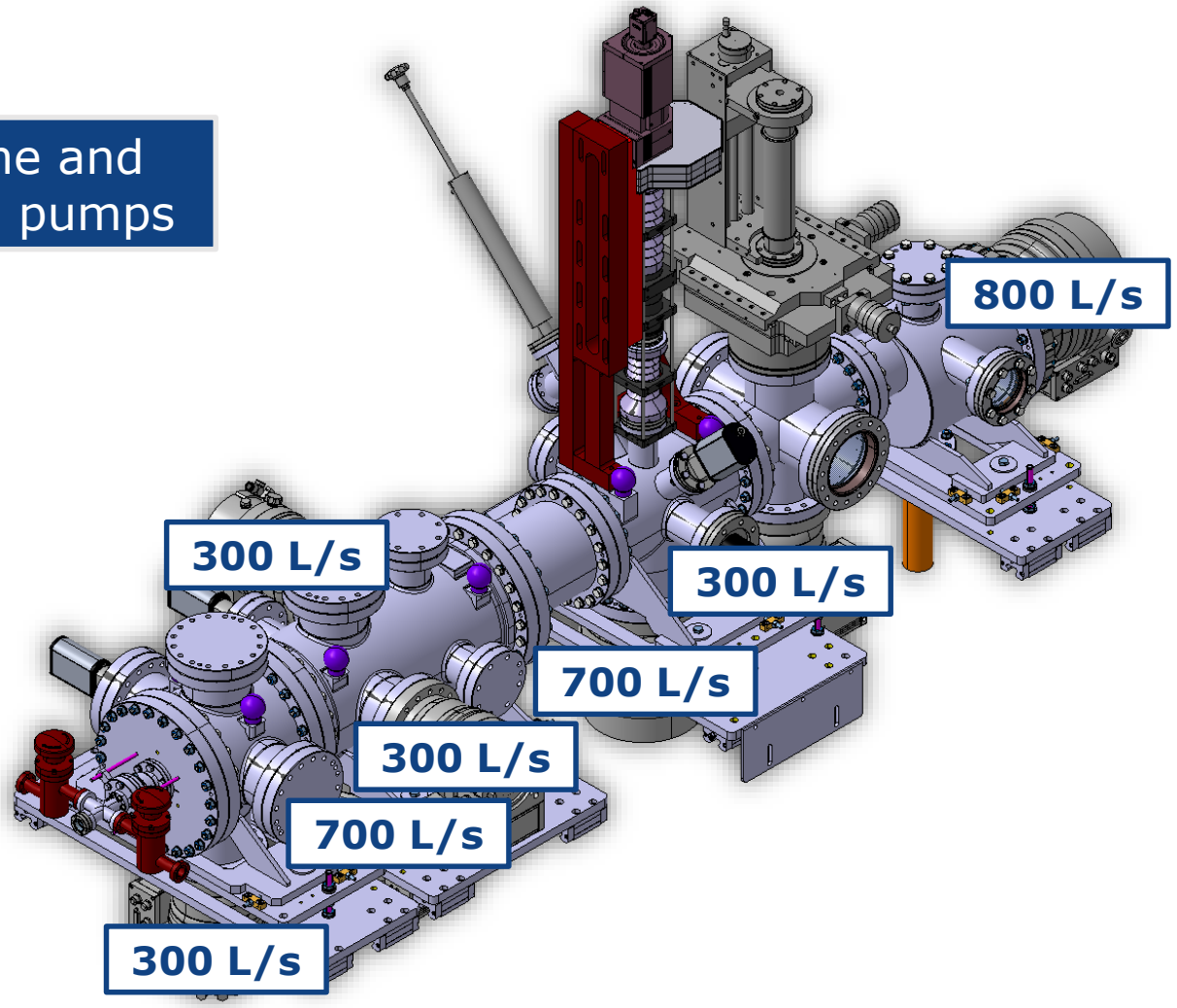
5. Vacuum system and expected pressures

Baseline pumps



5. Vacuum system and expected pressures

Baseline and optional pumps



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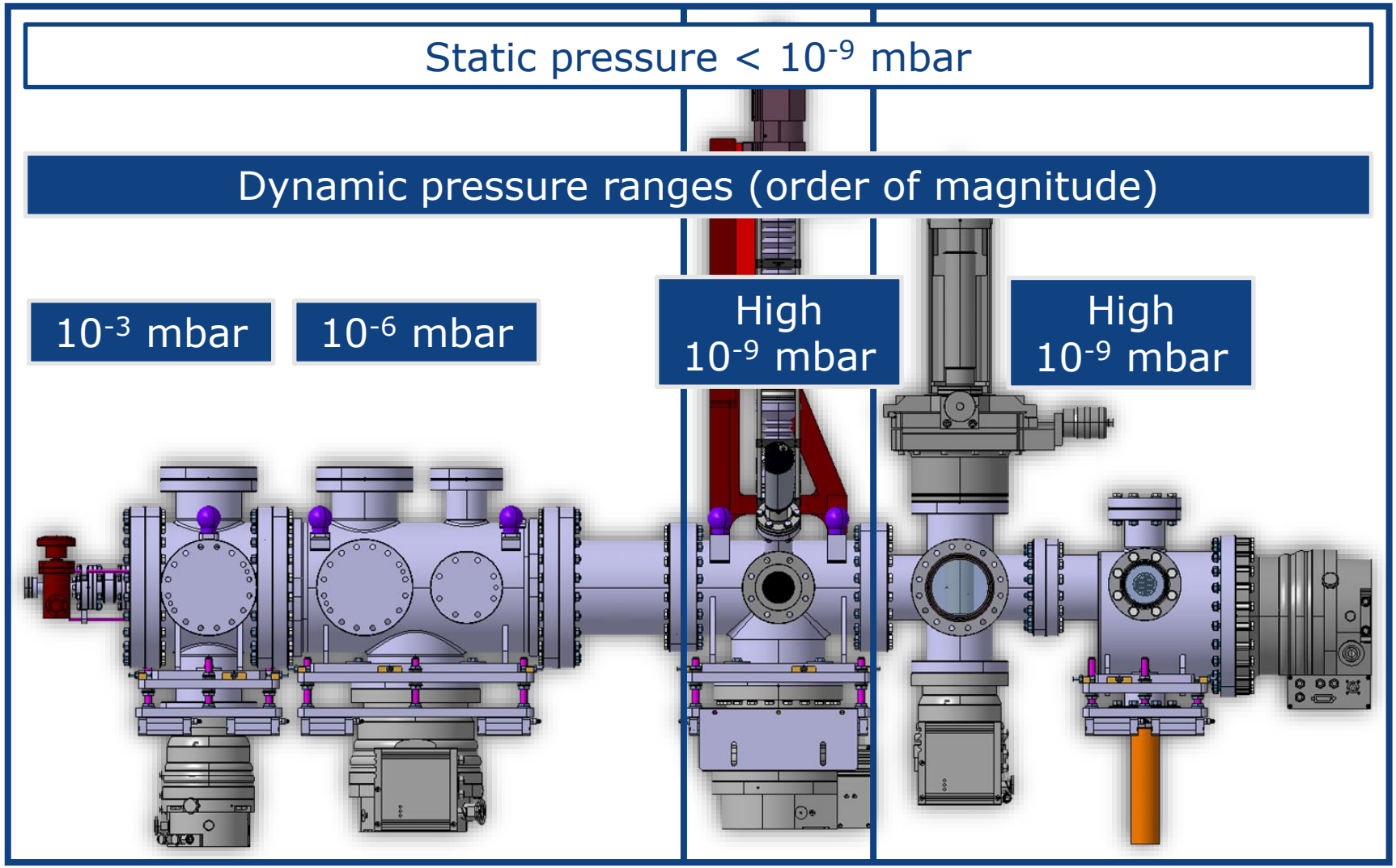
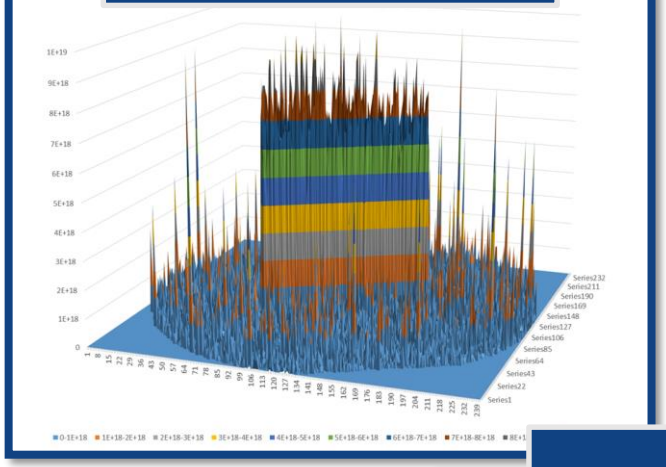
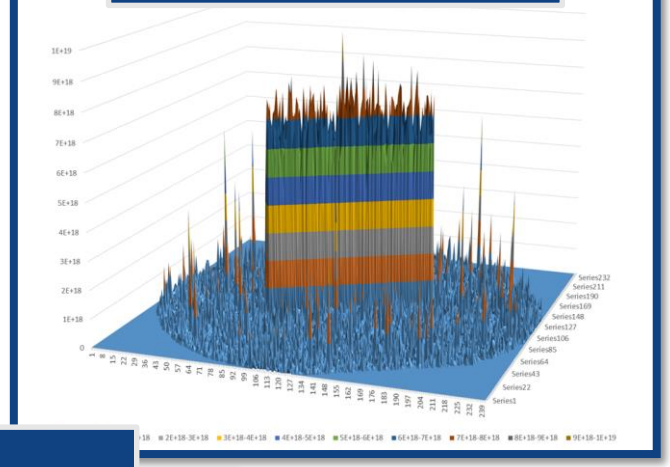


6. Flexibility of the system

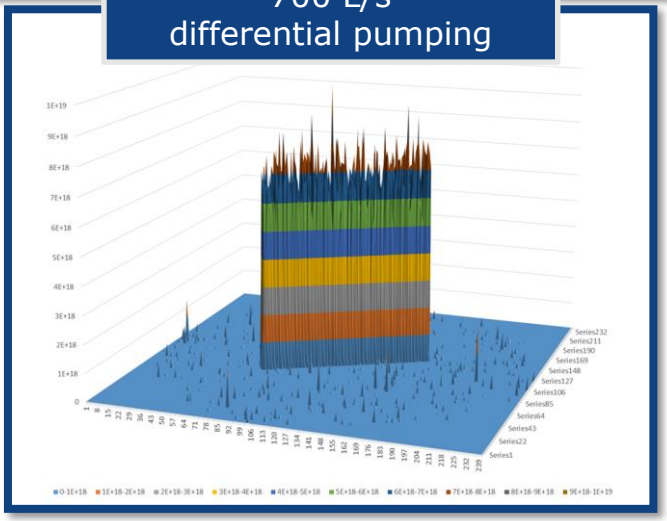
700 L/s
pumping



1400 L/s
pumping



700 L/s
differential pumping



Source: M. Ady

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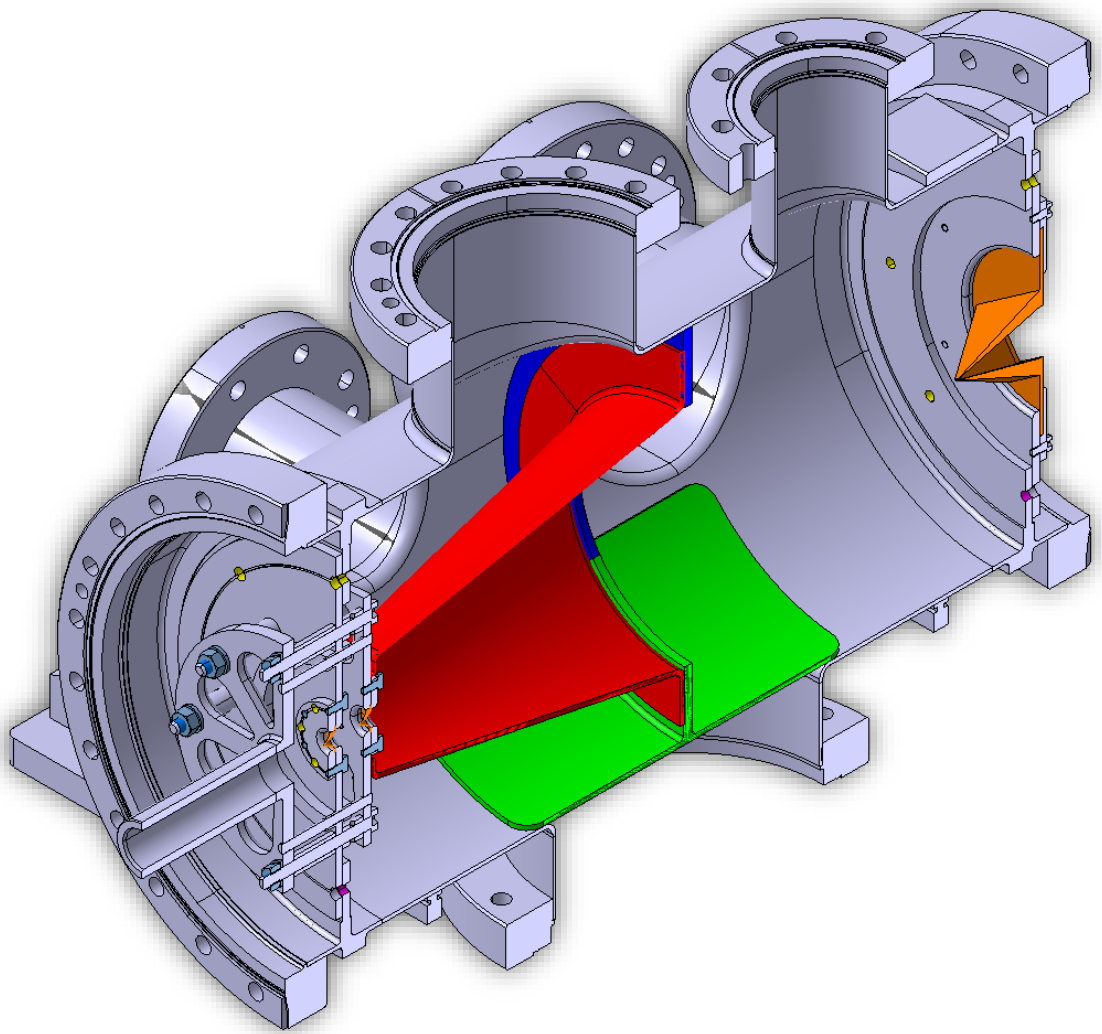

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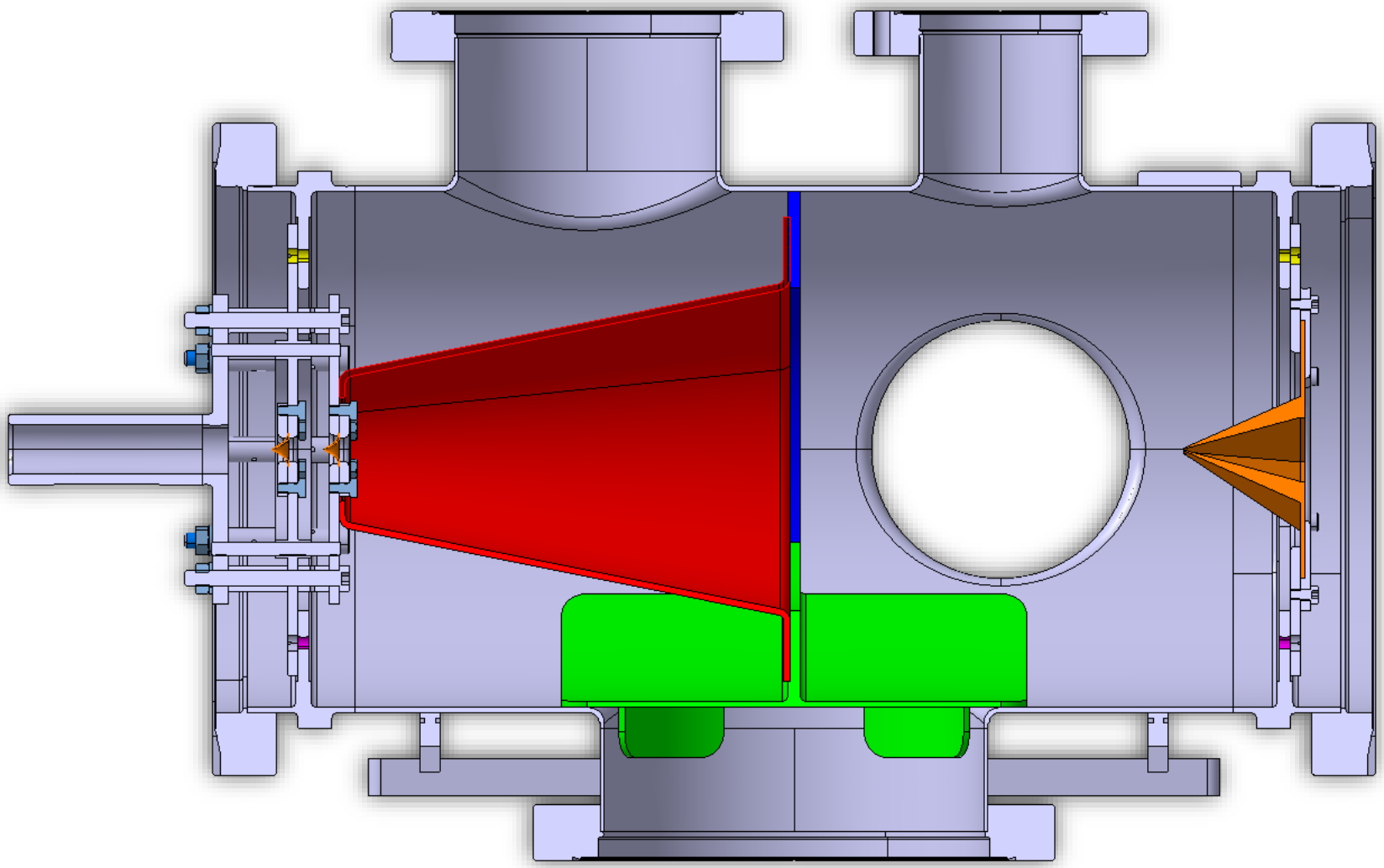

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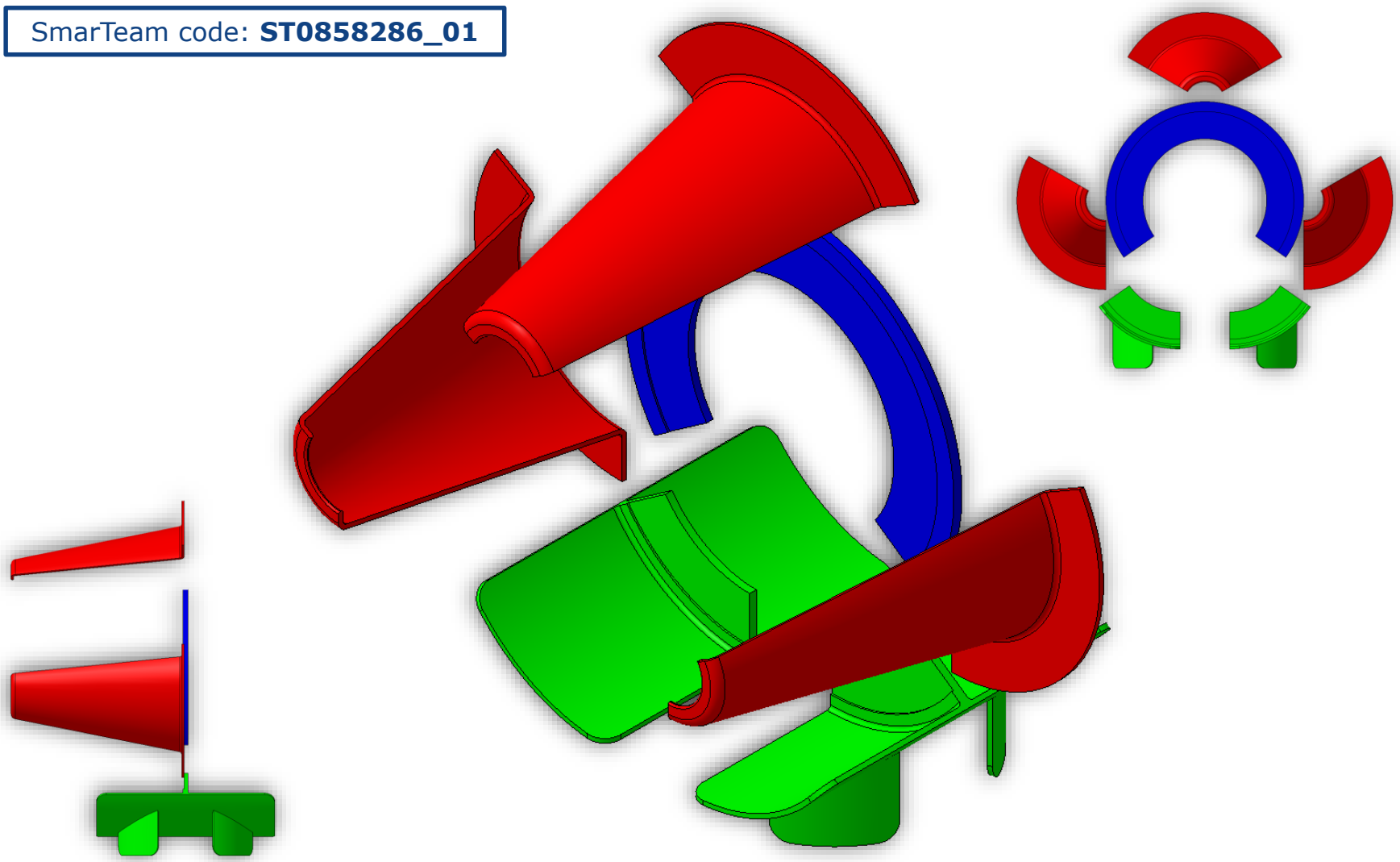
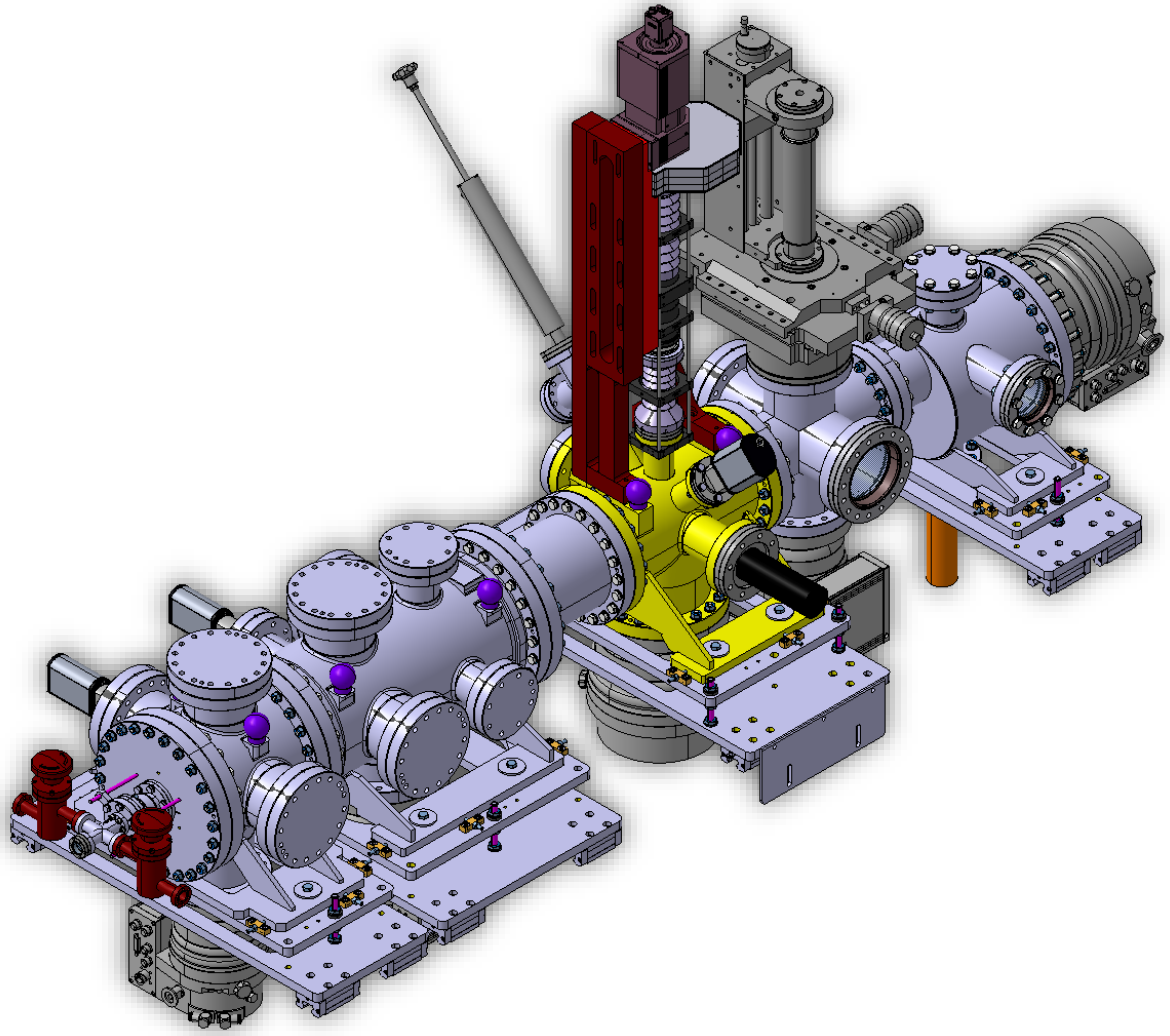


7. Integration of the system



Thank you!