





# Beam Gas Curtain Monitor V4 Conceptual Design Status

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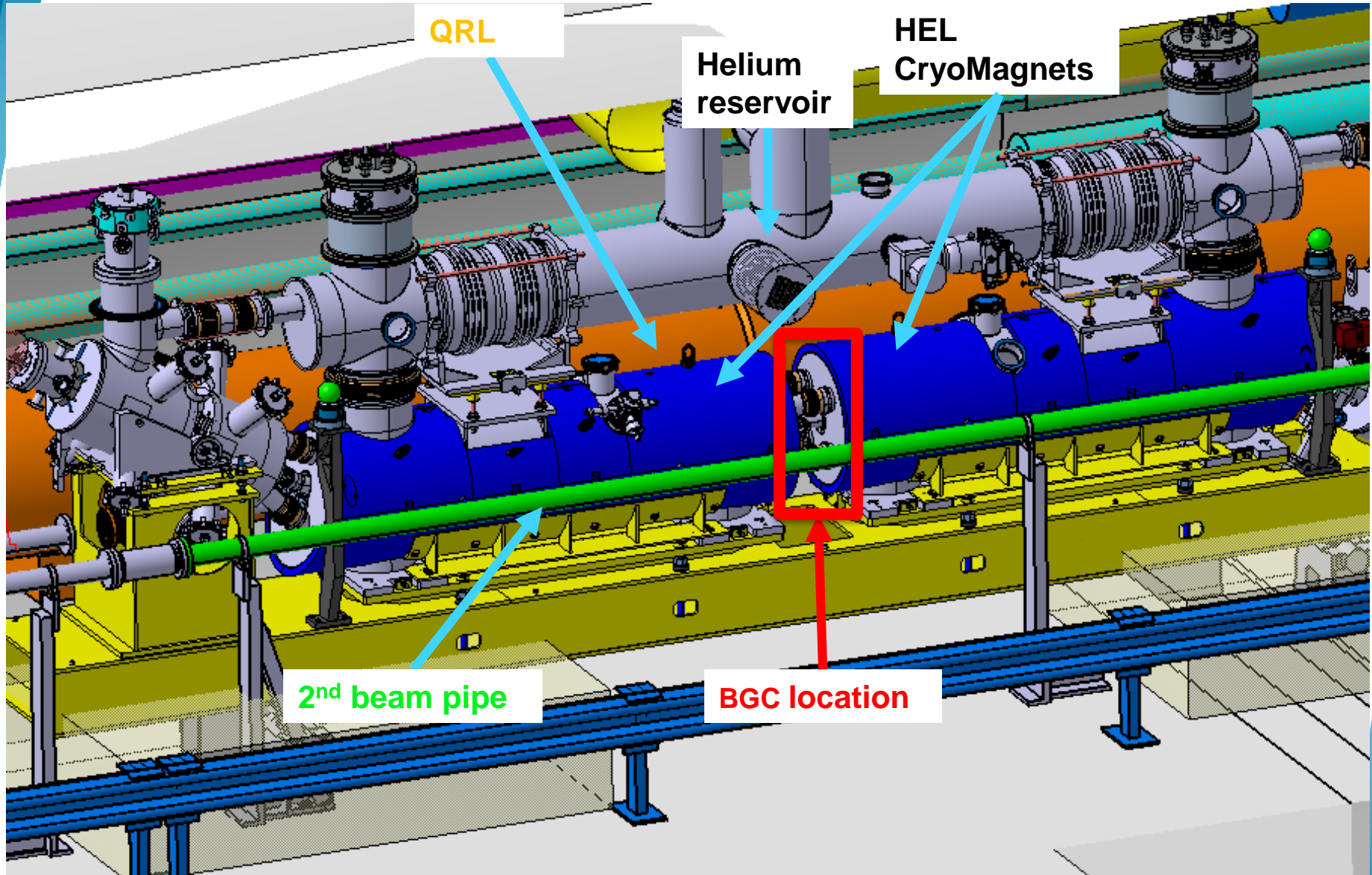


BGC collaboration meeting,  
March 2022, CERN, Geneva, CH

# Contents

- Hollow Electron Lens (HEL) boundaries conditions (Point 4 left and right) for BGC V4
- Recall of V3
- V4 design options
- V4 Mock-up
- Summary

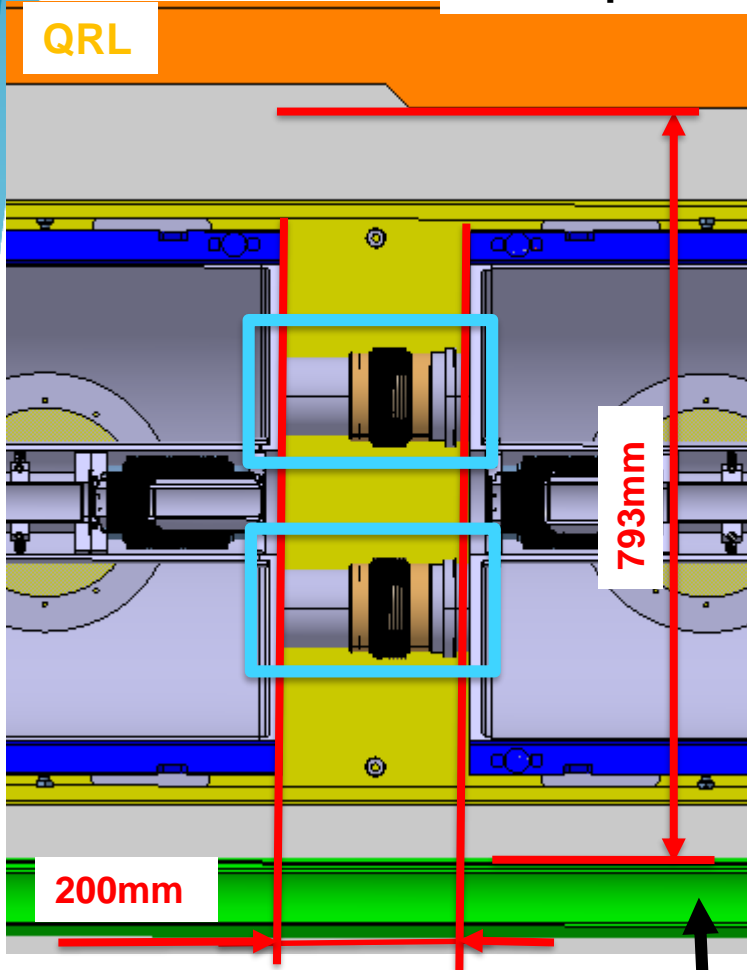
# BGC V4 Installation environment P4 right



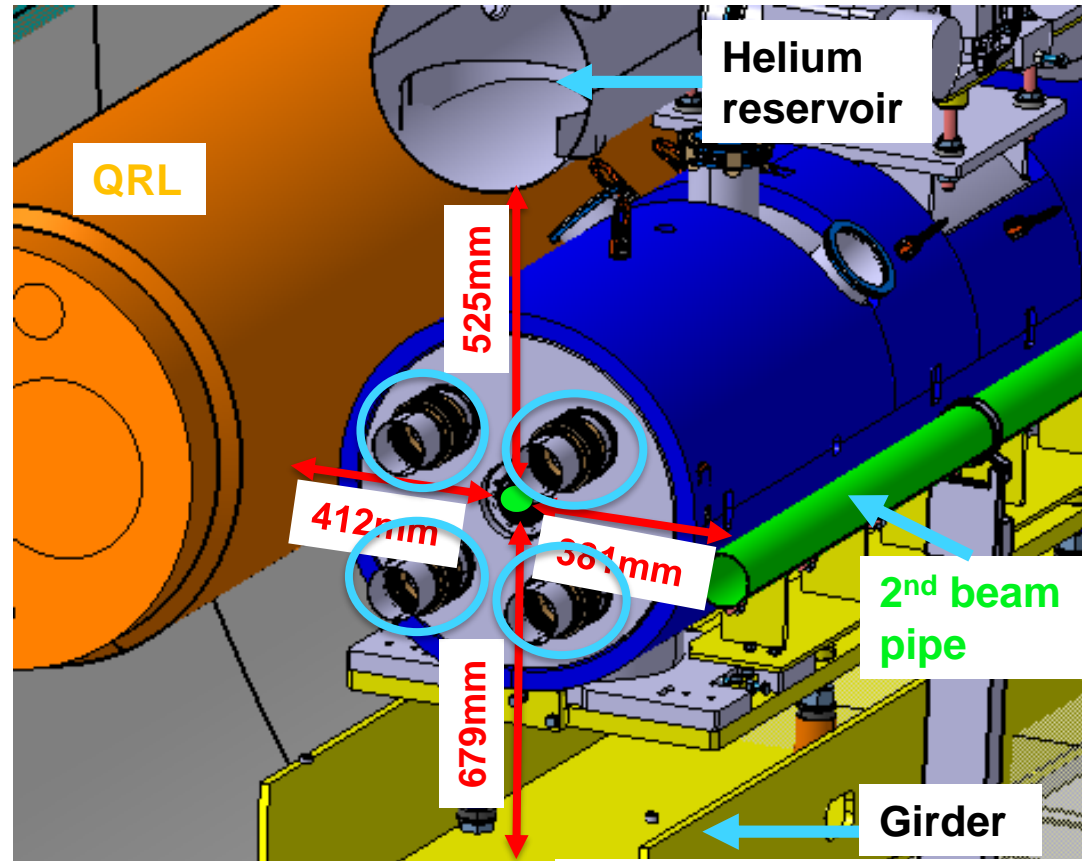
# BGC V4 Installation conditions P4 right

## Space for the BGC

HEL Top view



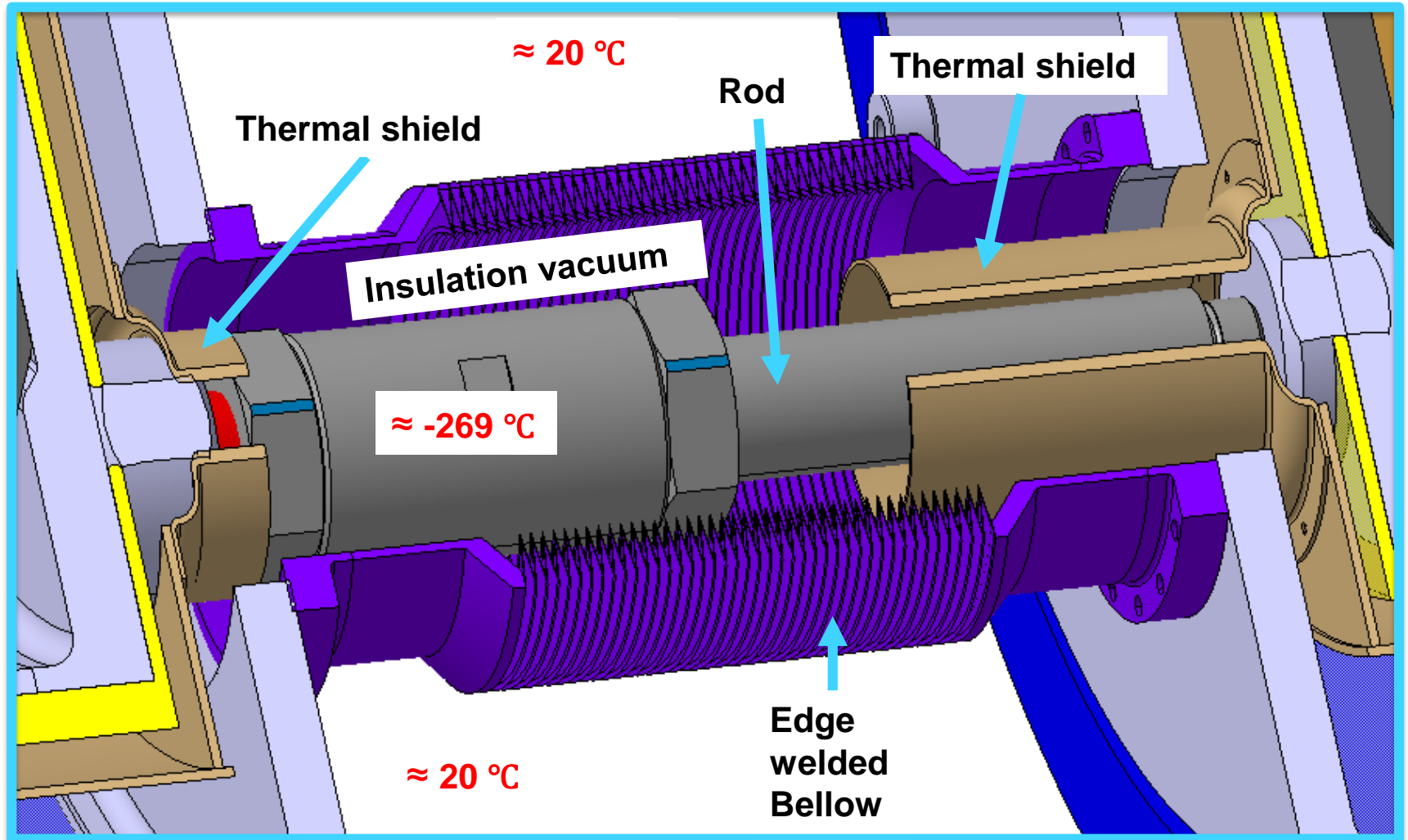
4x Rods in Bellows to compensate for magnets force



2nd beam pipe

# BGC V4 Installation conditions P4 right

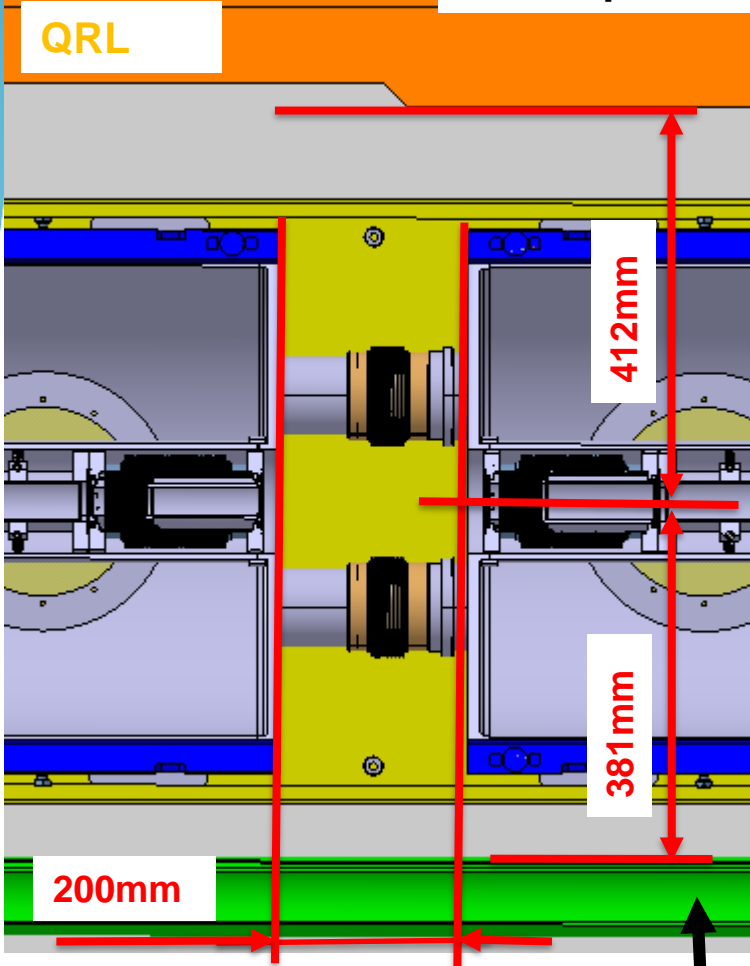
## Removable ROD structure



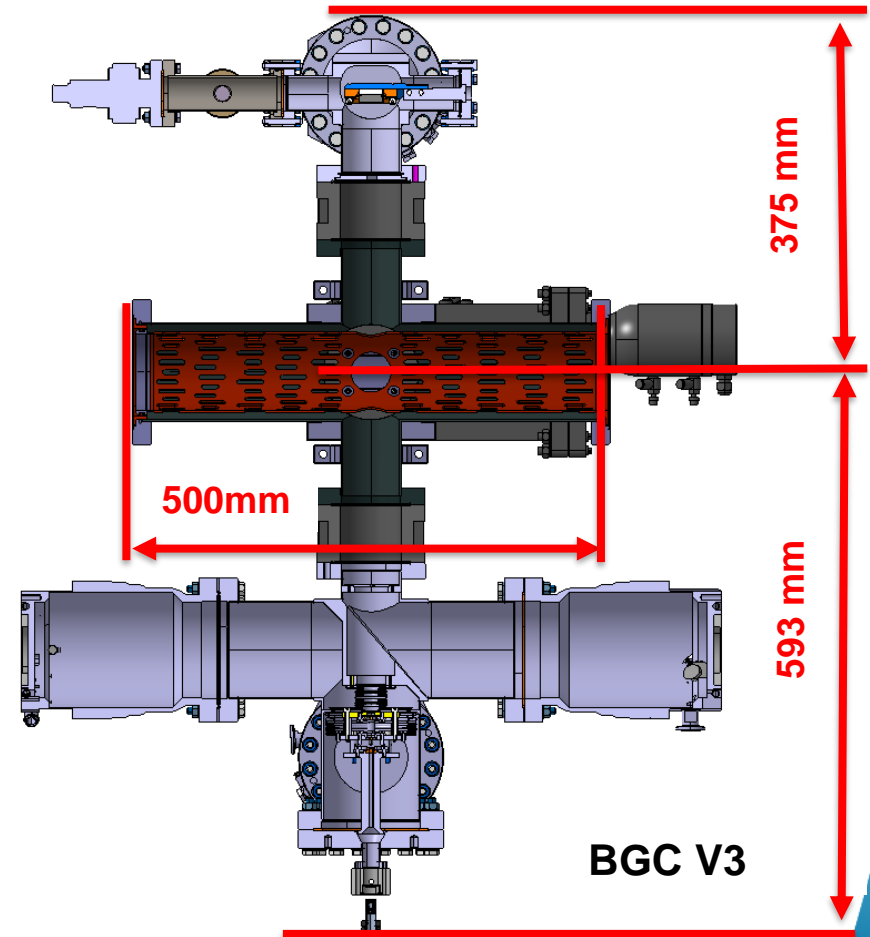
# BGC V4 Installation conditions P4 right

## Space for the BGC

HEL Top view

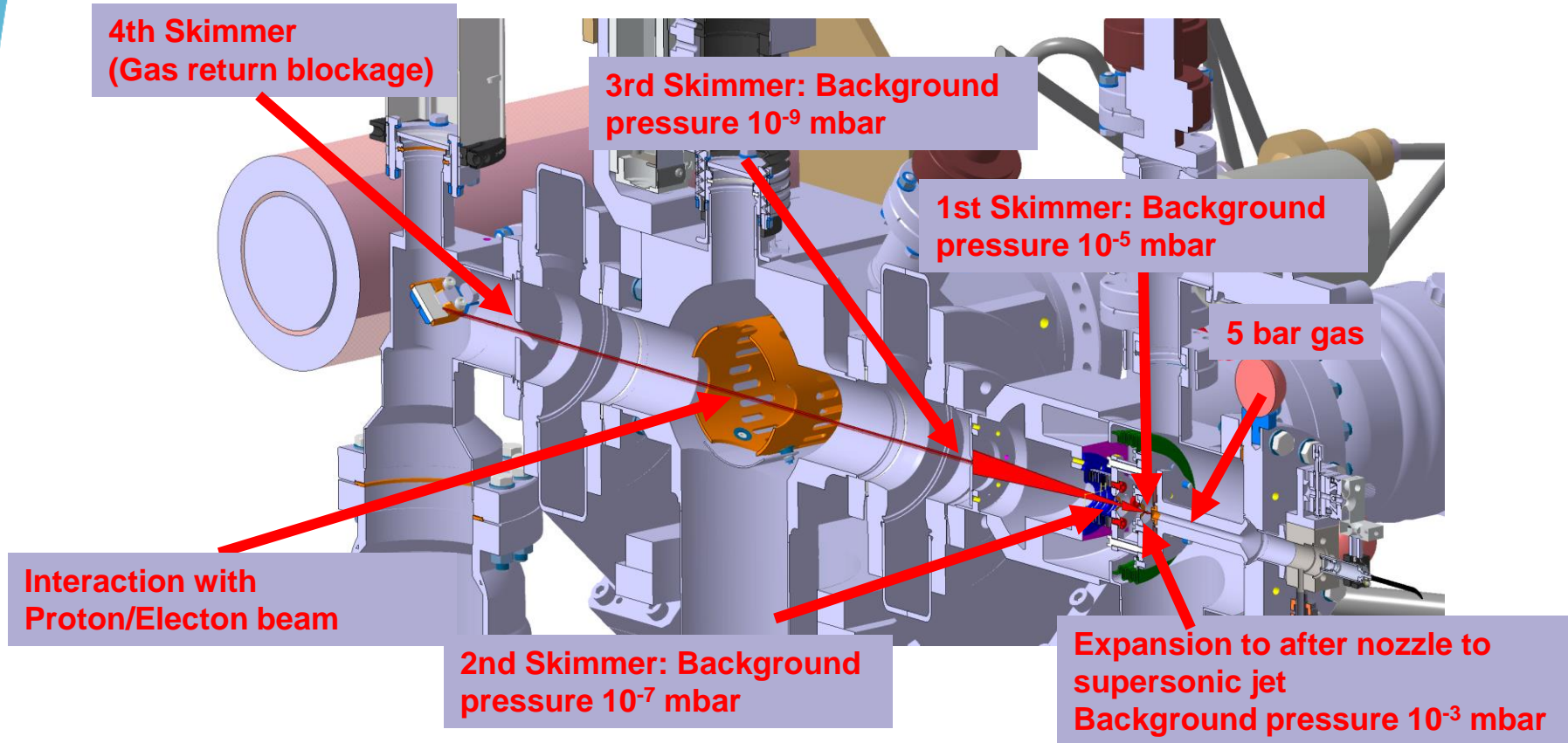


2<sup>nd</sup> beam pipe



BGC V3

# Recall of V3

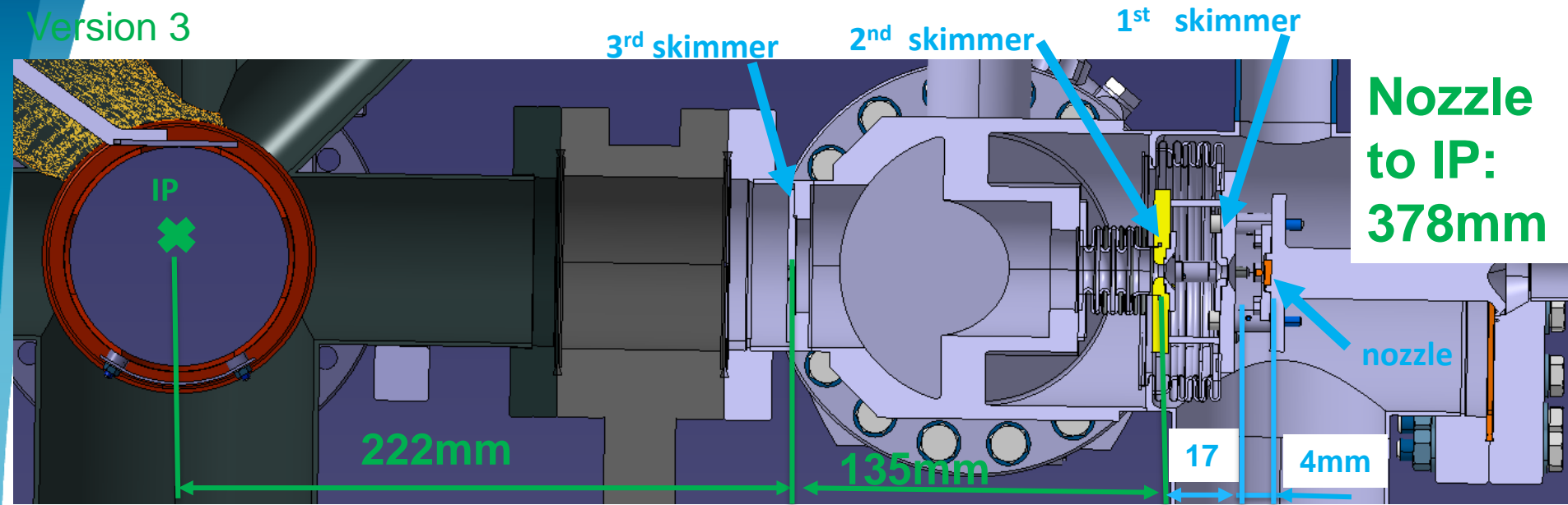




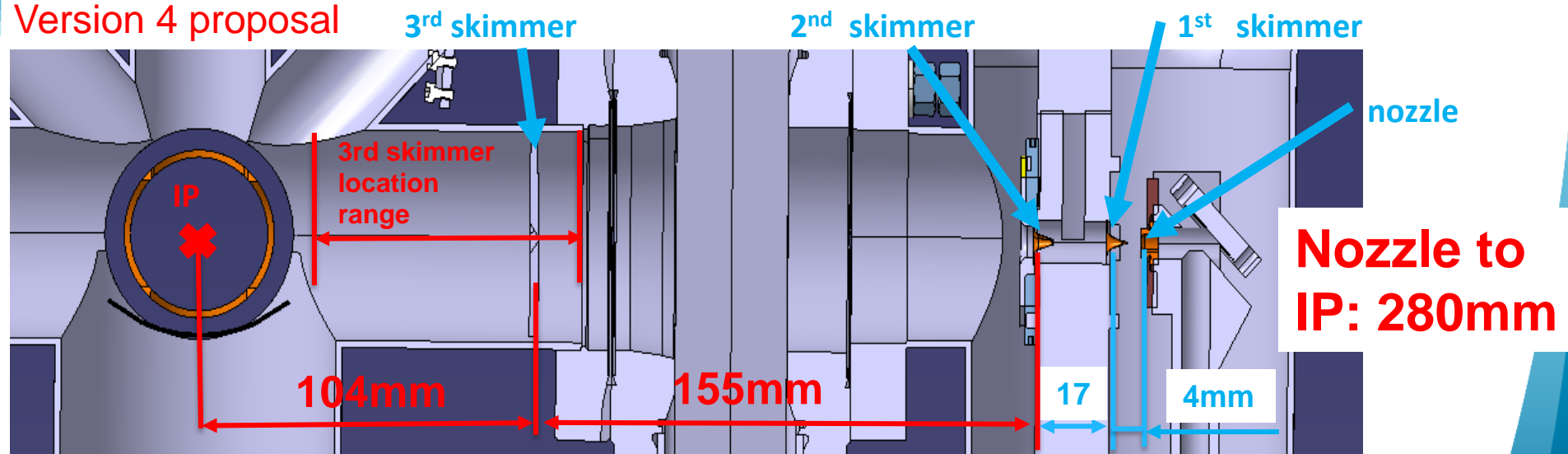
# BGC V3 and V4

## Skimmers – nozzle distances comparison

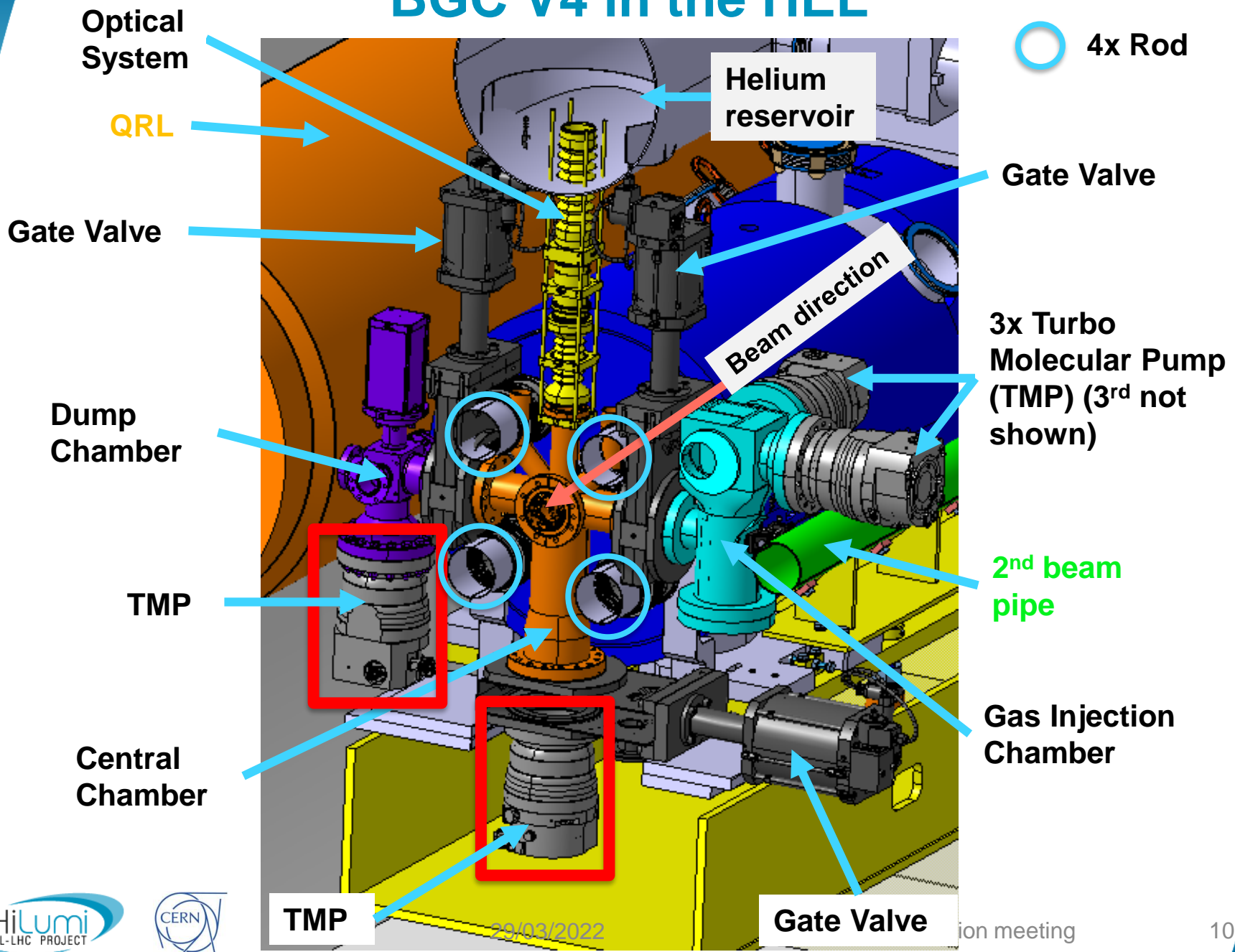
Version 3



Version 4 proposal



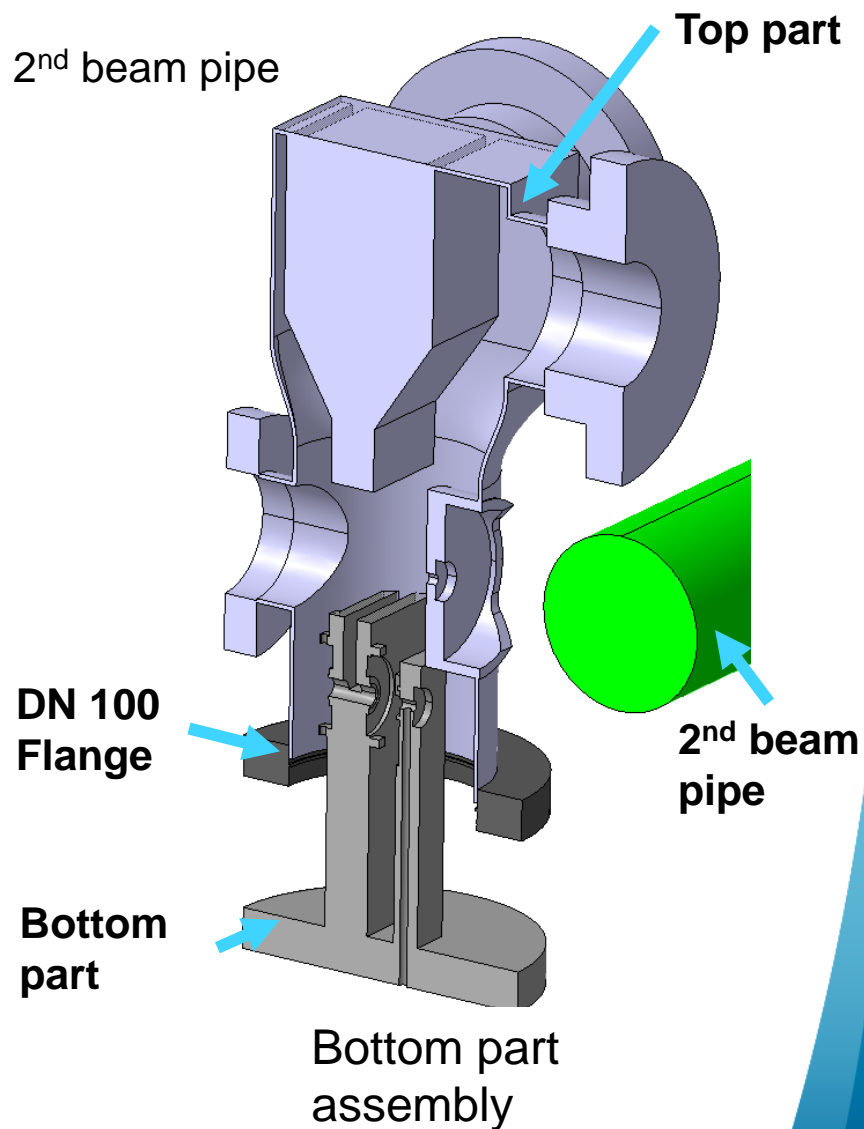
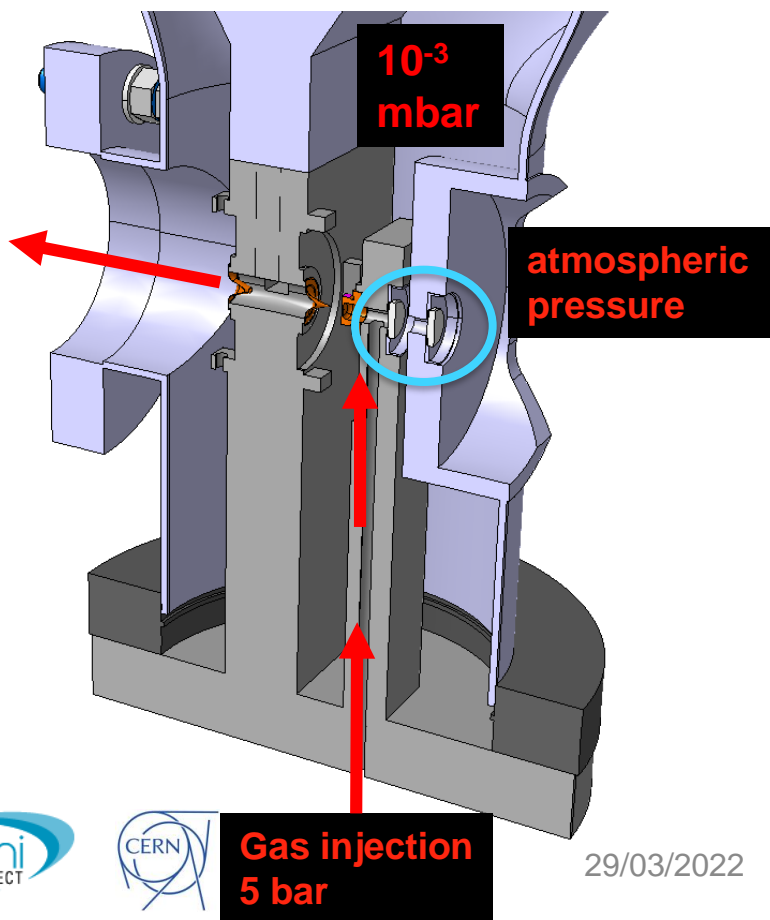
# BGC V4 in the HEL



# Solutions – Gas Injection Chamber

## Gas injection bottom mounted:

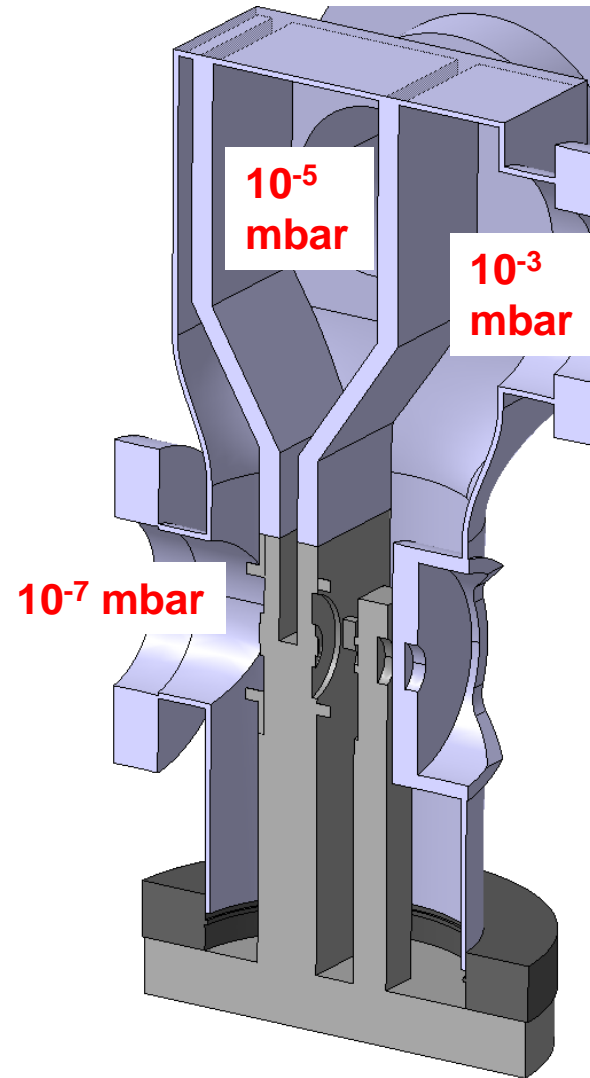
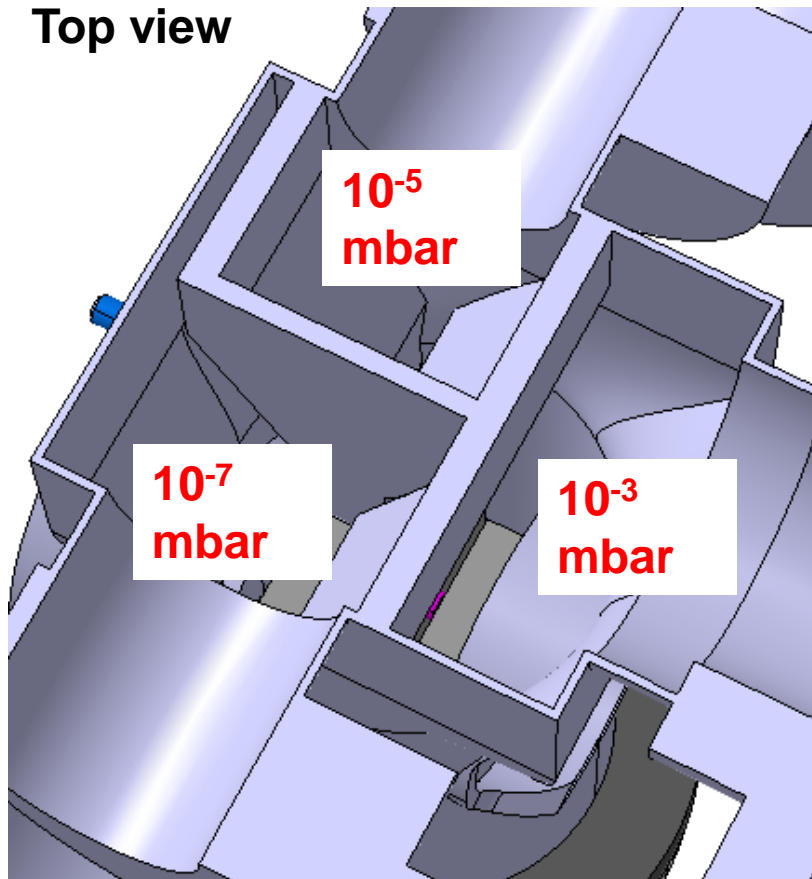
- + Space saving due to less flanges horizontally
  - + Assembly/disassembly without any impact of the 2<sup>nd</sup> beam pipe
  - + Simple connection based on 100 Flange
- 2 welded windows for diagnostic laser



# Solutions – Gas Injection Chamber

- gas routing in 3 compartments
- how to make it leak tight?

Top view

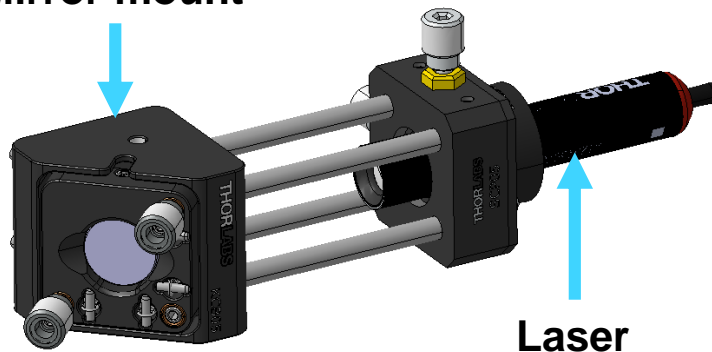


# Solutions – Diagnostic Laser + Mirror

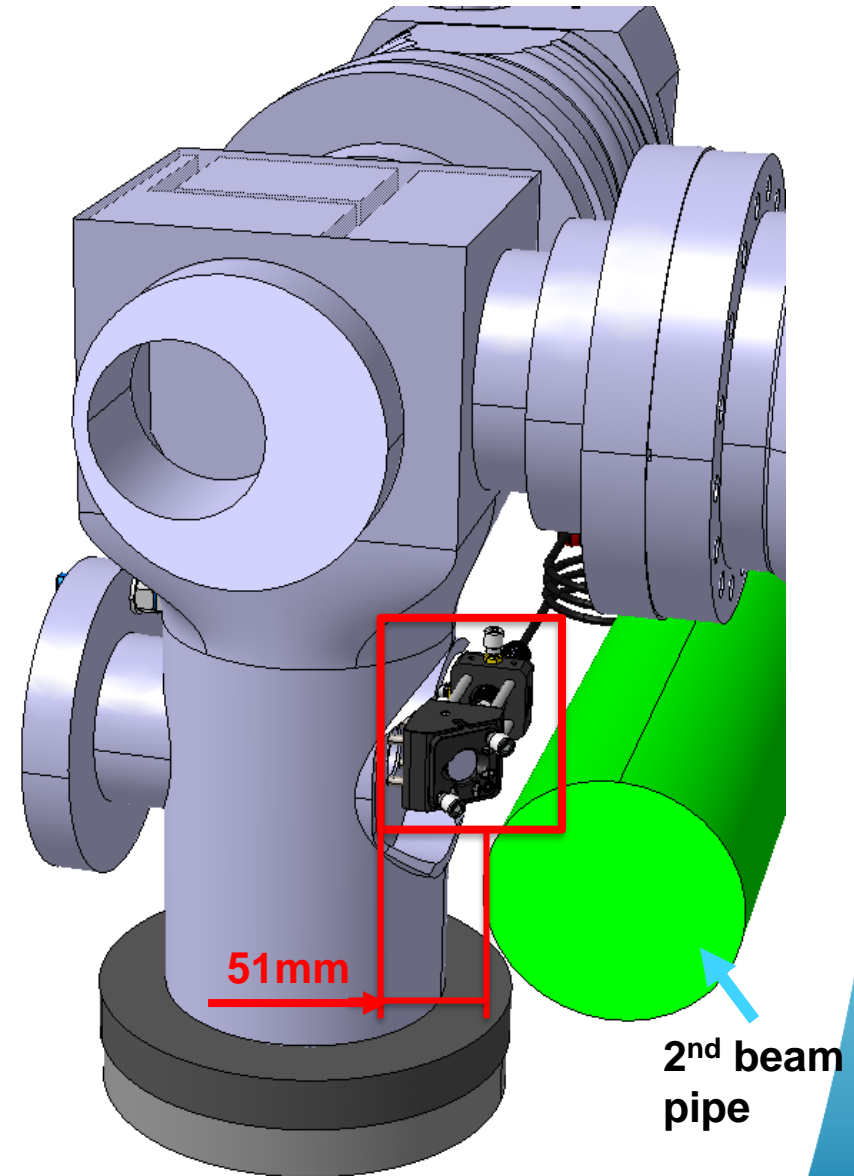
Diagnostic laser with the use of a mirror:

- Side mounting possible
- Mirror mount: 2 angles adjustment
- Laser mount: 2 directions adjustment
- All standard parts from the market

Mirror mount



Laser



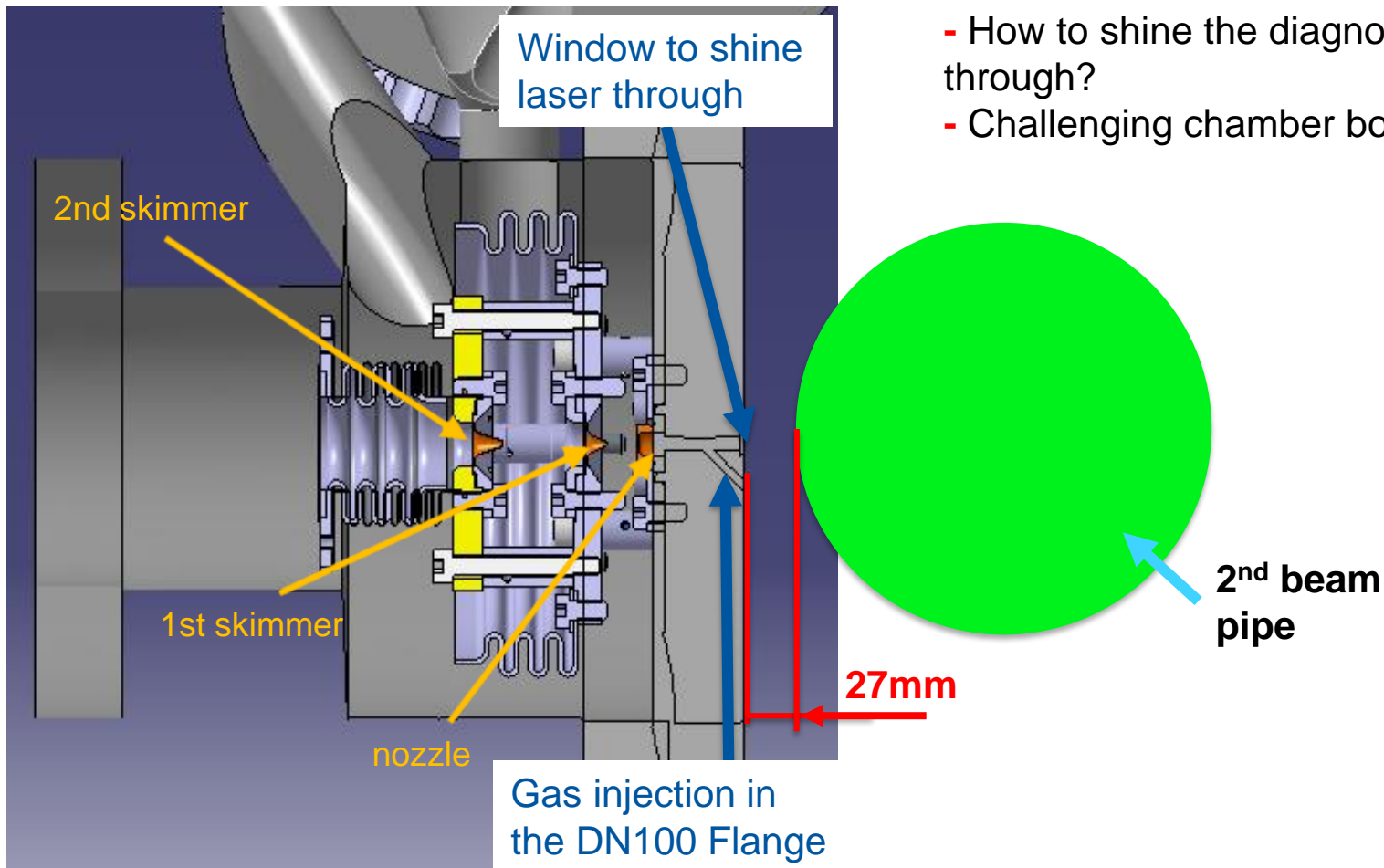
2nd beam pipe

# Solutions – Horizontal Gas Injection Chamber

Skimmers/nozzle assembly from V3  
mounted on DN100 flange with the window

+ possibility to use skimmers/nozzle  
assembly like in V3

- How to shine the diagnostic laser  
through?
- Challenging chamber body design



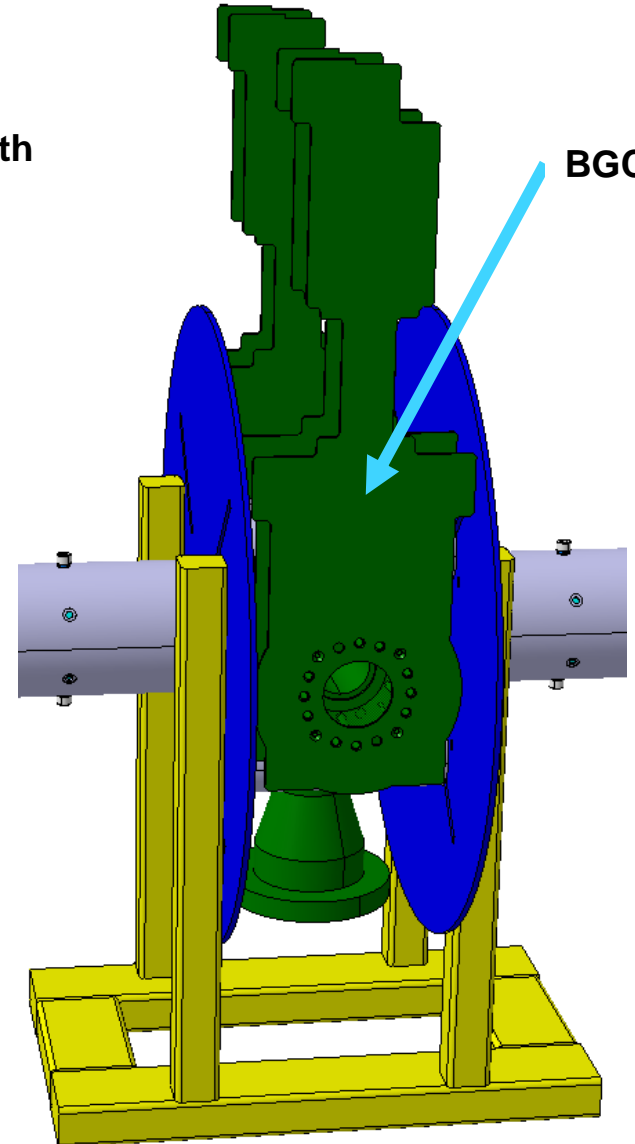
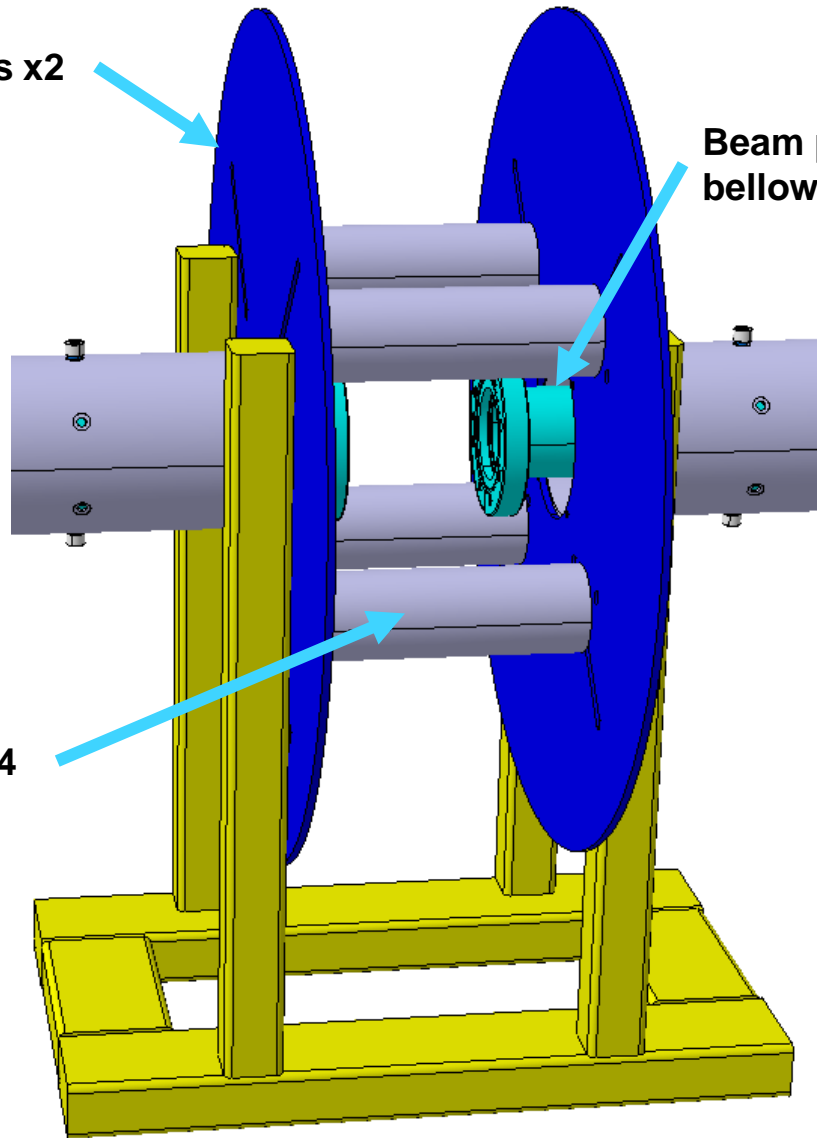
# BGC V4 Installation sequence on Mock-up

Magnets x2

Beam pipe with bellows

BGC

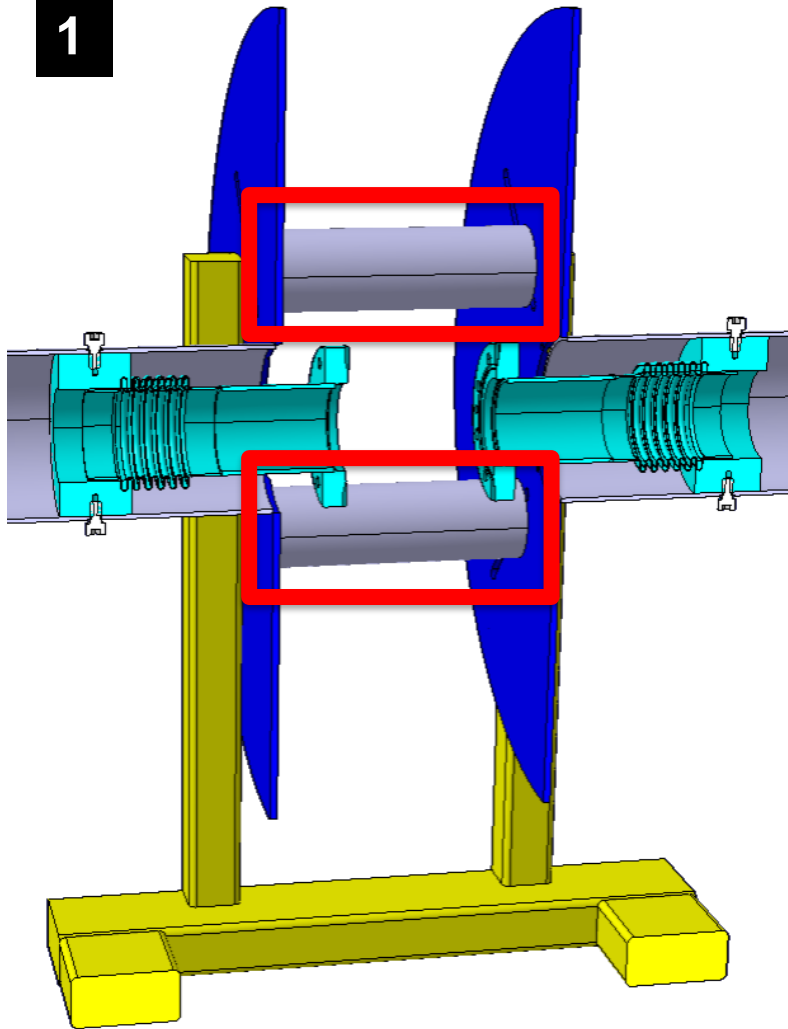
Rods x4



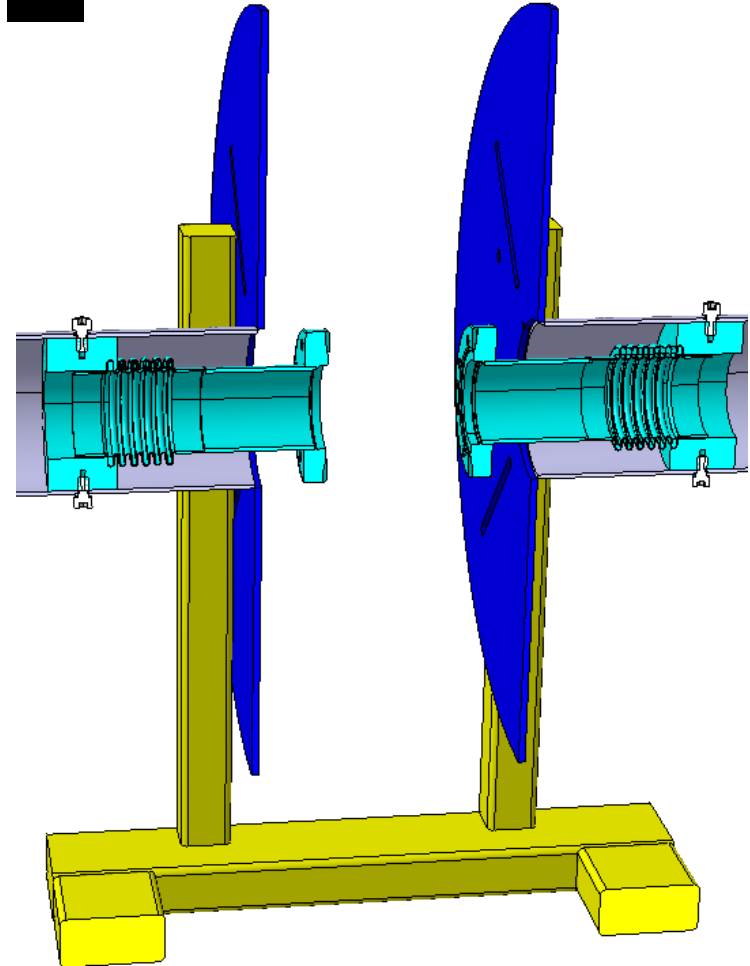
# BGC V4 Installation sequence on Mock-up

## 1. Rods - removed

1



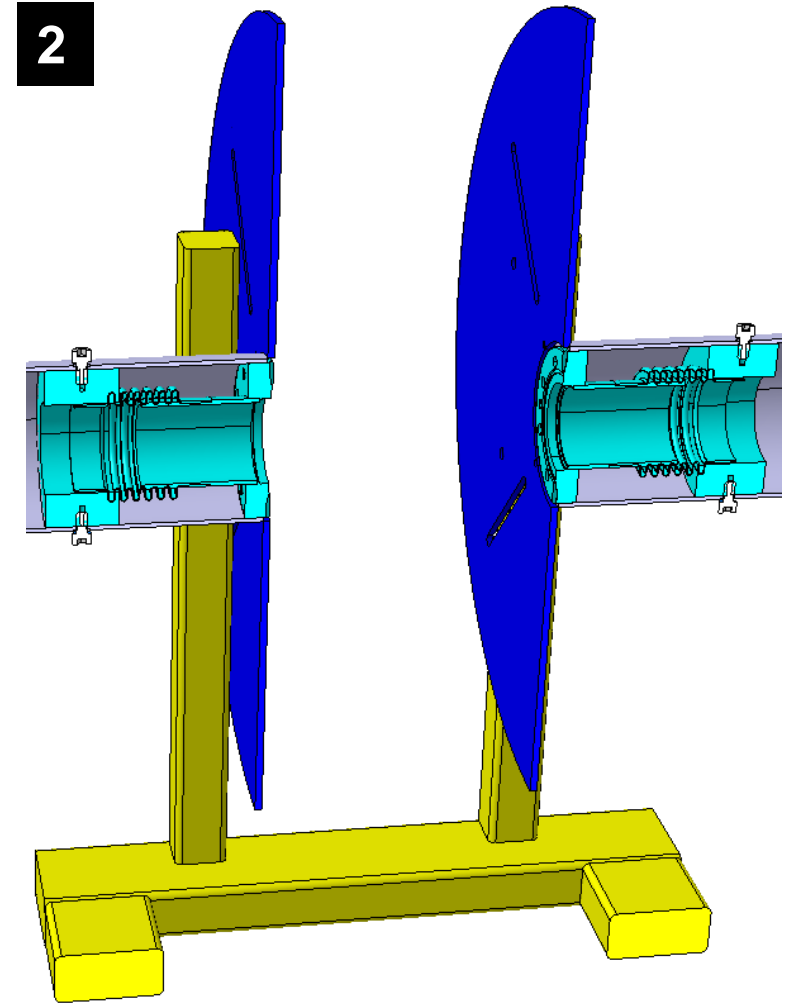
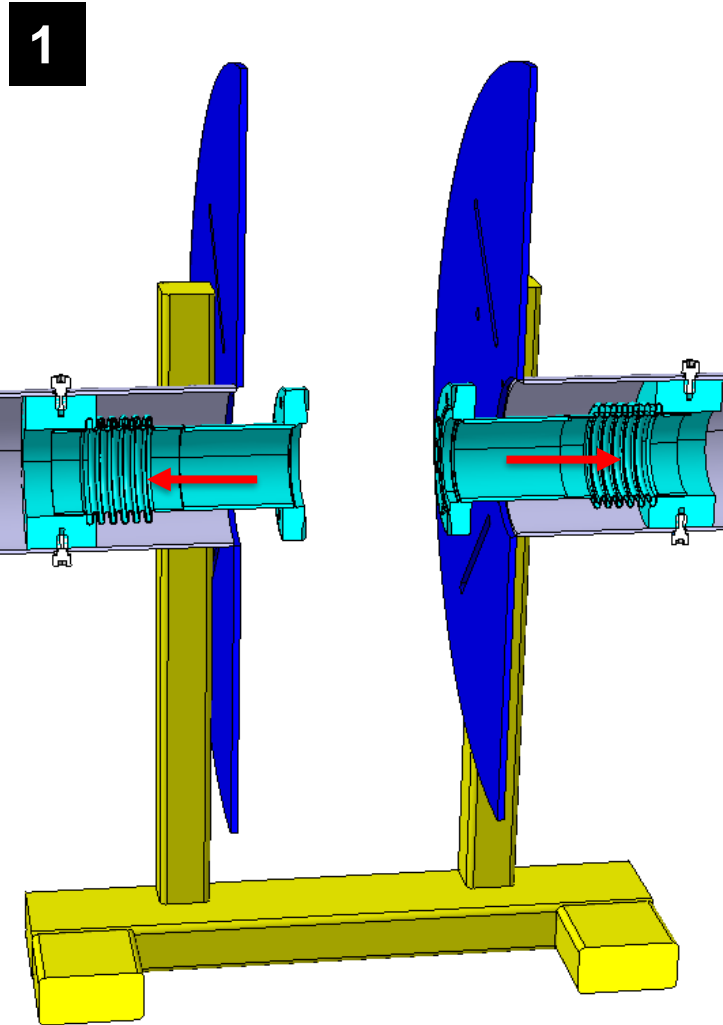
2





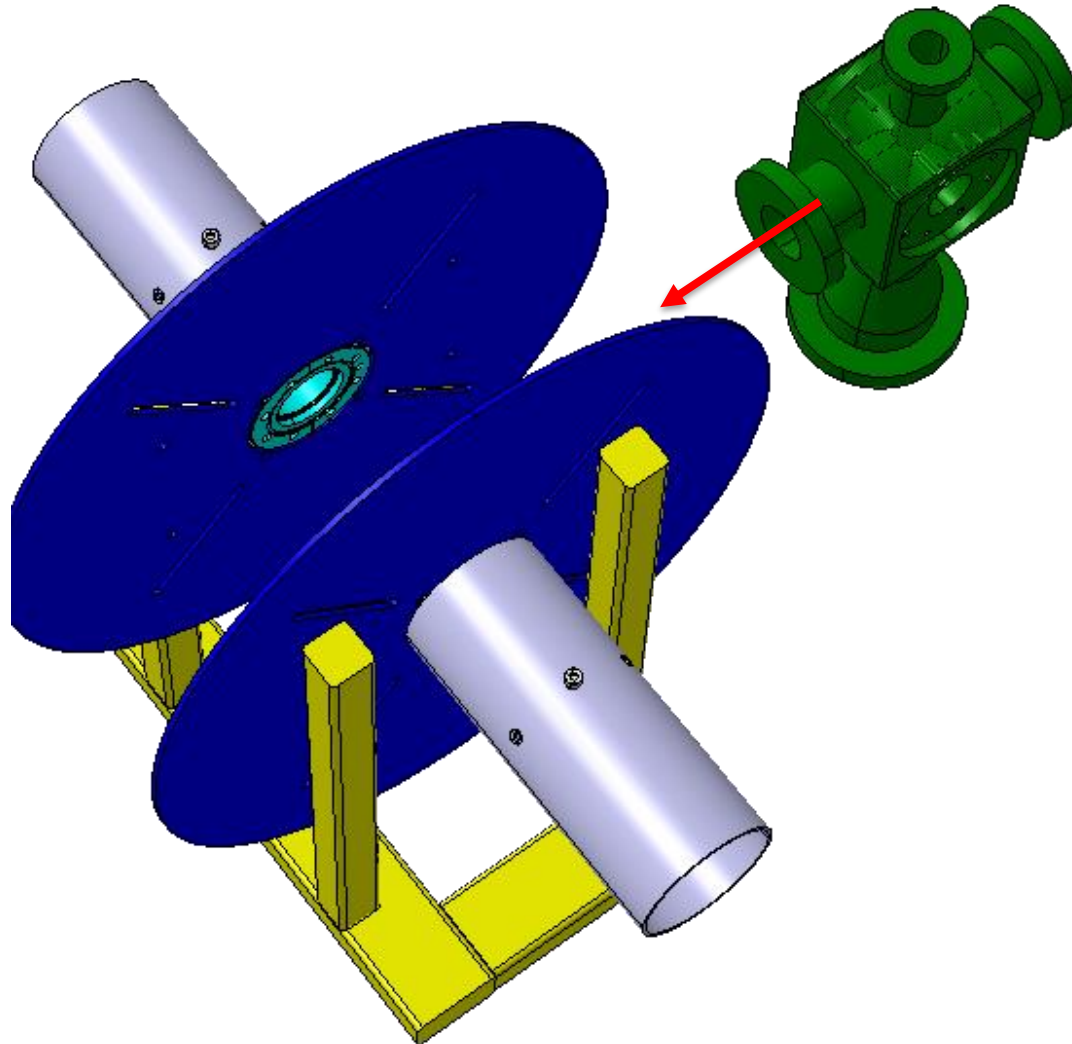
# BGC V4 Installation sequence on Mock-up

## 2. Beam pipe with bellows adjust – moved away



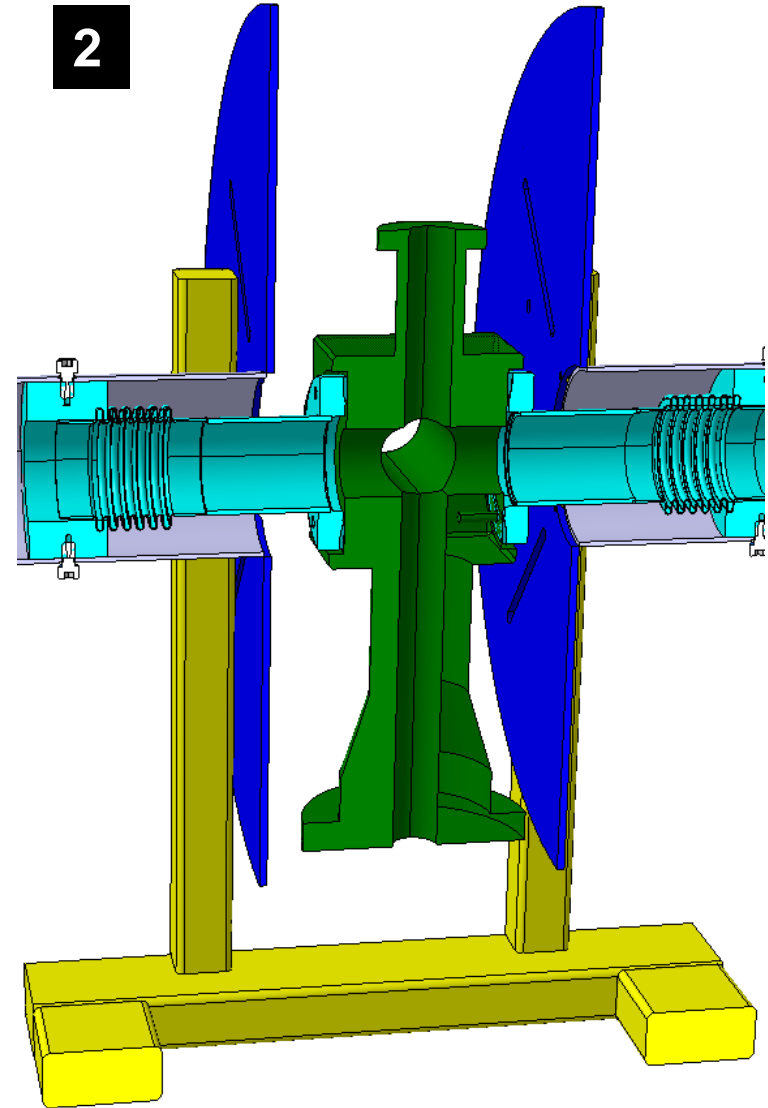
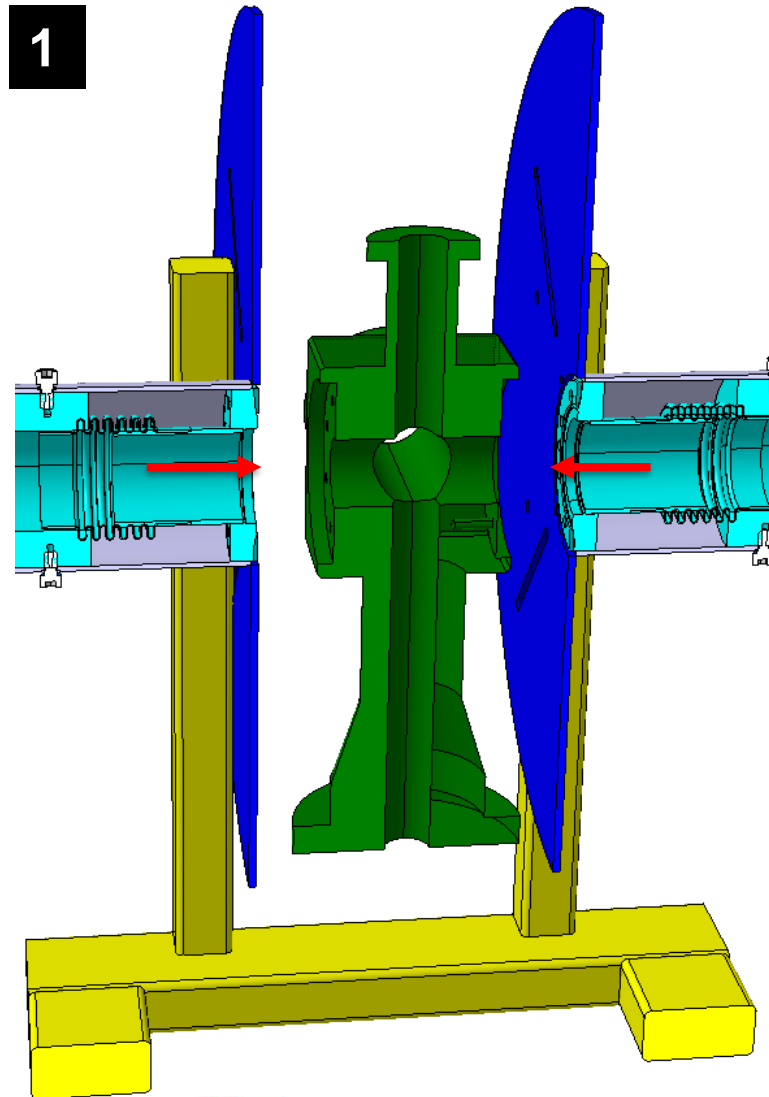
# BGC V4 Installation sequence on Mock-up

## 3. BGC Central Chamber between magnets



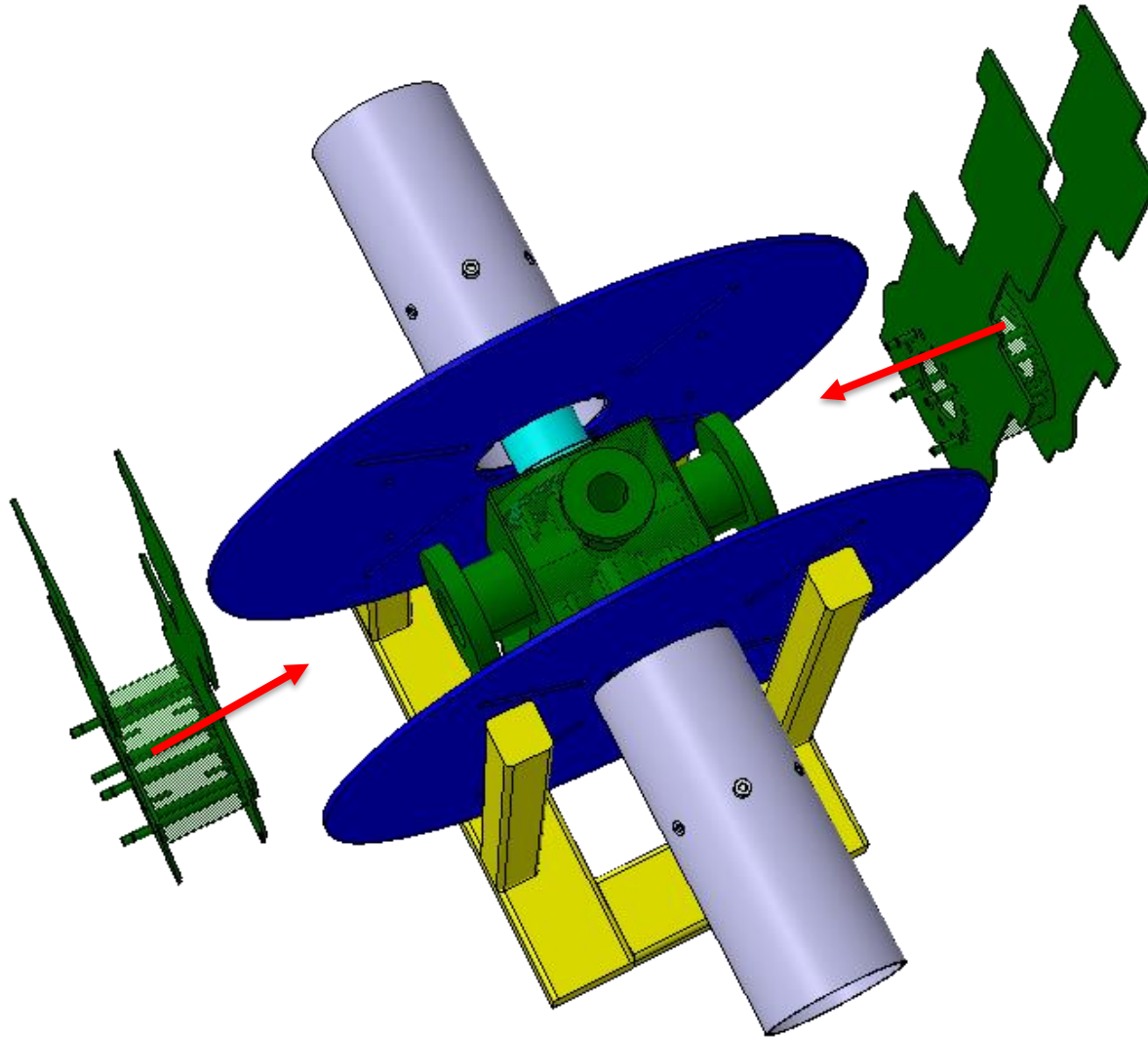
# BGC V4 Installation sequence on Mock-up

## 4. Beam pipe with bellows adjust – moved in



# BGC V4 Installation sequence on Mock-up

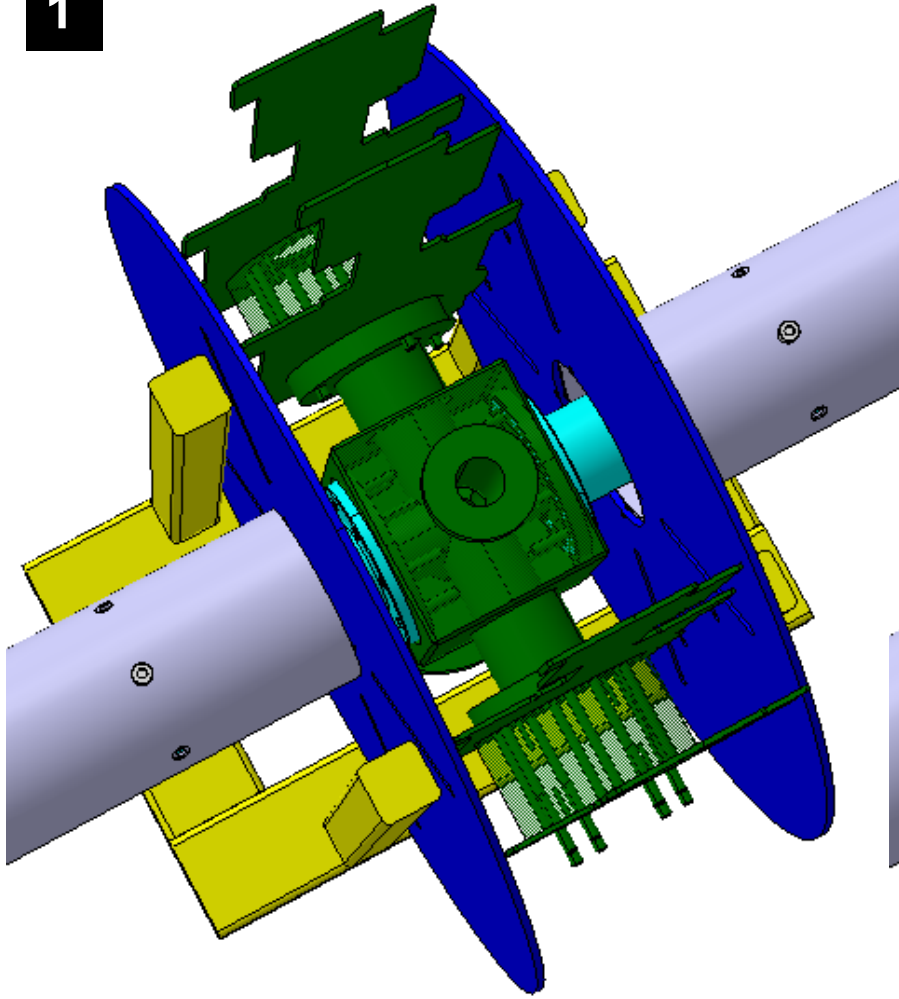
## 3. BGC 2x Gate Valves between magnets



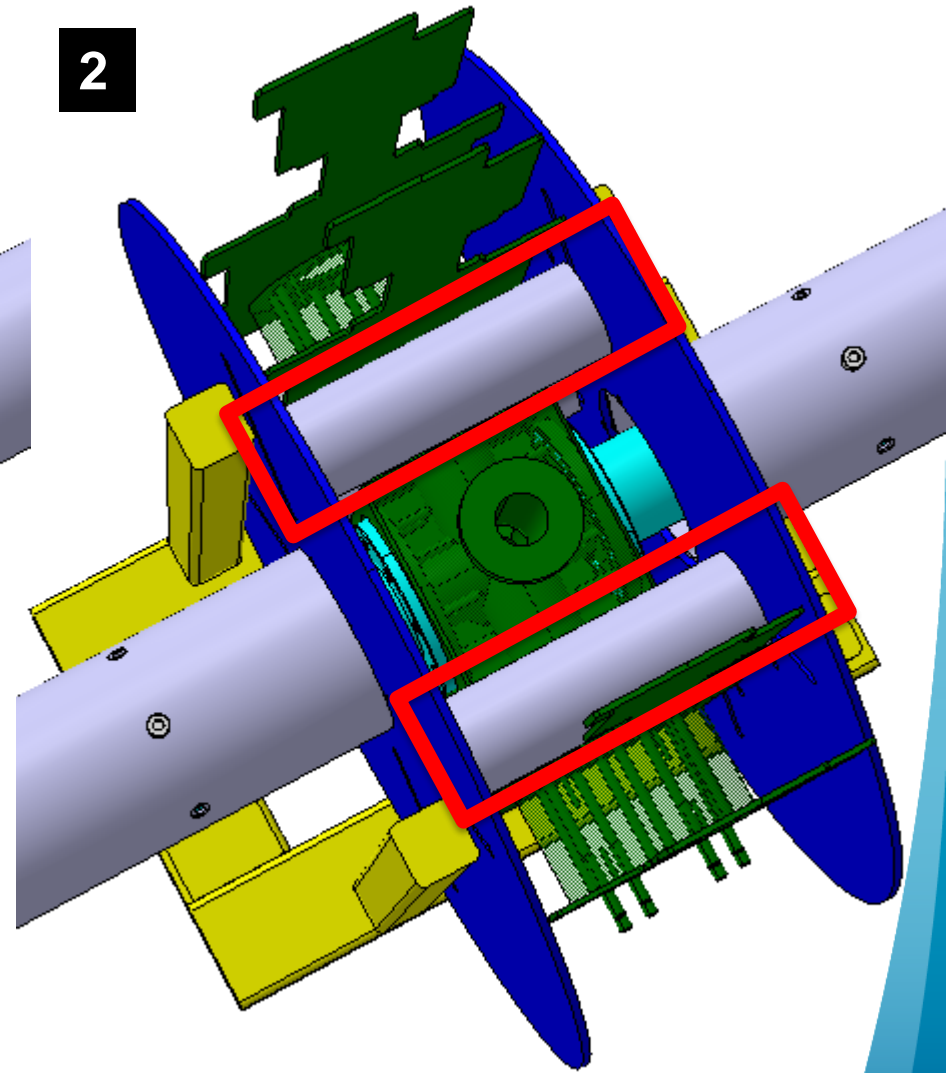
# BGC V4 Installation sequence on Mock-up

## 4. Rods installation

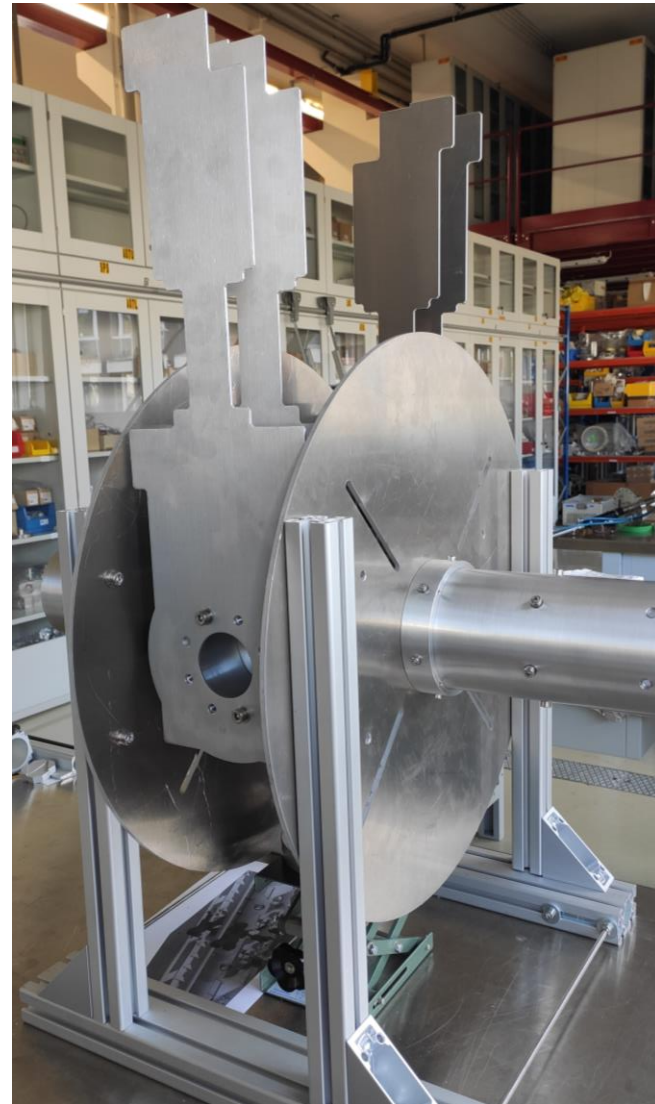
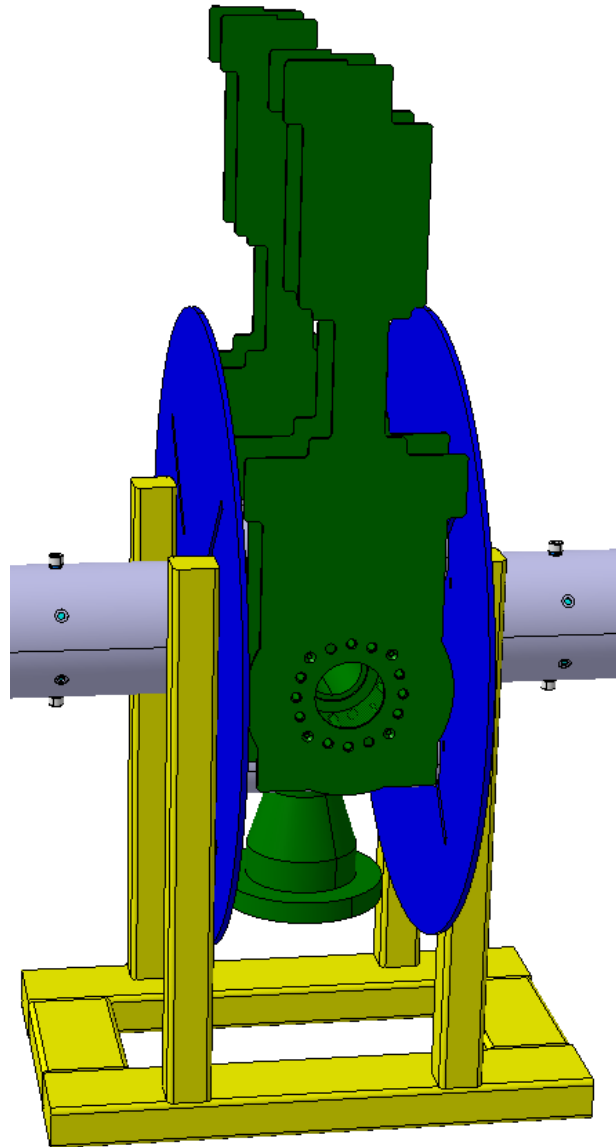
1



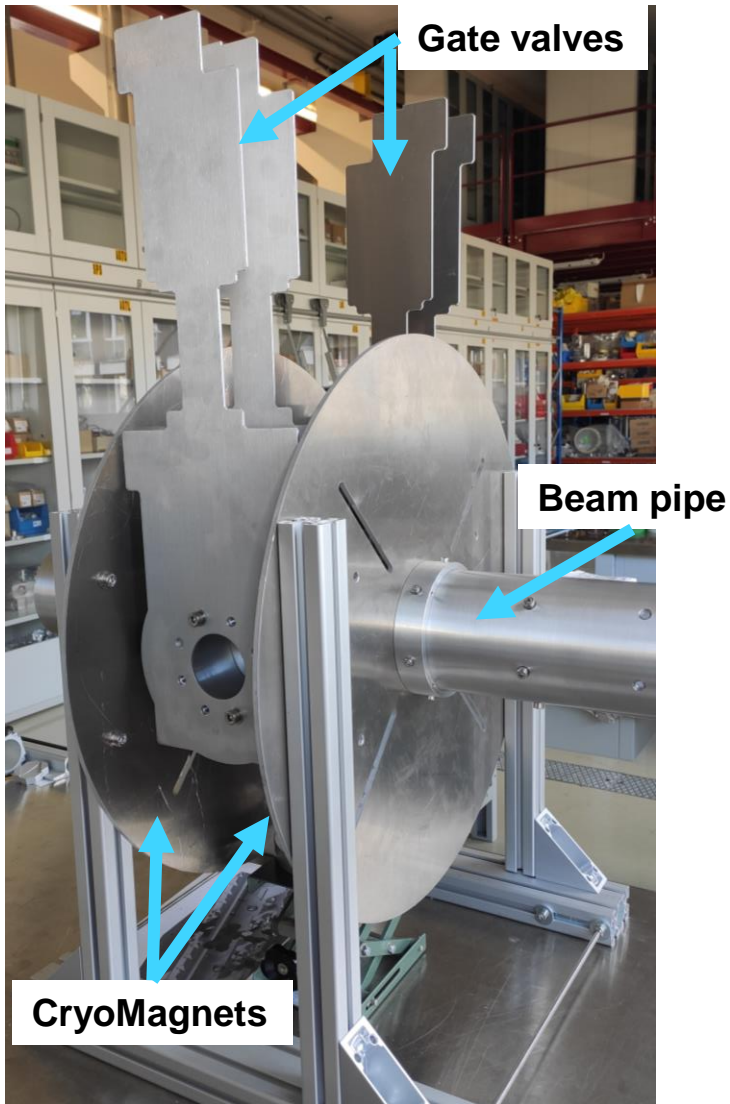
2



# BGC V4 Installation sequence on Mock-up



# BGC V4 Mock-up



- Useful
- Evolution

Mock-up location: building 865 R B01



# V4 Next steps

## Gas injection chamber:

- Skimmers/nozzle fastening method
- Skimmers/nozzle alignment method
- Leak tightness
- Optimization together with vacuum group

## Make optical system fit:

- Optimize size
- Mirrors?
- Other?

## Central chamber:

- Copper liner
- Create space for pressure gauge
- Create the space for camera target

## Dump Chamber - check



# Summary

- V4 mechanical design on the right track
- Interactive process between vacuum and mechanical design
- Installation possible in Point 4 left and right
- Vacuum beam pipes with bellows required
- Mock-up – shown useful



***Thank you!***  
***What questions do you have?***

