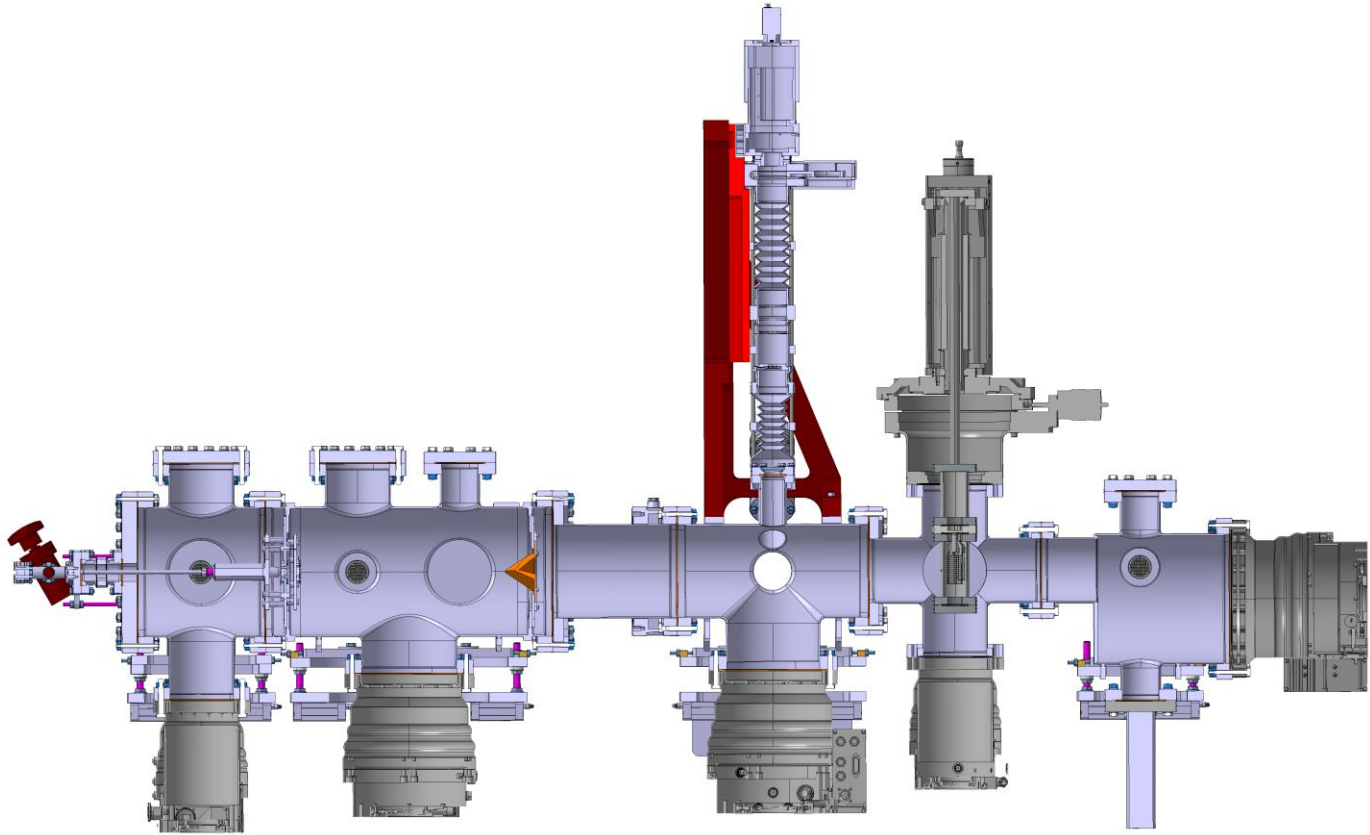


# BGC Update from CERN

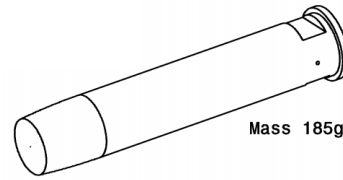
BGC Review, GSI

Tom Dodington, BE-BI-ML

19.03.2018

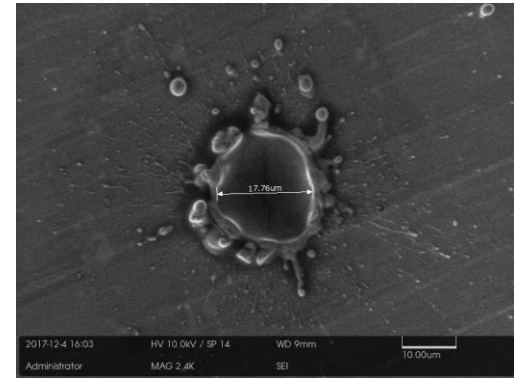
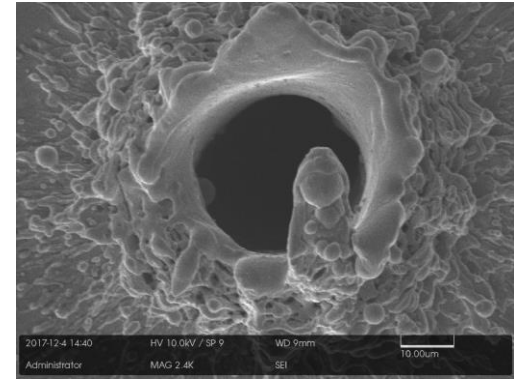
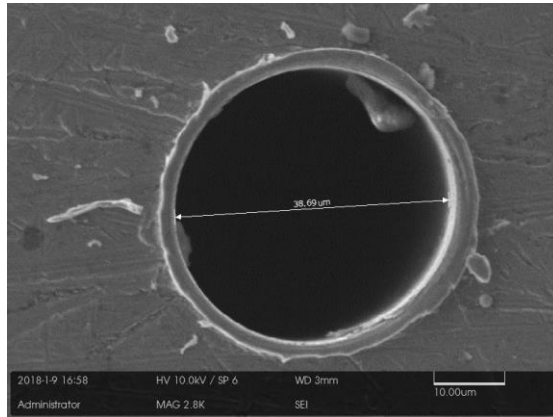


# Gas Nozzle



Manufactured with Scitech Precision.

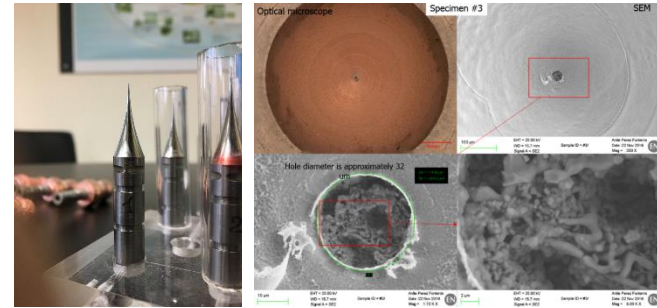
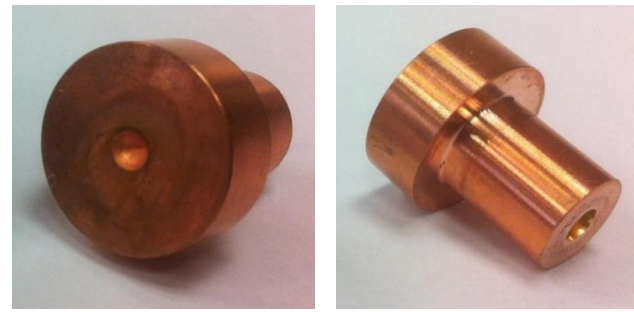
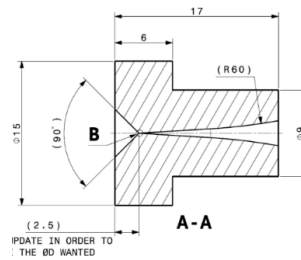
- STFC spin off at Rutherford Appleton Workshop, UK
- 20um holes produced using laser.
- 30um machined with mechanical drill bit.
- First nozzle dispatched from RAL.



# Gas Nozzle

Future design considerations:

- Many issues raised re. the welding of two parts
- Ensuring concentricity of hole to outer diameter
- Replaceable end caps, to change diameter.
- Convergent/Divergent nozzles ( ***INDICO*** )
  - Throat diameters 10-30um.
  - Manufactured by CERN, using external electro-erosion.
  - How feasible is this with our use case?



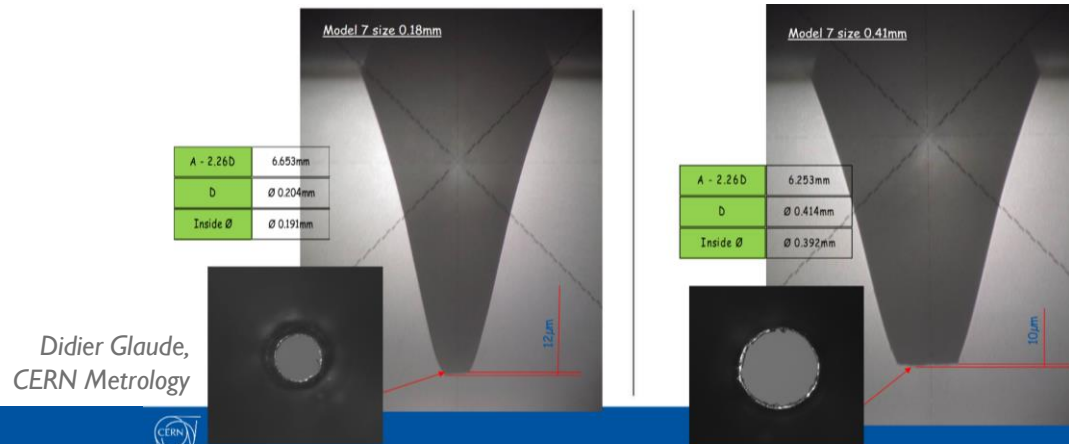
# Skimmers

Purchased from Beam Dynamics Inc., US

Analysed by CERN metrology, [EDMS. 1898684](#)

Would like to measure knife edge with SEM microscope.

Looking into methods of custom skimmer manufacture.



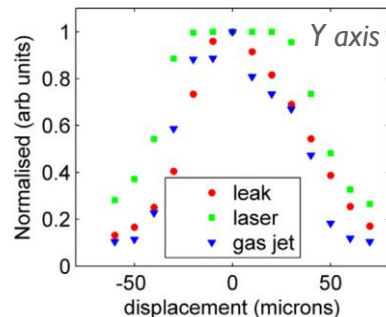
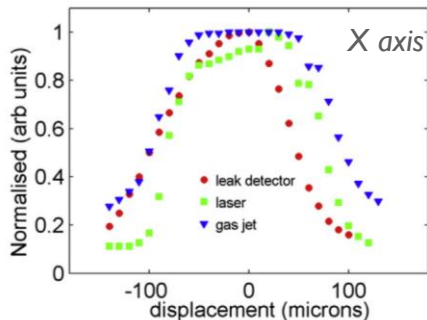
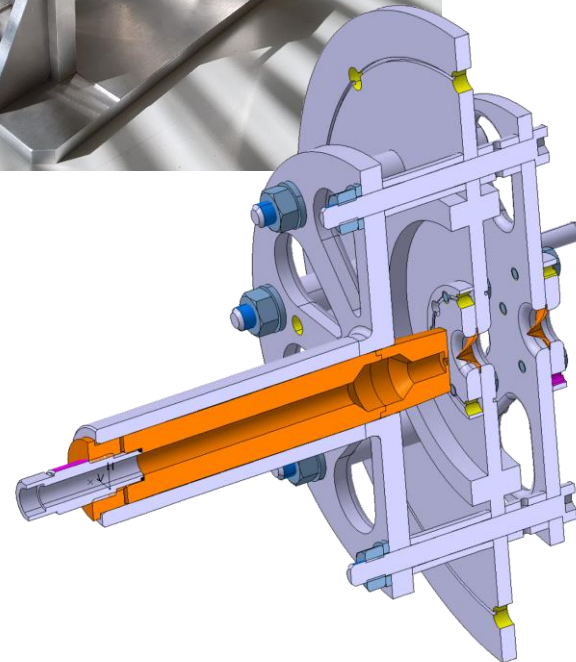
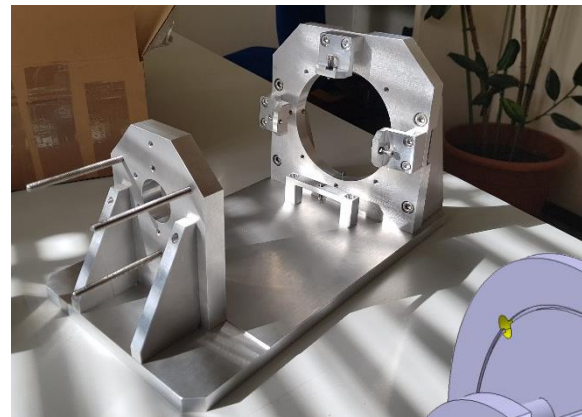
# Alignment

Targeting 50um concentric alignment between nozzle and skimmers 1 & 2.

All parts are ready - except nozzles.

Method: Use alignment bench with extra fine threaded screws. Should allow 10um adjustments to be made.

Johanna Glutting is working on this.

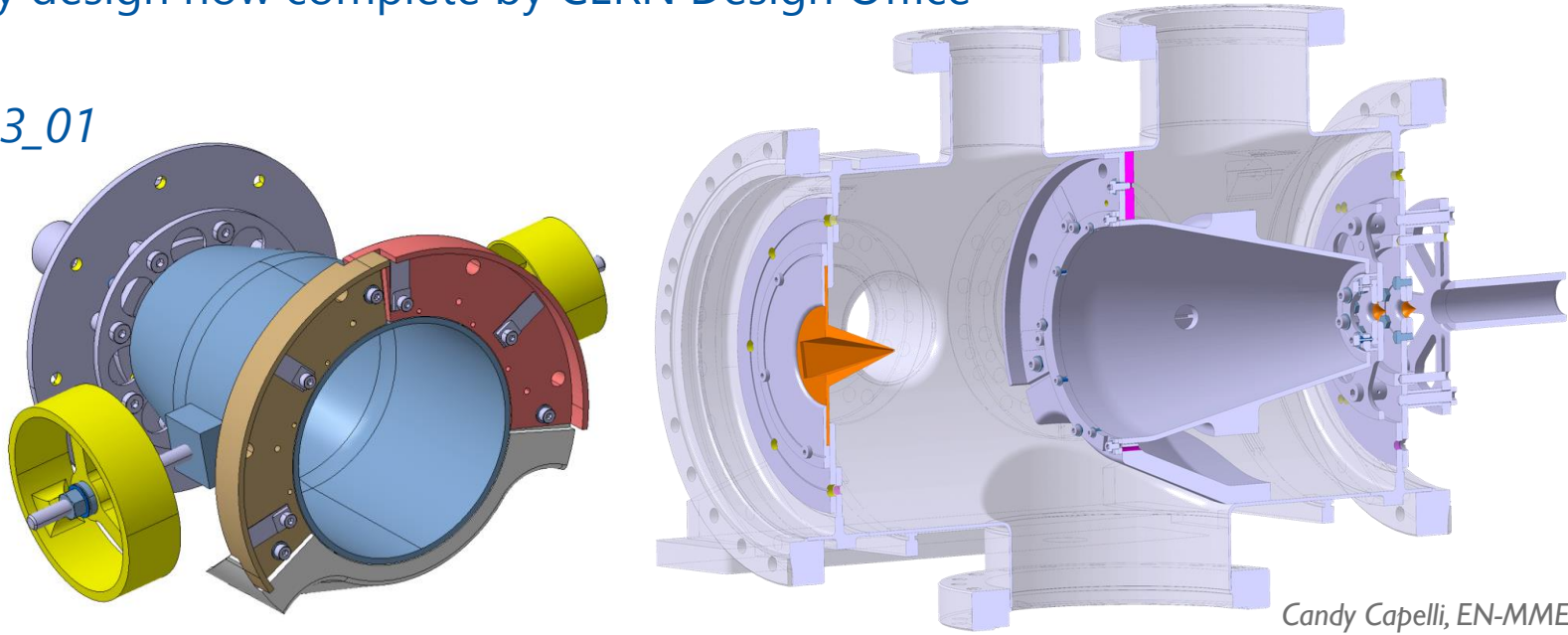




# Gas Volume Partition

Idea to separate pumping between skimmer 1 & 2  
Secondary design now complete by CERN Design Office

*ST0923983\_01*

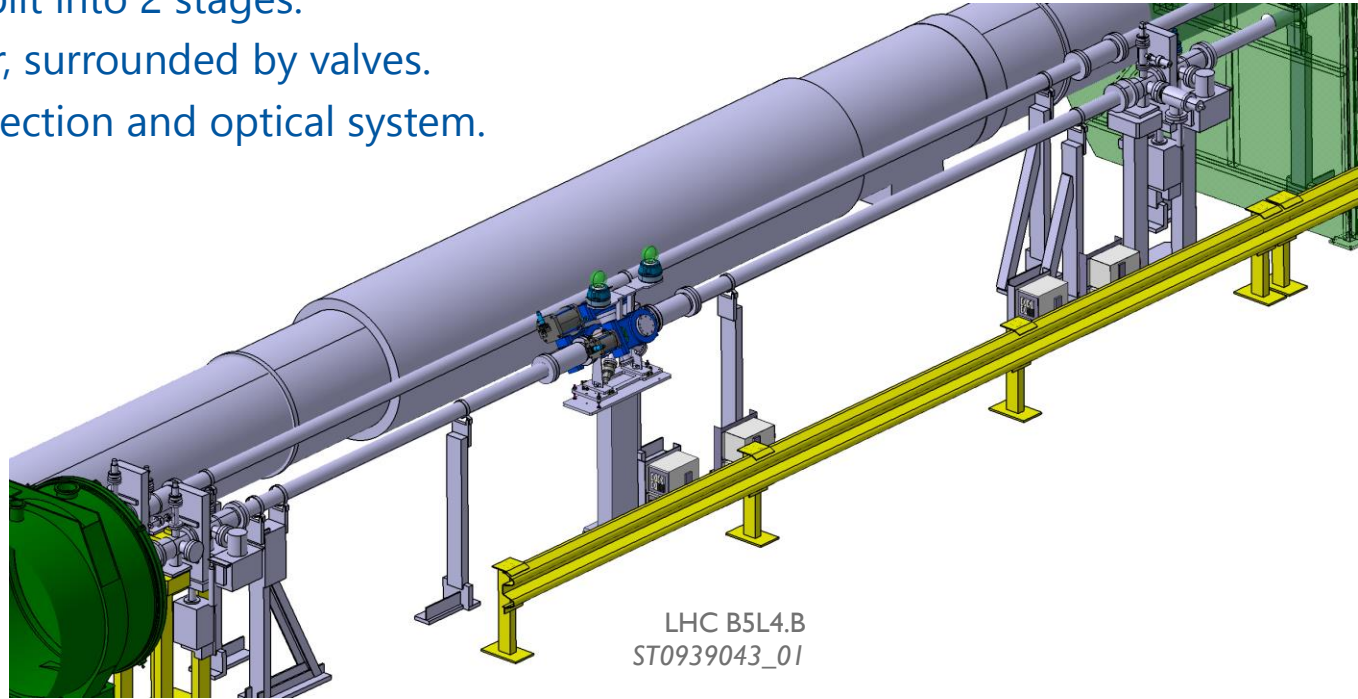
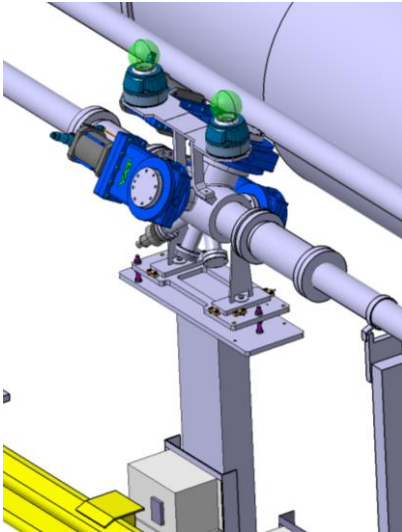


*Candy Capelli, EN-MME*

# BGC LHC Integration (v3)

Design & Installation split into 2 stages:

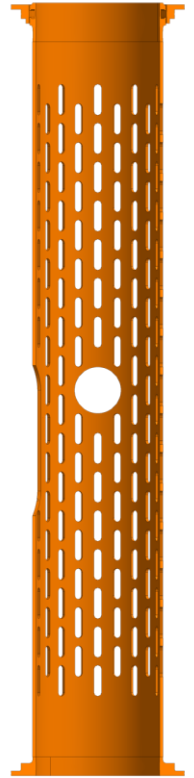
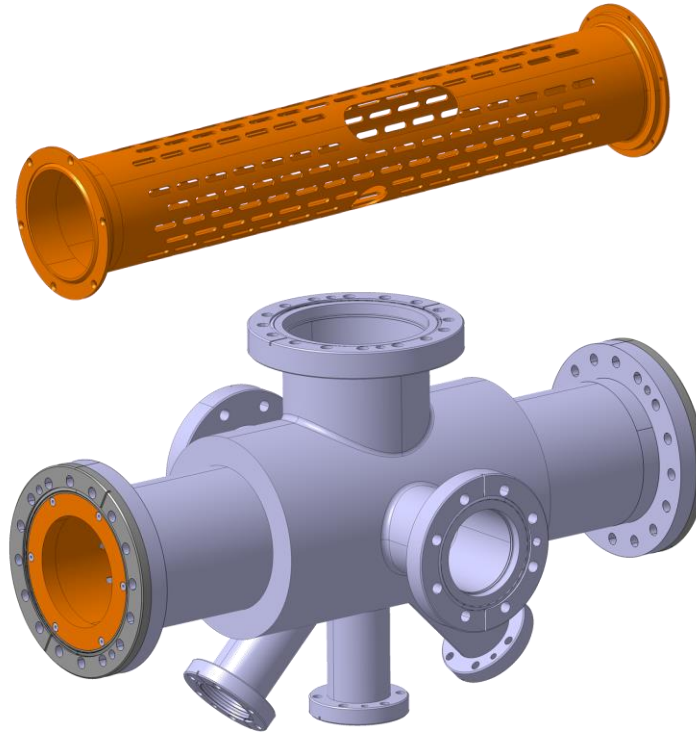
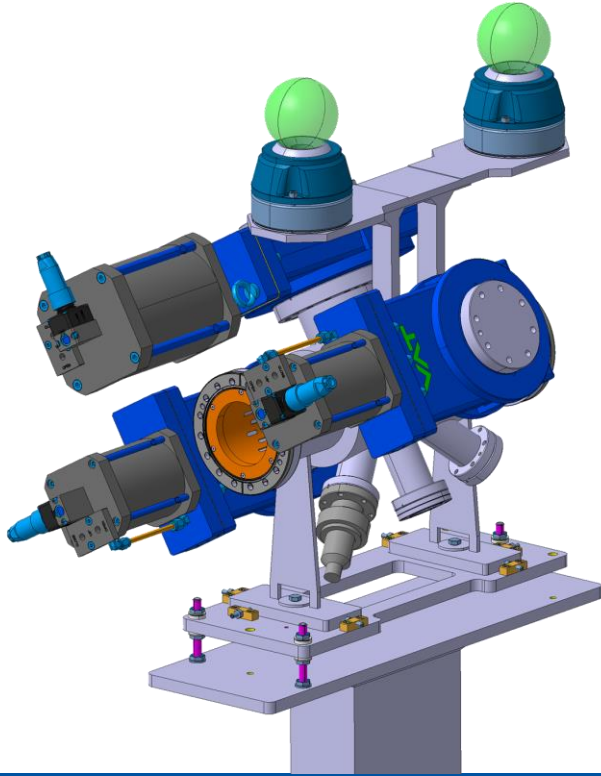
- I. Interaction chamber, surrounded by valves.
- II. Gas generation, collection and optical system.



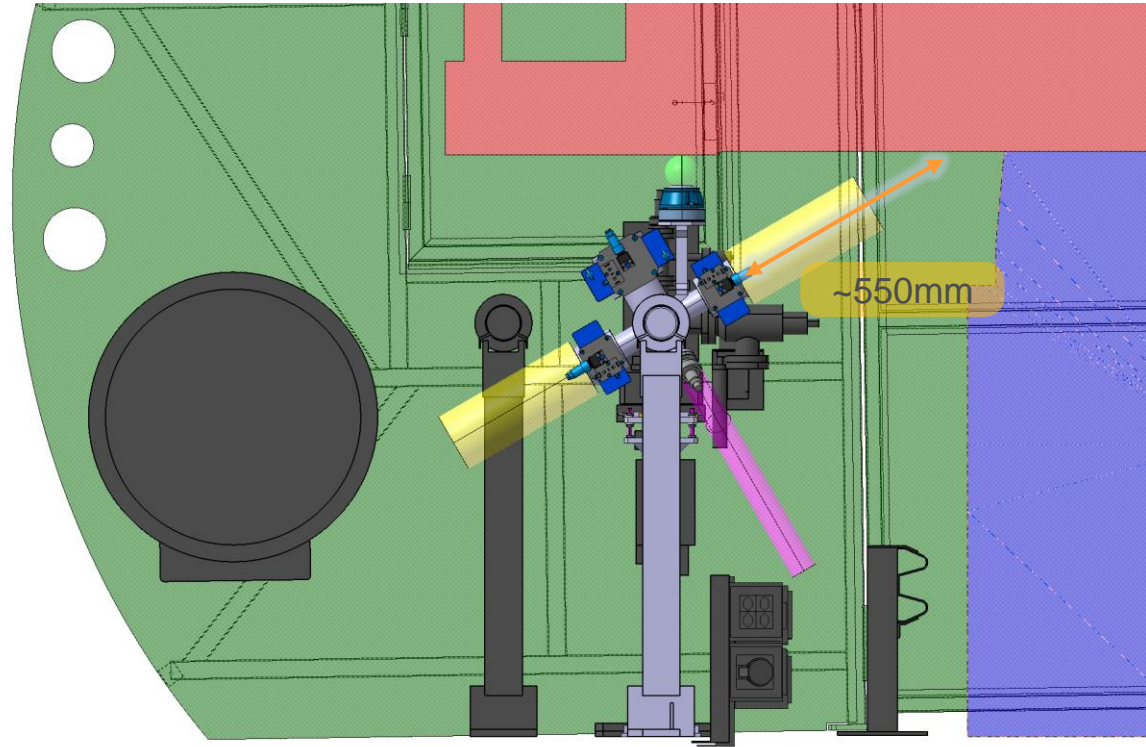
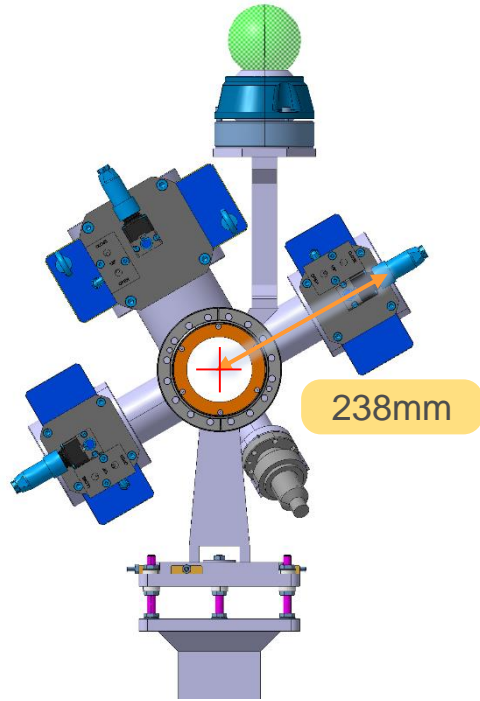
LHC B5L4.B  
ST0939043\_01



# BGC LHC Integration (v3)



# BGC LHC Integration (v3)



# BGC LHC Integration – Design Queries

Distances for future designs,

- Nozzle → Skimmers → Interaction Point
- Interaction Point → '*Central*' Pump

Dimension	v2 design	V3 target
Nozzle → Skimmers 1 & 2	<25mm	?
Skimmer 2 → Skimmer 3	350mm	
Skimmer 3 → Interaction Point	380mm	250mm
Nozzle → Interaction Point	810mm	450mm
Gas Inlet → Interaction Point	1150mm	~550mm

Pumping:

- Method? Turbo/Ion/Cryo pumps
- Effect if placed further from interaction point, to avoid HEL solenoid.

Feasibility of using a pulsed gas jet?

Future design modifications to improve alignment.



# Gas Volume Partition

