BGC v4 for HEL vacuum simulations

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BGC Collaboration meeting

March 2022

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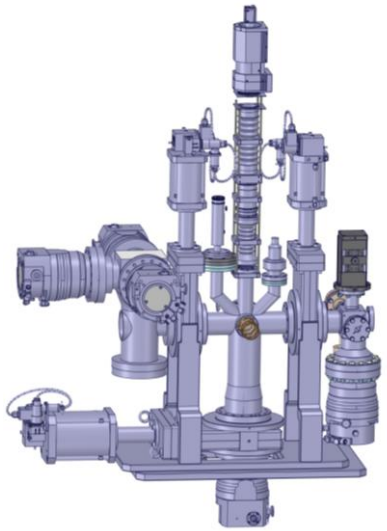
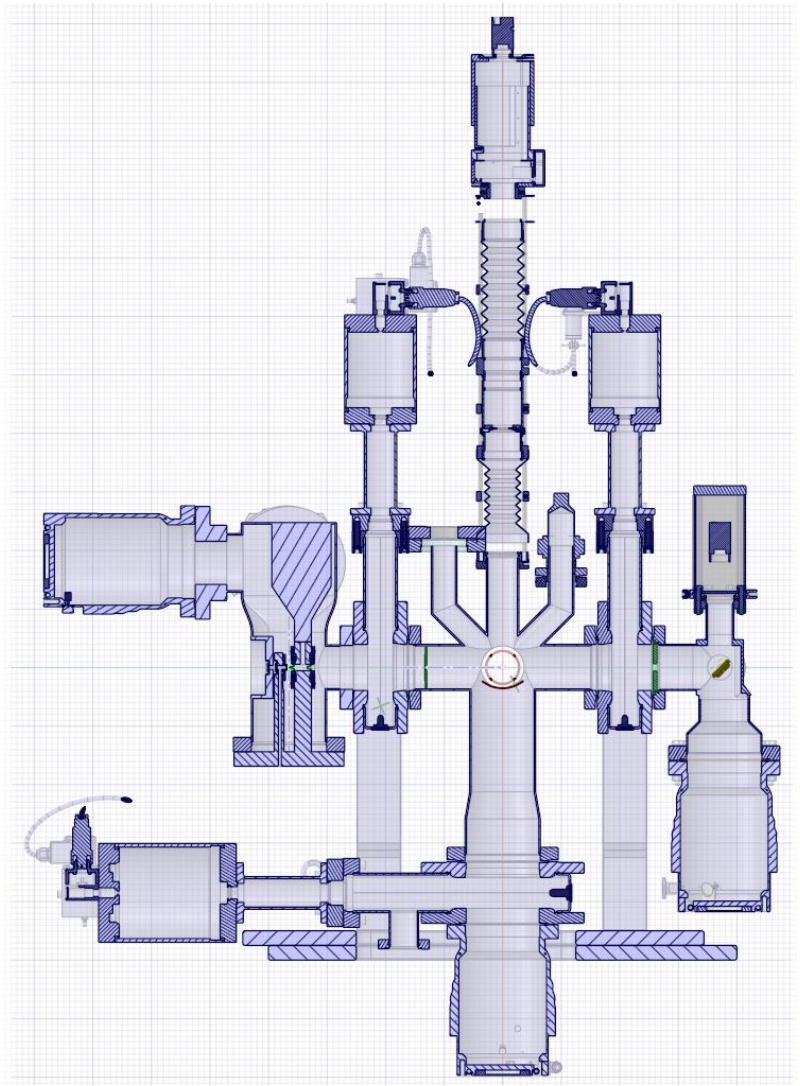
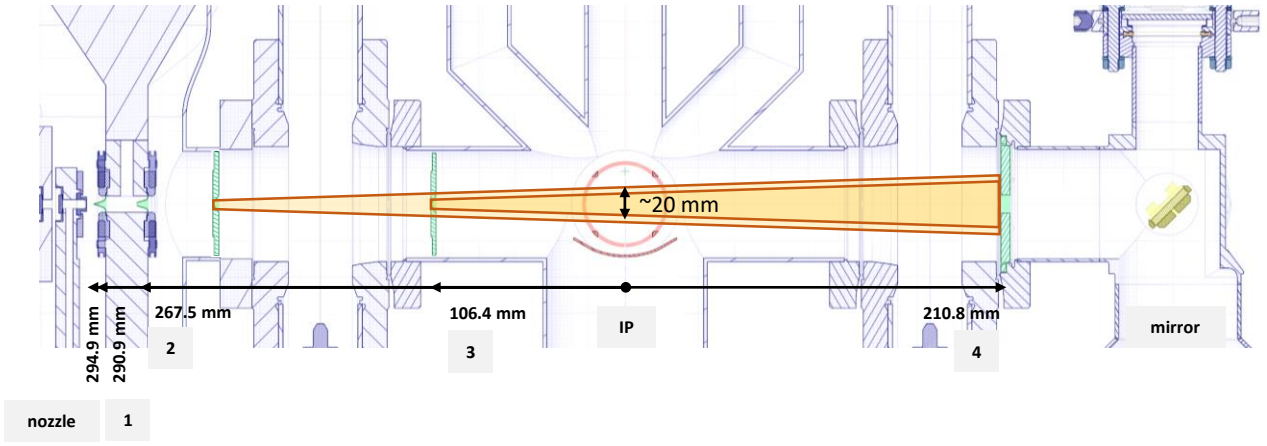
BGC v4 simulation geometry



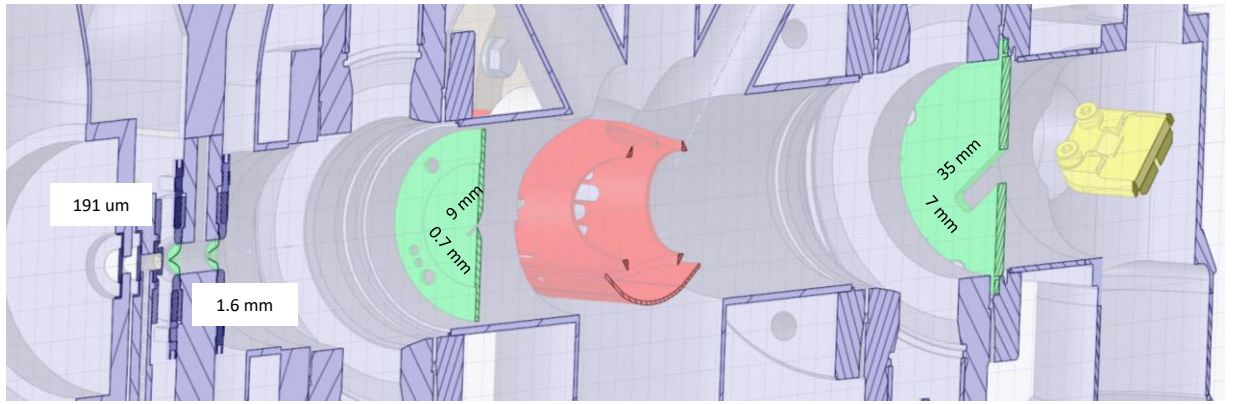
Original model



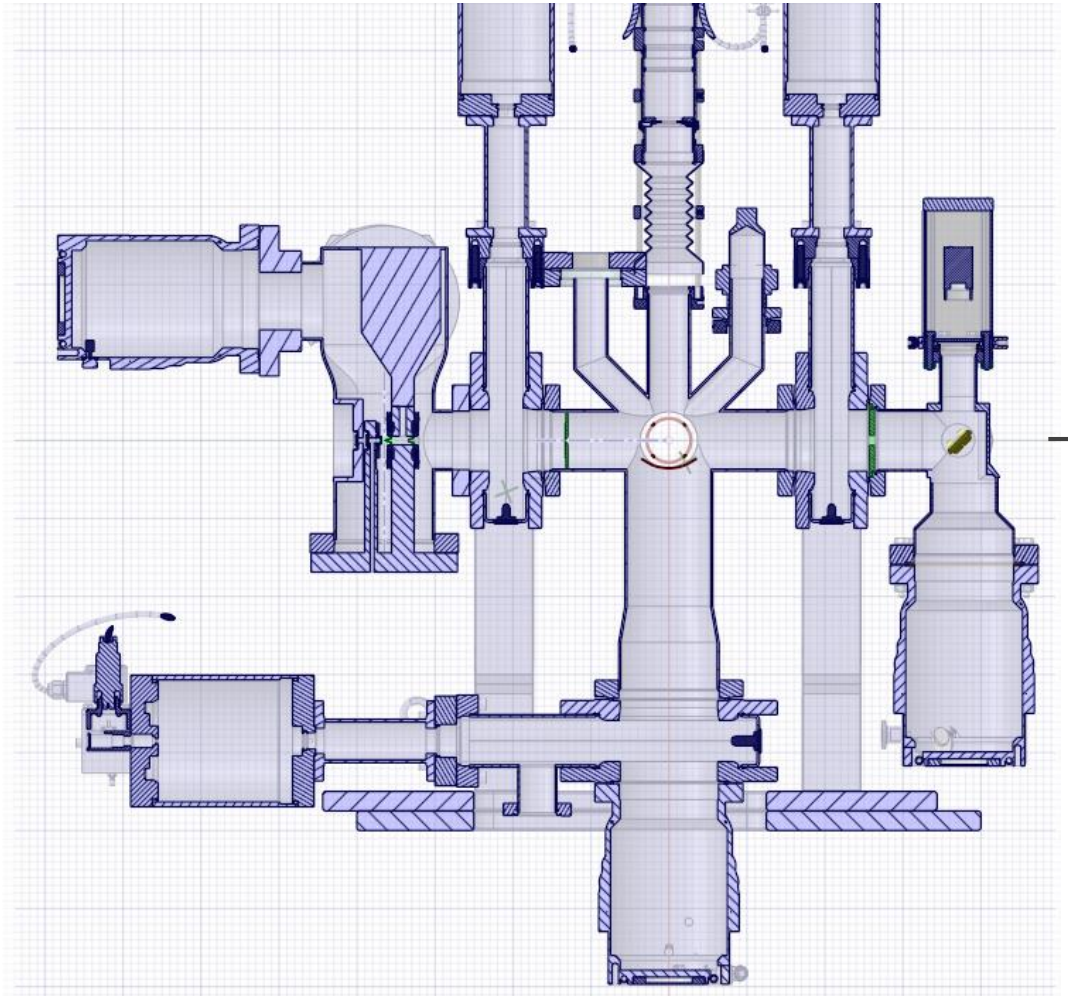
Distance from IP



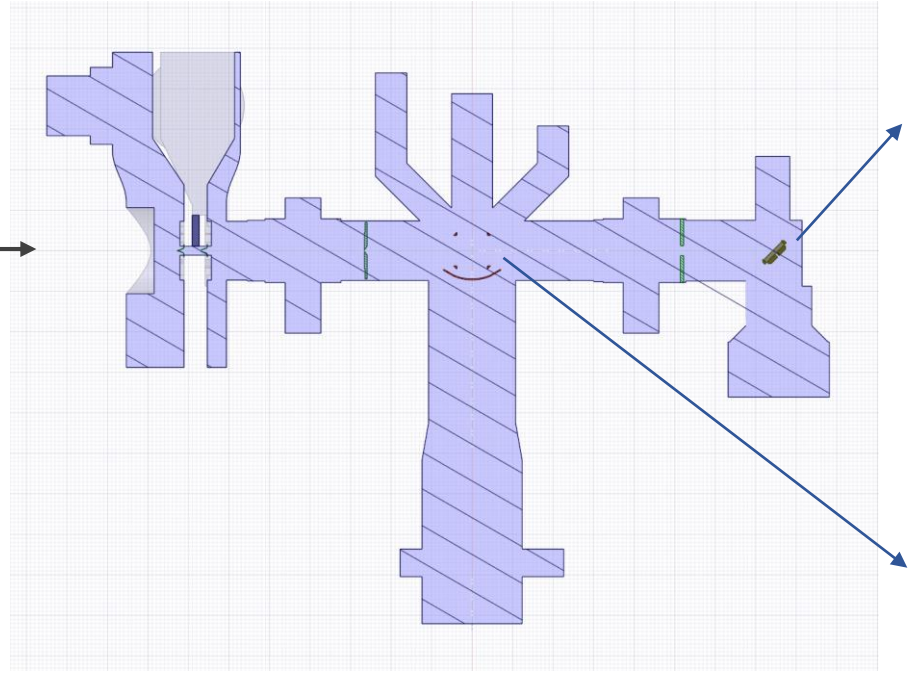
Skimmer sizes

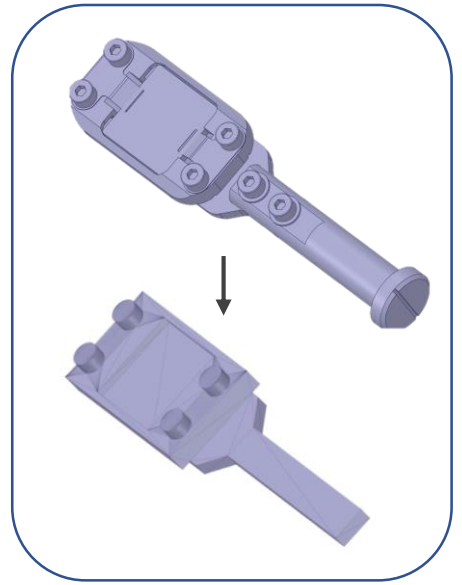


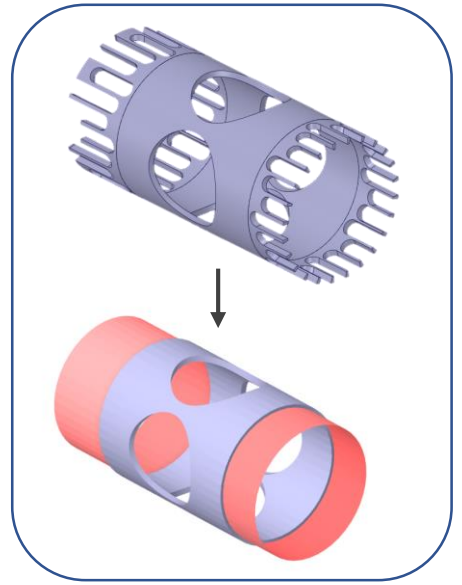
BGC v4 simulation geometry



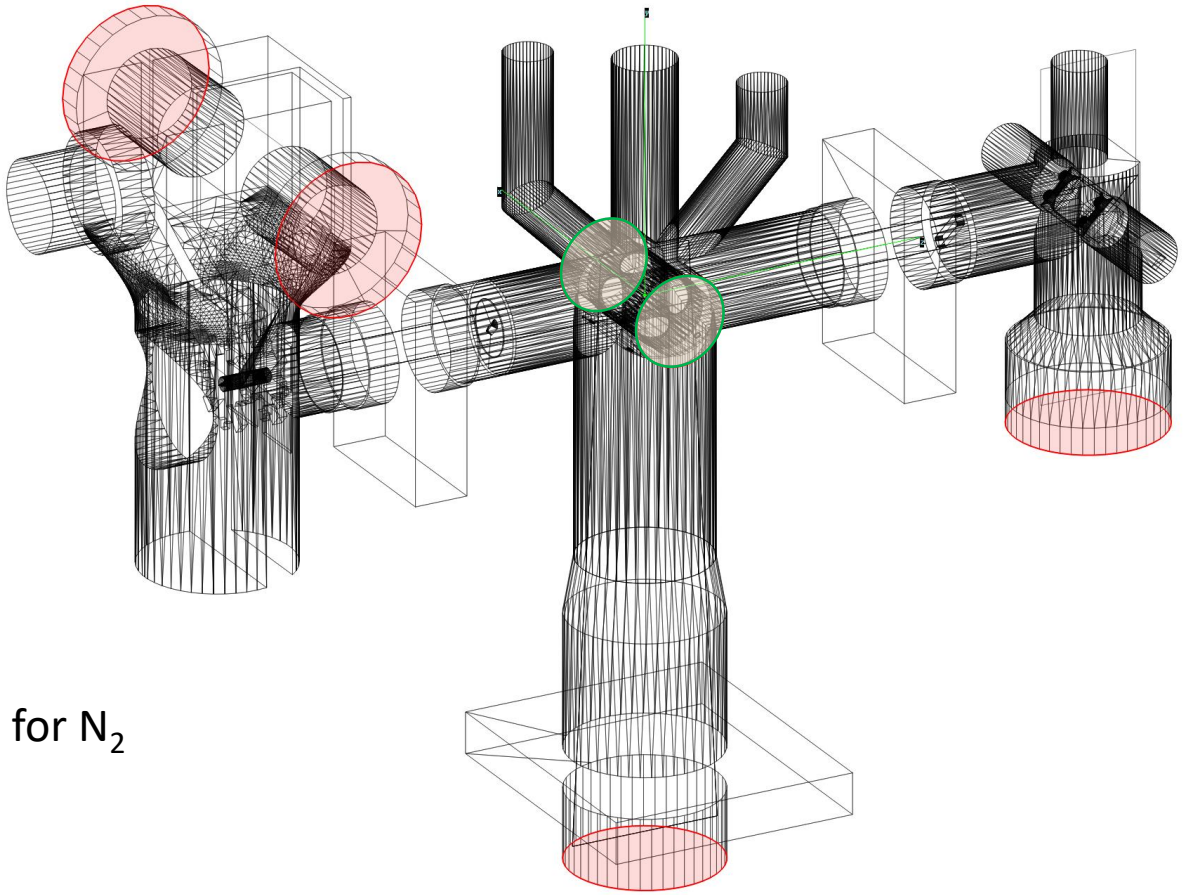
Simplified model





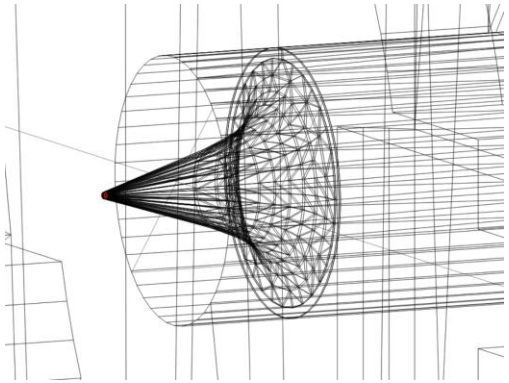


Simulation parameters: pumping speed

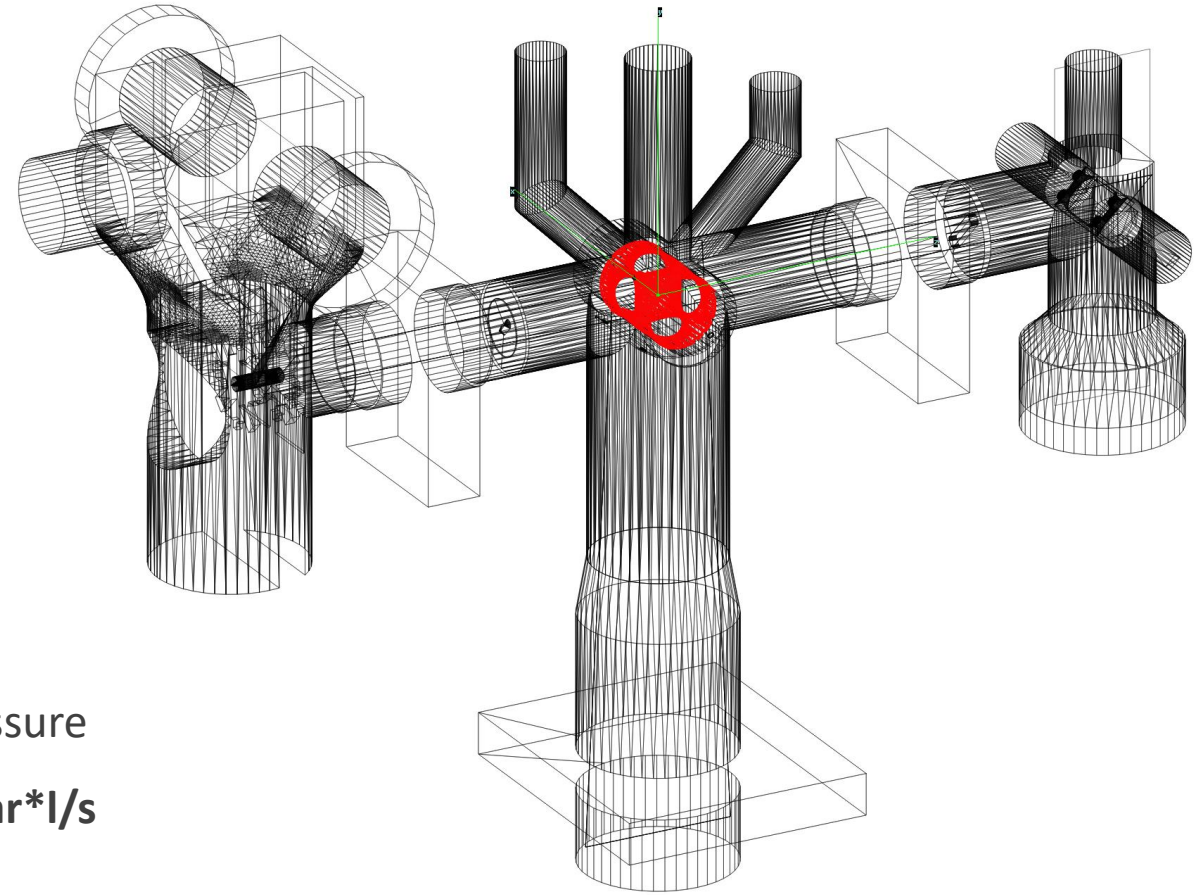


- Turbomolecular pumps **260 l/s** for N_2
- LHC sticking **20 %** ⟶ **64 l/s**

Simulation parameters: desorption

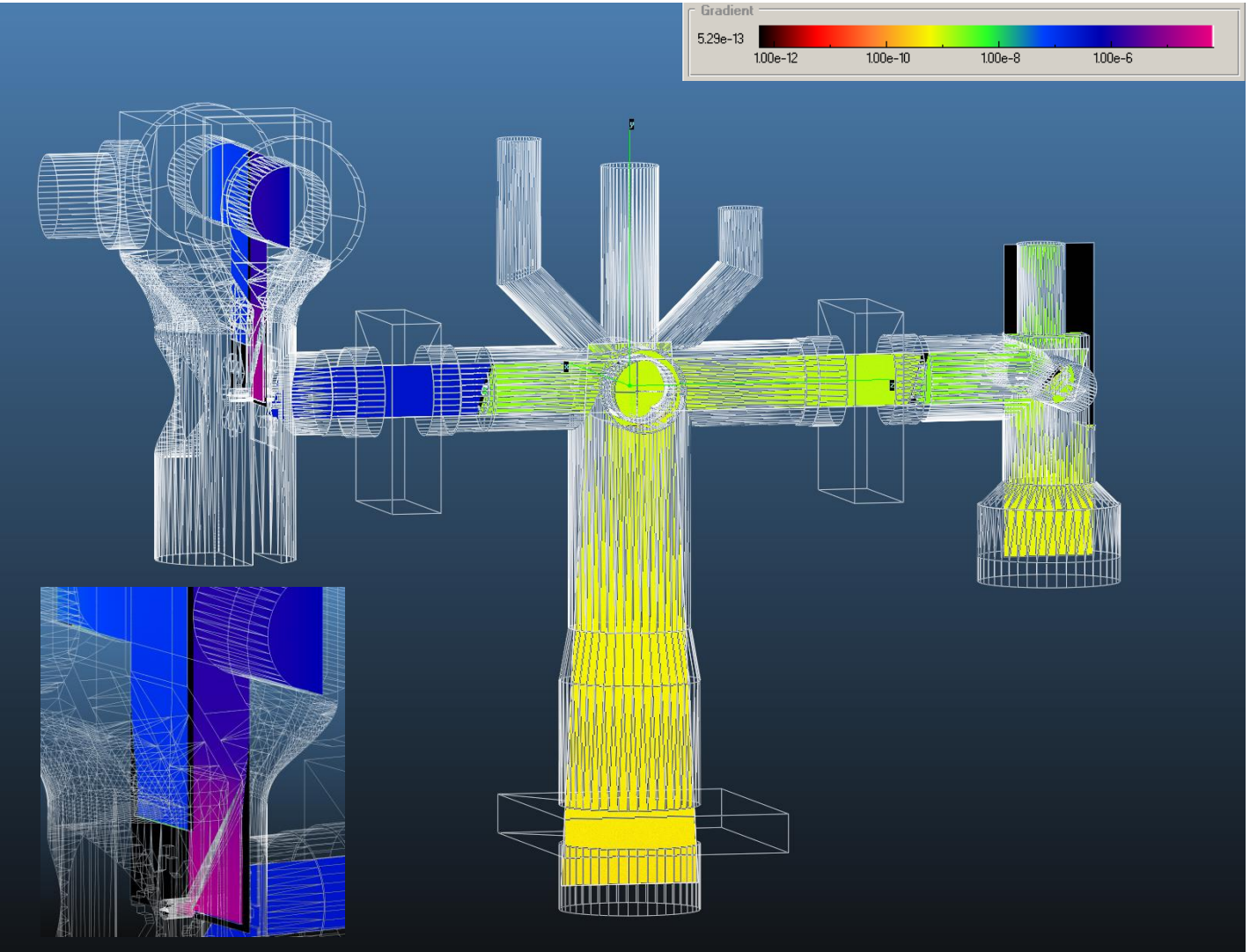


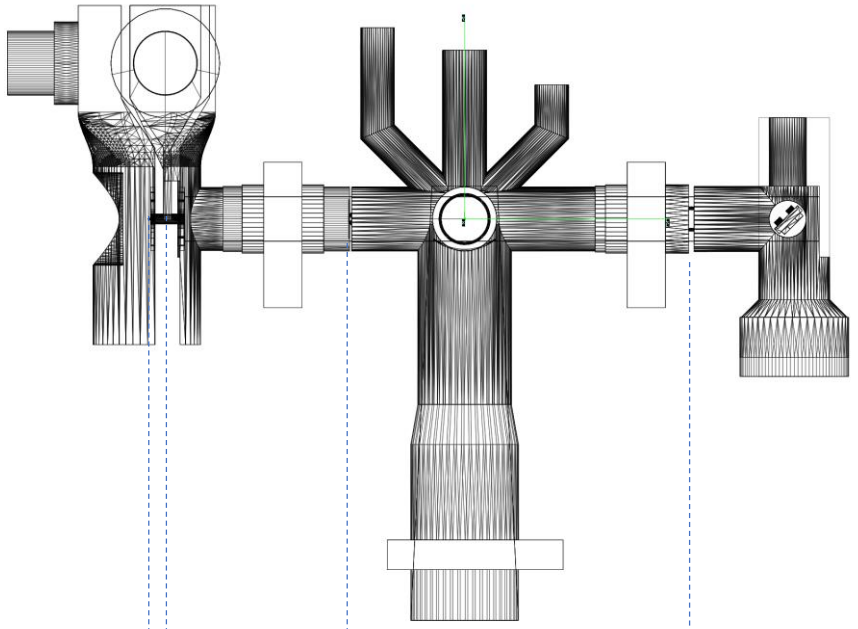
Desorption from skimmer 1

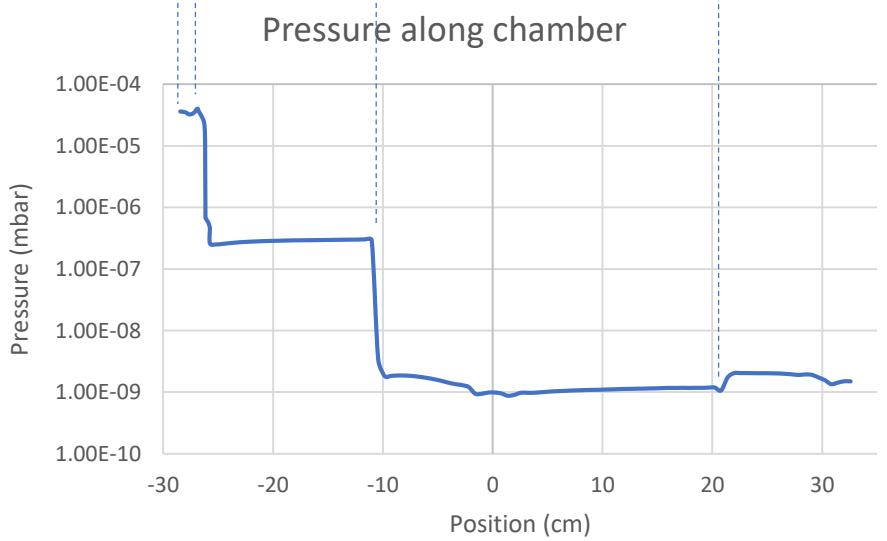


- Desorption scaled to a background pressure of 1E-09 mbar at IP ⟶ **1.41E-04 mbar*l/s**
- Cos^50

Results: pressure profile

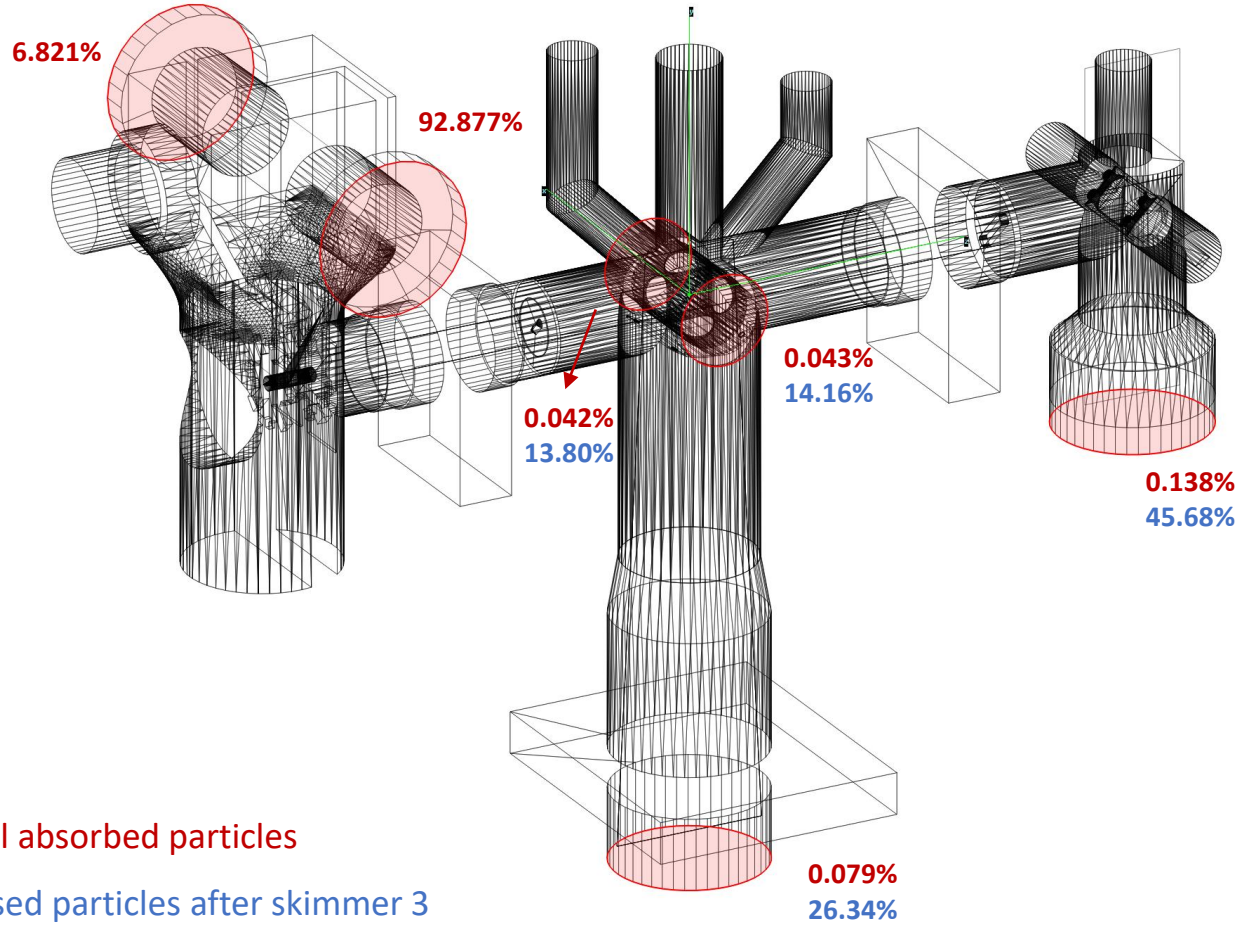






Results: gas exit ratios

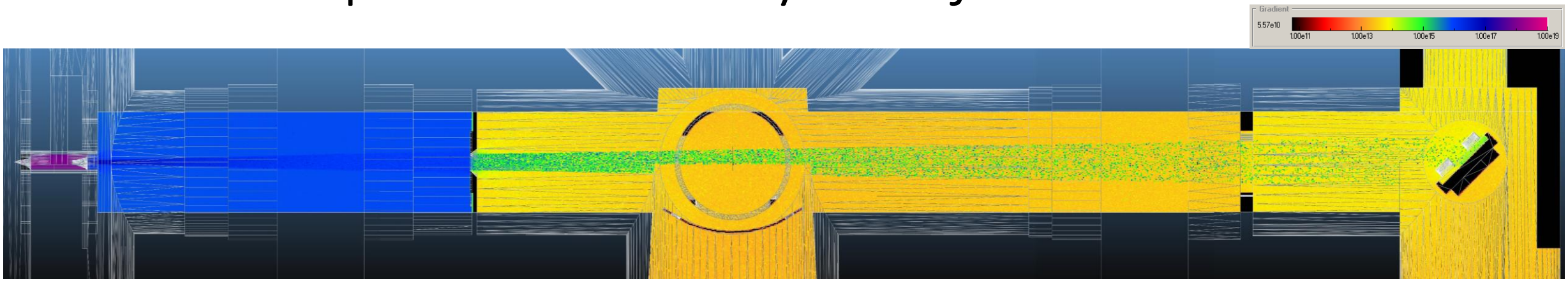
	mbar*l/s
Desorption	1.41E-04
To LHC	6.00E-06
	5.85E-06



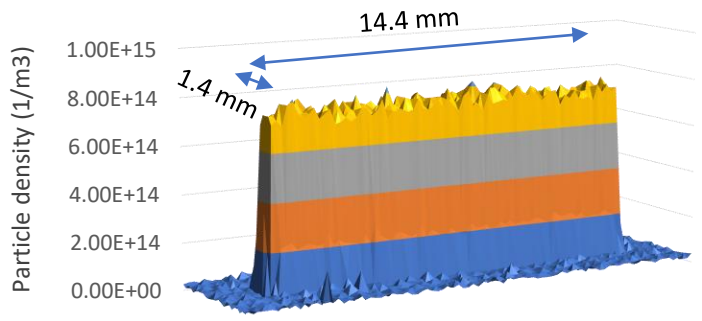
From total absorbed particles

From passed particles after skimmer 3

Results: particle density and jet size

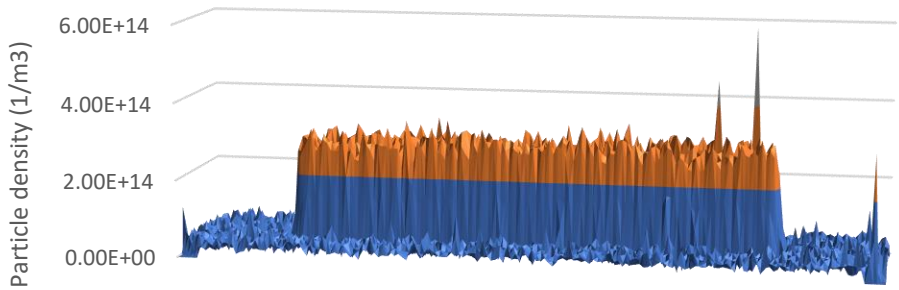


Jet particle density at IP



0.00E+00-2.00E+14 2.00E+14-4.00E+14 4.00E+14-6.00E+14
6.00E+14-8.00E+14 8.00E+14-1.00E+15

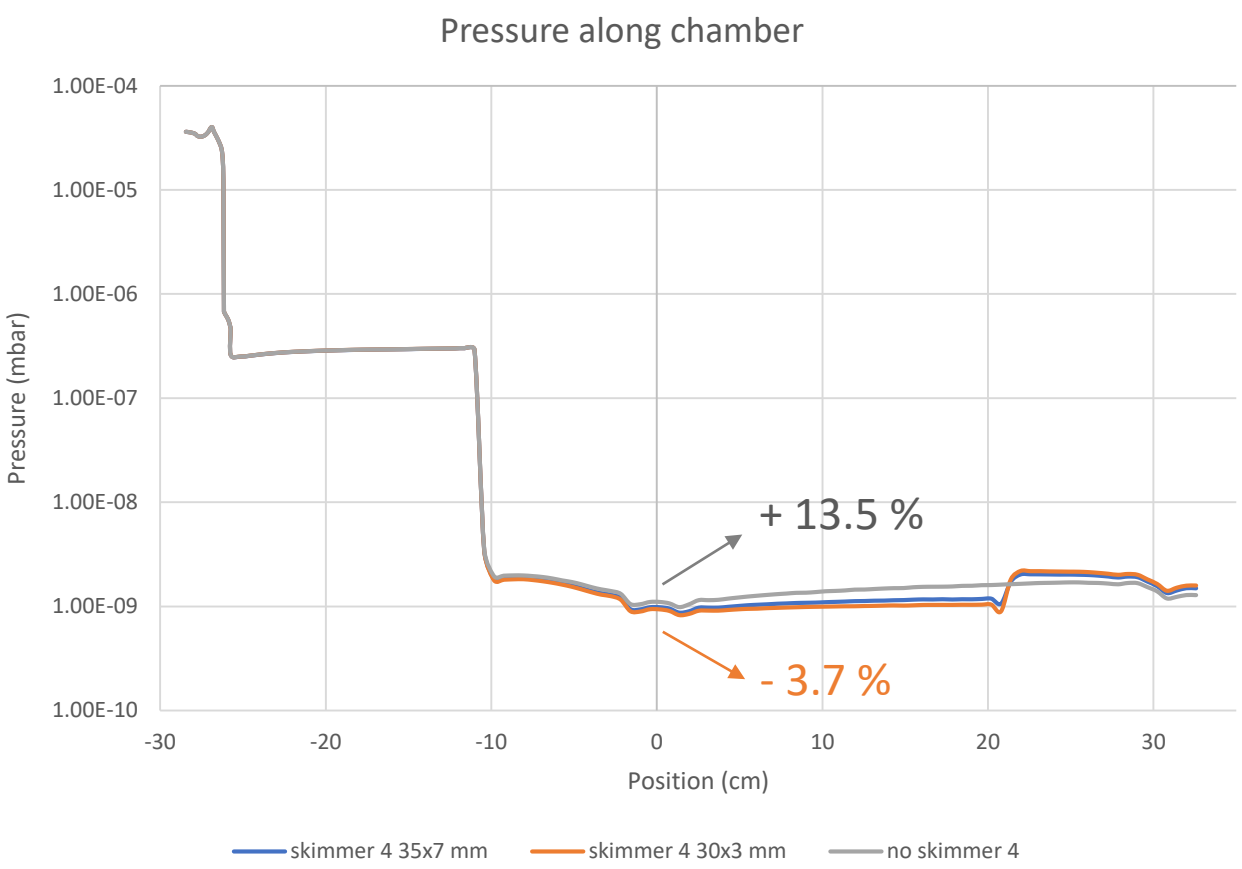
Jet particle density at skimmer 4

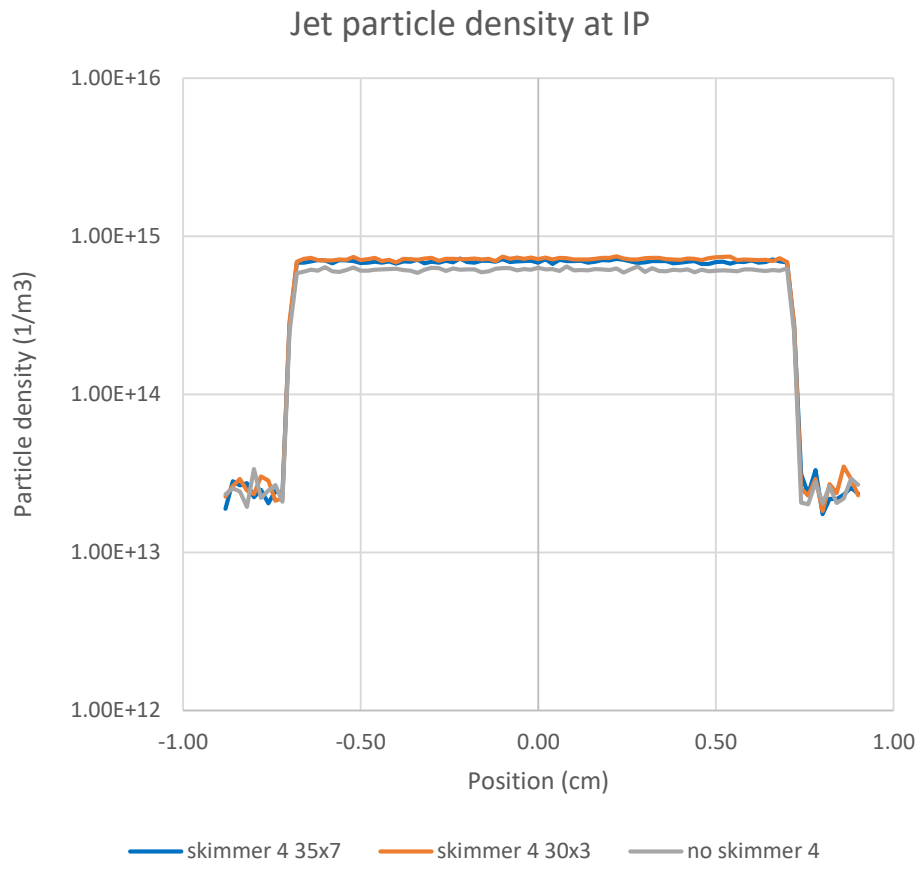


0.00E+00-2.00E+14 2.00E+14-4.00E+14 4.00E+14-6.00E+14

Skimmer 4 size (mm)
35x7
30x3

Simulation with new skimmer 4 size





Conclusions and next steps

- Preliminary results for background pressure at IP around 1E-09:
  - Jet particle density at IP below 1E15, while it has been reached 1E16 in previous designs.
  - Pressure profile results: skimmer 4 does not make much difference to background pressure at IP.

- Following work will focus on vicinity areas of BGC v3 in LHC.

Thank you for your attention

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