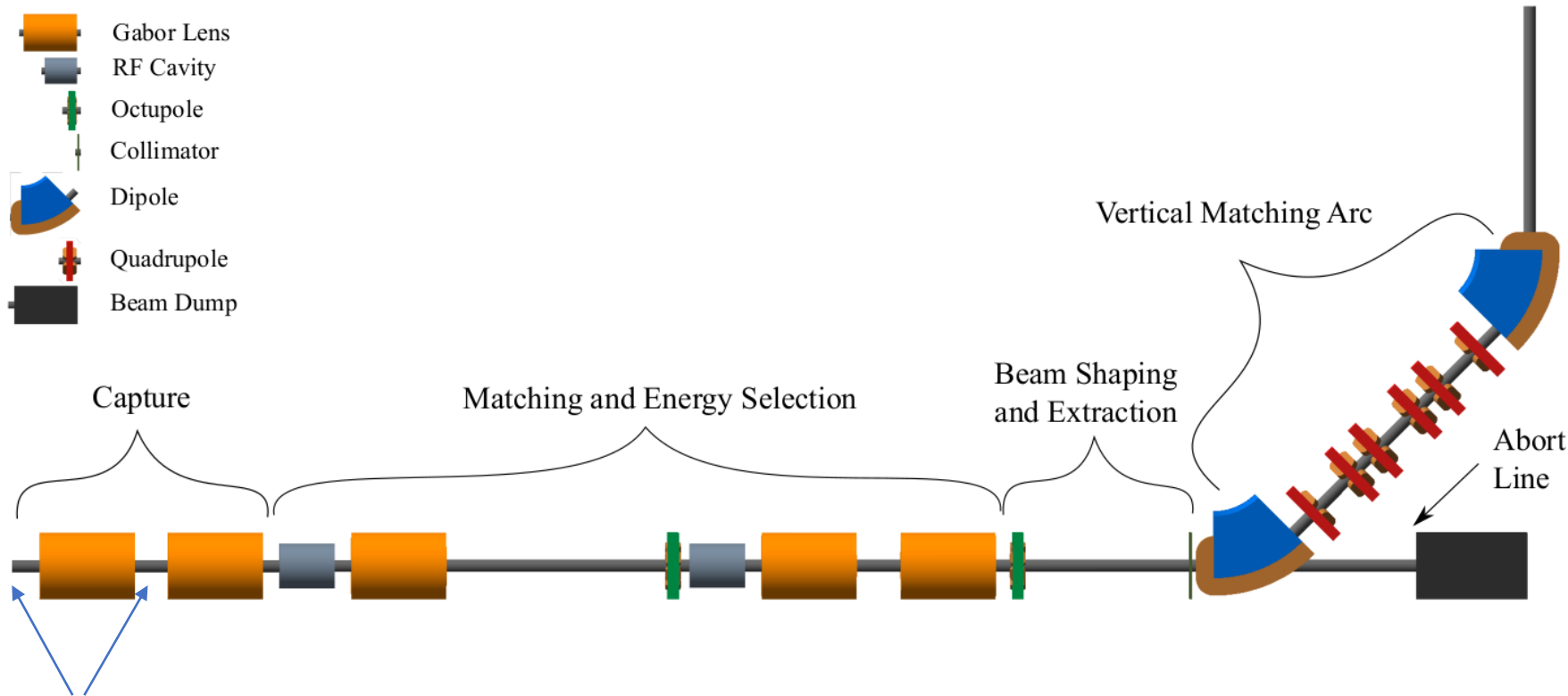
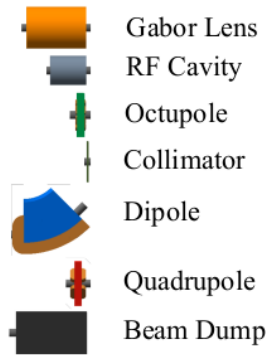


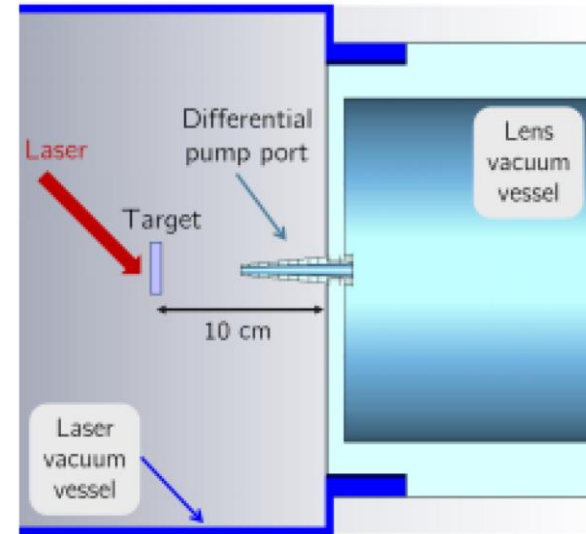
Space issues in the LhARA capture area

J. Pasternak, IC/JAI/RAL-STFC, 15/11/2022

Introduction



No space! Flange to flange.



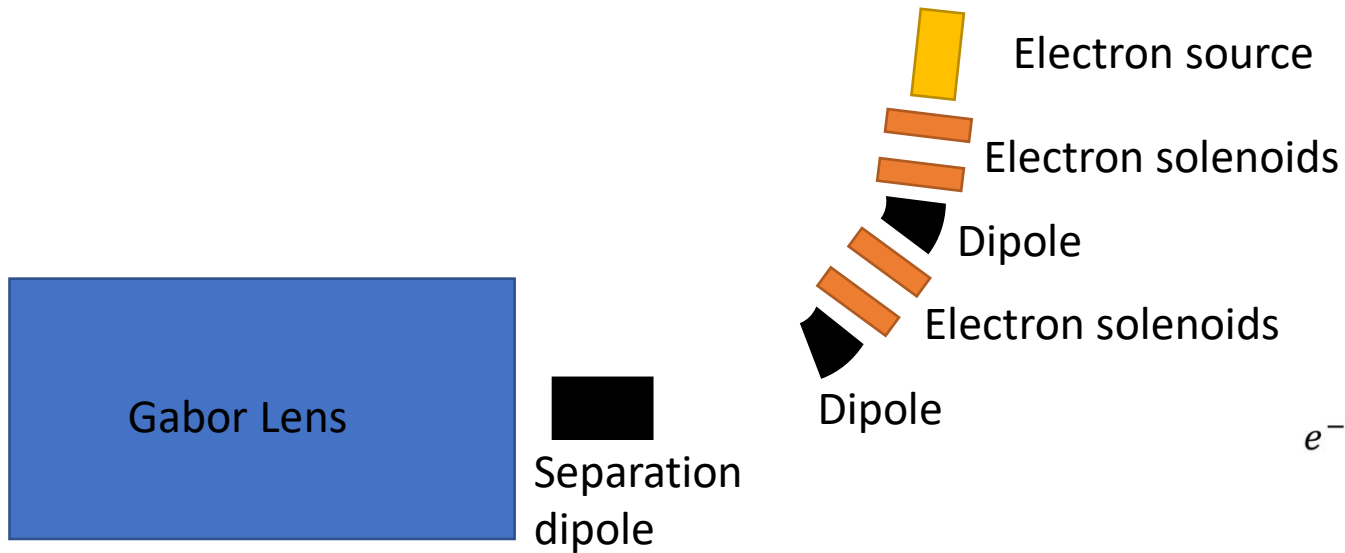
What is shown on this picture as orange box is the effective optical length:

$$L_{\text{eff}} = \int g dz / g_c,$$

g - electric field gradient on axis,
 g_c - electric field gradient on axis in the centre of the lens.

- The design created was based on two assumptions:
 - Internal filling of the electrons
 - Vacuum pumps coupling based on some perforated elements
- It is time to rethink this ideas

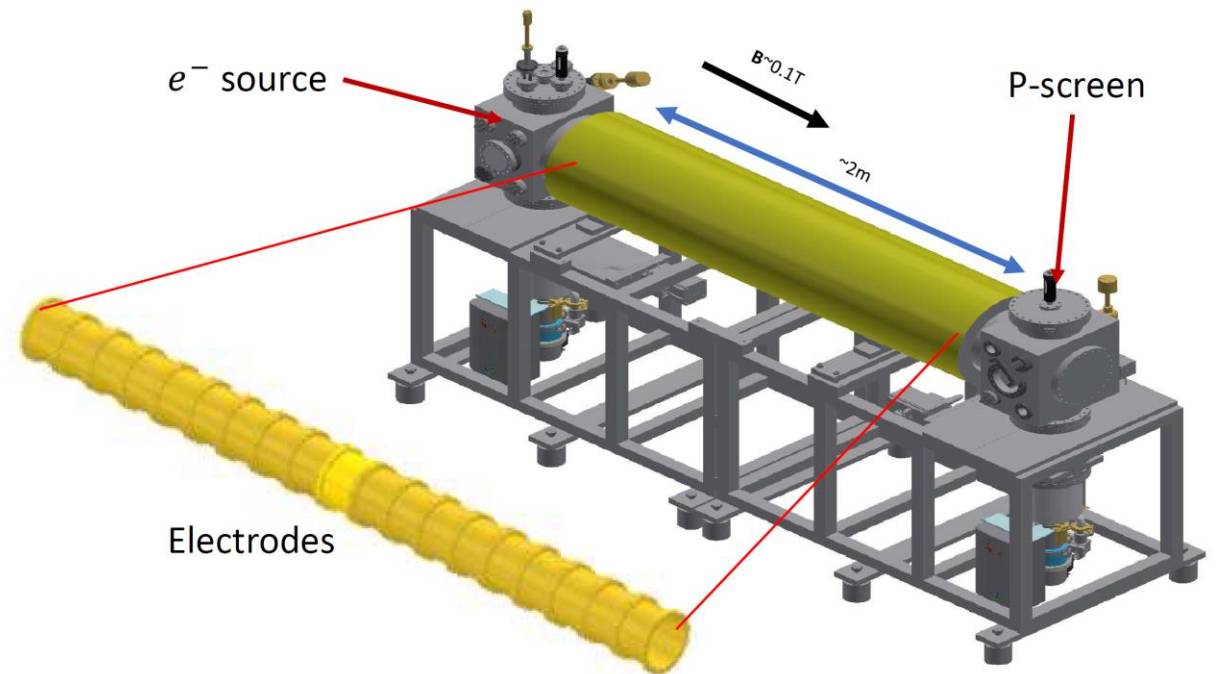
Side filling of the GL



Pumping may need to be coupled externally in z and as close as possible to the nozzle, again problem for the first lens. Is NEG an option?

In case of side filling of the GL on axis from the external e. source:

- Dedicated electron beam line with the focusing system is needed
- There is a space issue for the first lens



From C. Baker

Can we modify the design?

- Increasing the distance between GL1 and GL2 decreases the performance
- With the most up to date distribution from the nozzle (from HT), we can add 15cm between the nozzle and the GL1
 - Not much more than that!
 - By doing so we can also add some space between GL1 and GL2 as the capture system becomes effectively based on the single lens - GL1, GL2 is there only as a tuning nob -> with a very low setting or off
 - This is only possible if we trust the target simulation
 - We are awaiting an update!