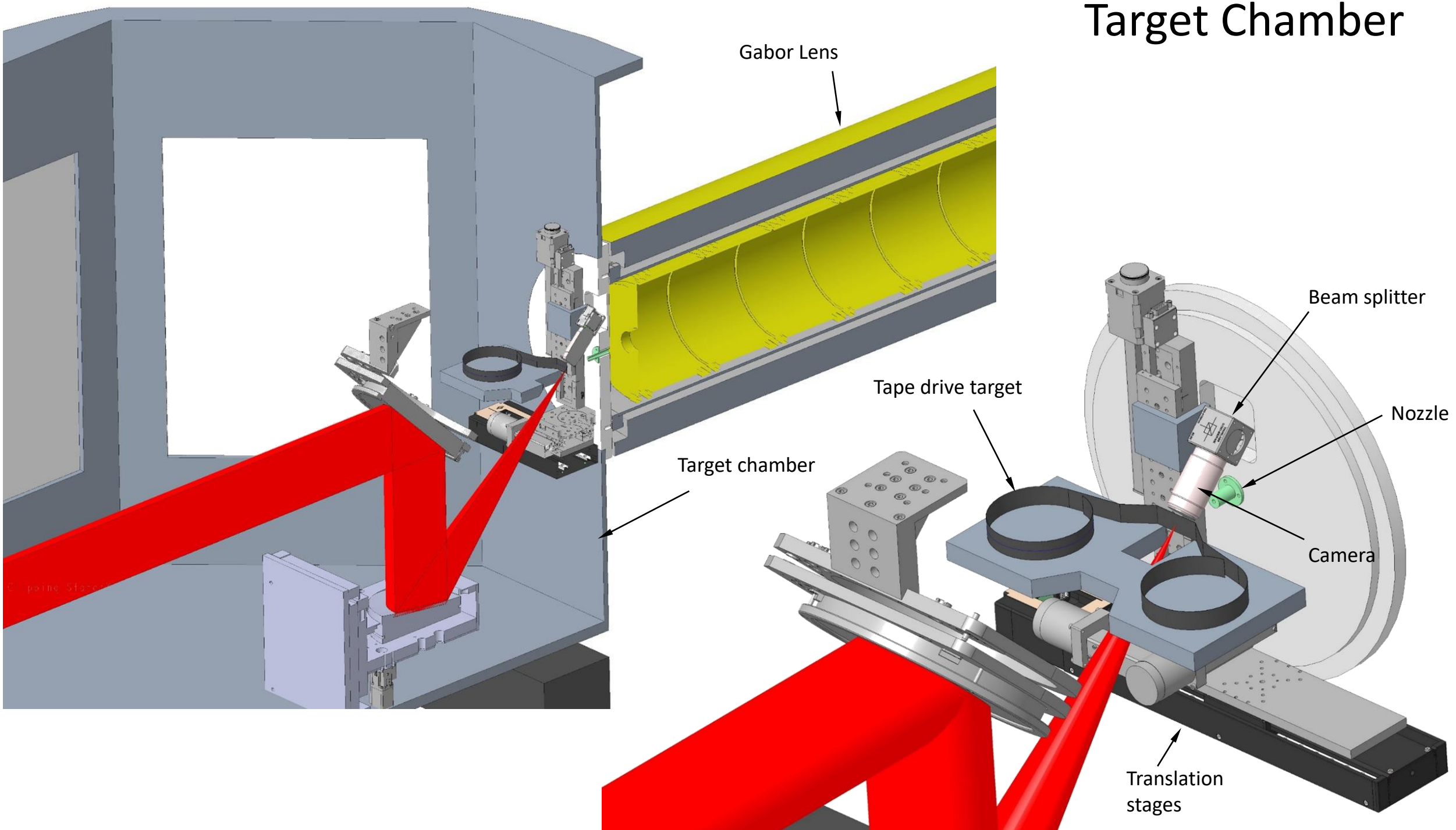
Target Nozzle and Gabor Lens Concept

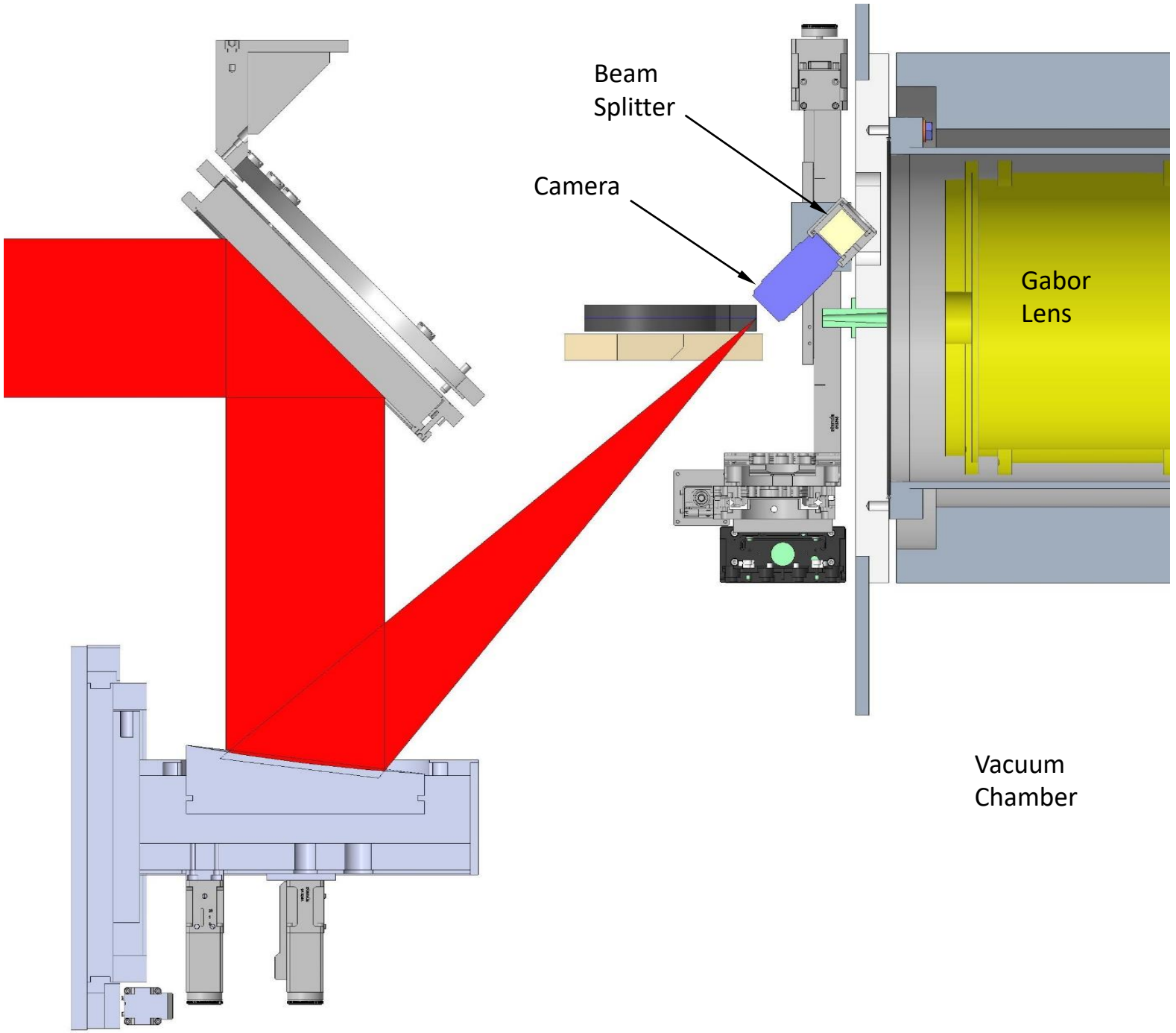
17th March 2023

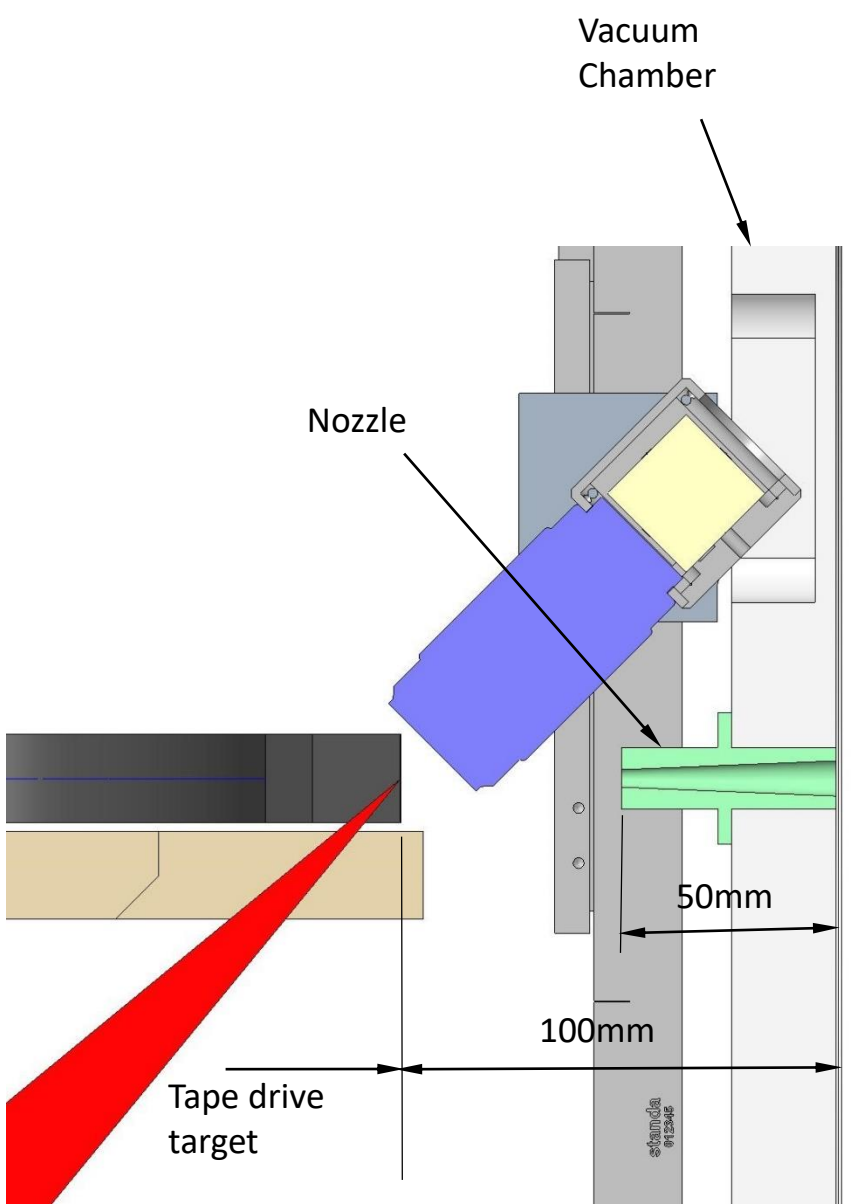
1272-pa1-meng-prs-0002-v1.0

Target Chamber

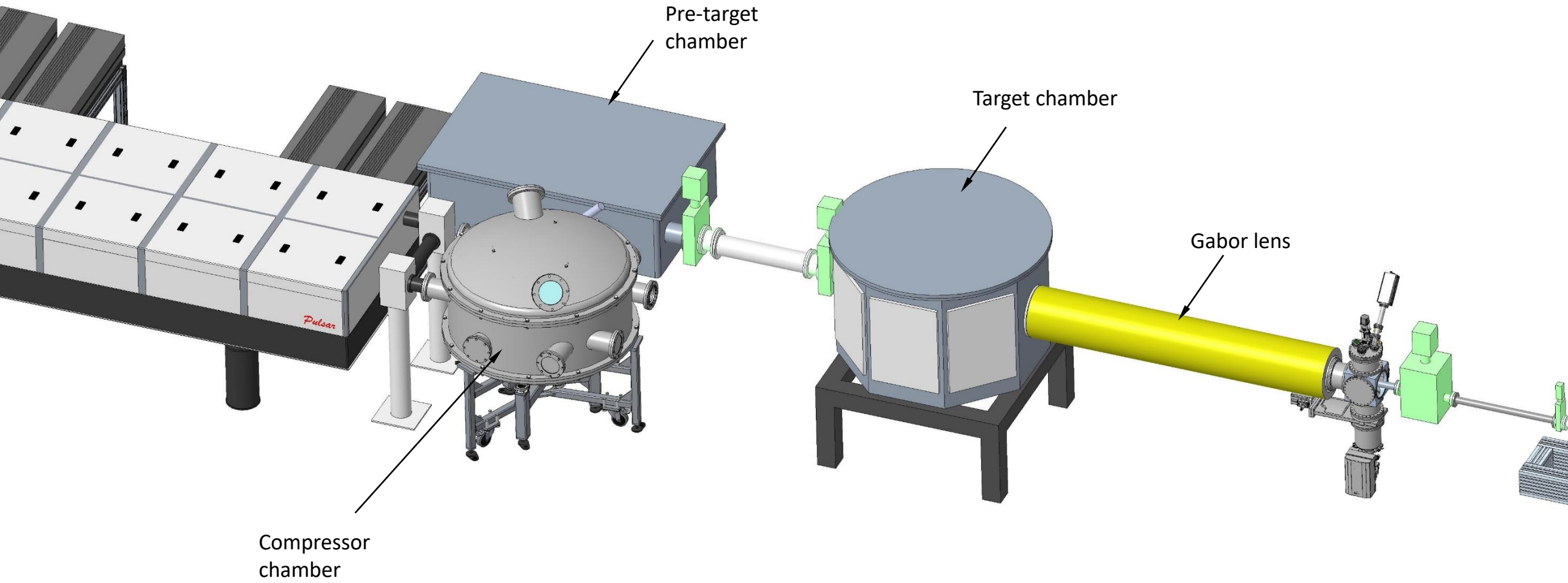


Target Chamber

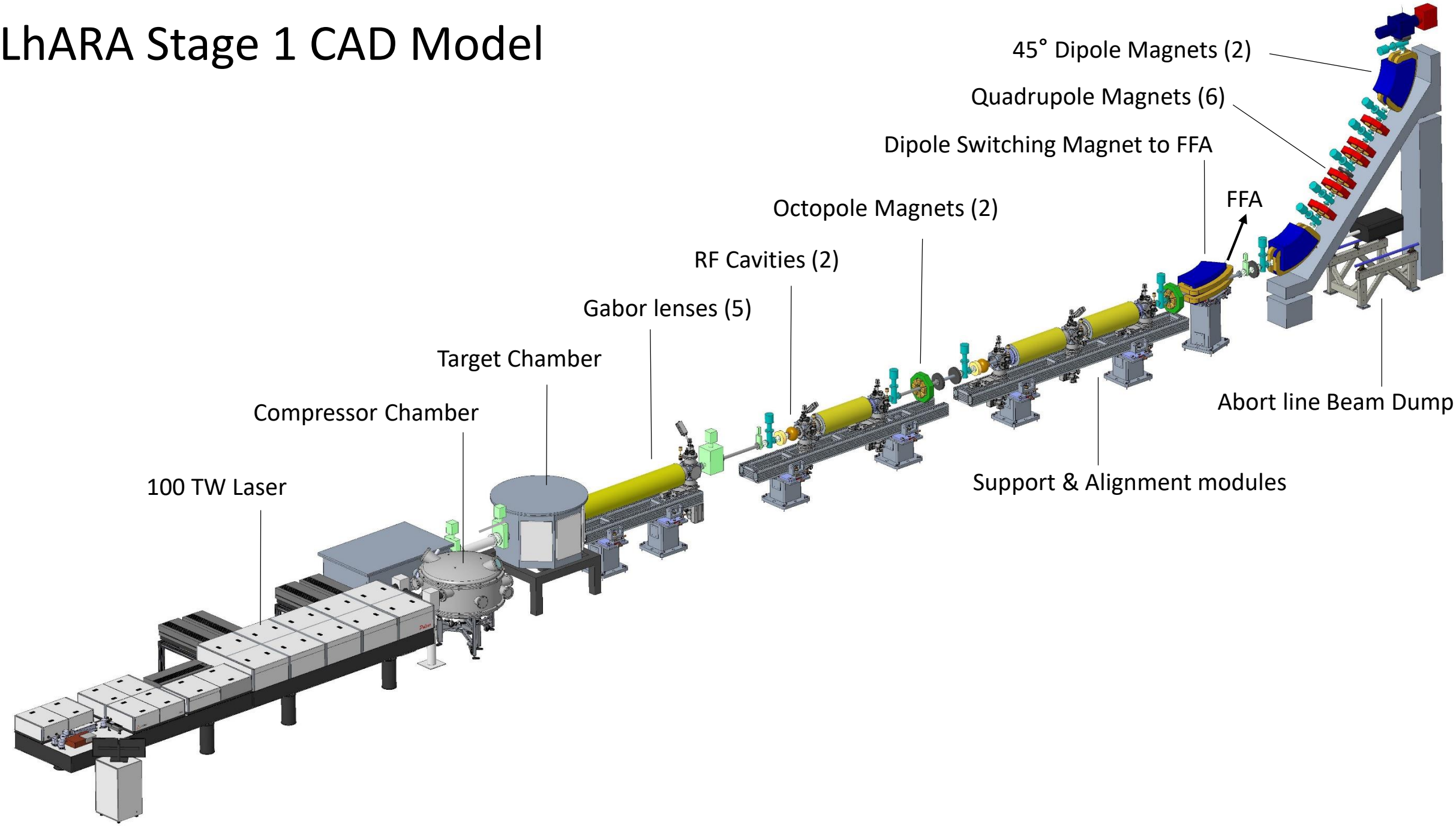




Target Chamber with Gabor Lens



LhARA Stage 1 CAD Model



Nozzle

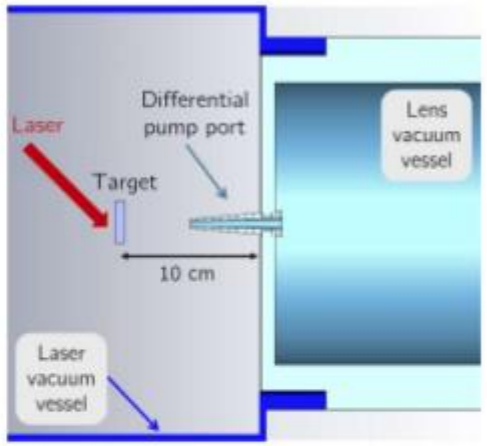
- The aperture of the nozzle collimates the particle flux from target.
  - Opening has a radius of 2 mm and widens to an exit radius of 2.87 mm.

R4 mm

- Simulations show the highest energy particles come off the target at an angle.
  - Adjustments of target with reference to the nozzle improves the transmission for the particles of interest.

- Simulations so far have neglected the electron population.
  - Investigations to study these electrons are ongoing.

Vacuum pressure:
1×10^{-6} to 1×10^{-7} mBar

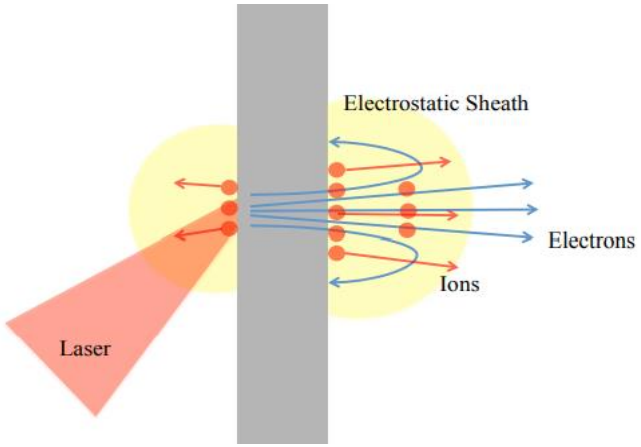


Vacuum pressure:
1×10^{-8} mBar or lower

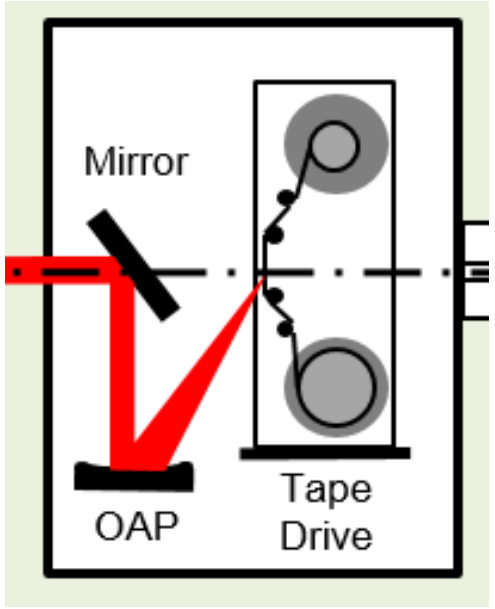
Figure: Schematic diagram of the interface between the target and the first Gabor lens.

Tape Drive Target

- Many acceleration methodologies, but most studied and best characterised is sheath acceleration
- 45^{o} laser incidence to target studied
- Tape targets one of several options
- Well established technology - relatively simple
- Selection of tape materials available - Mylar, Kapton, Ti…
- More advanced, etched targets possible - enhanced acceleration?
- R&D requirements in progress

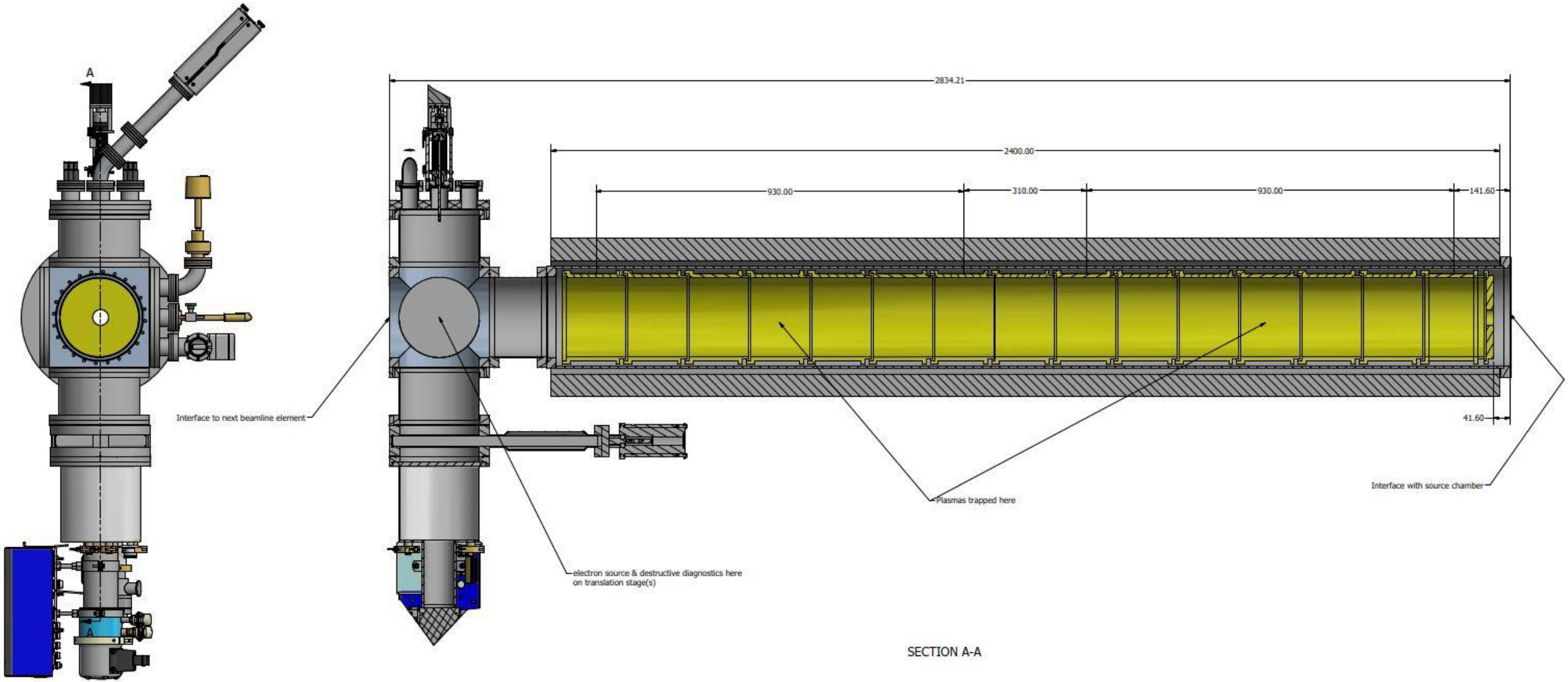


Target

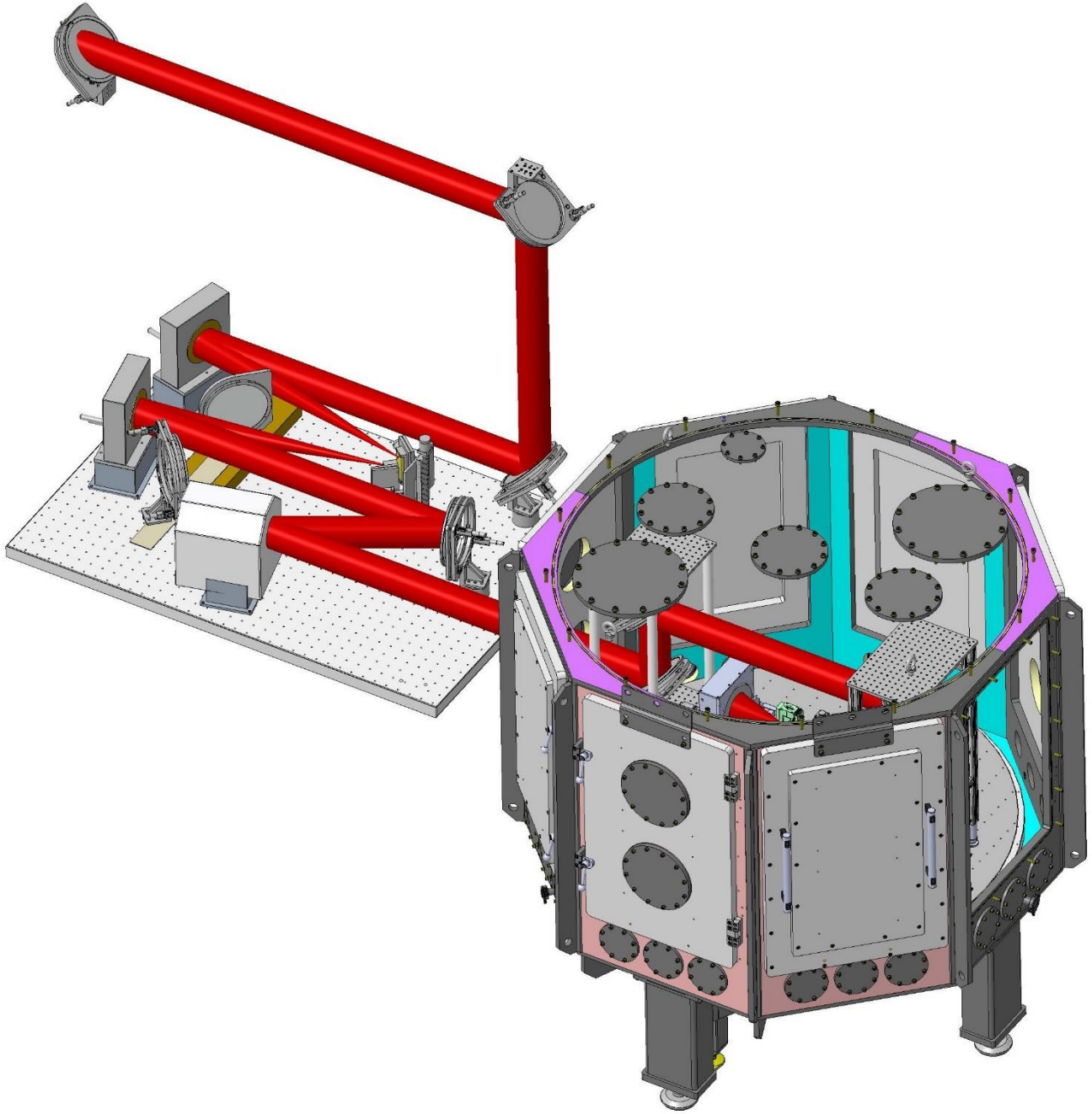


Noaman-ul-Haq et al. PRAB (2017)

Possible 2400mm Gabor Lens Capture System



Target Set Up SCAPA



Target Set Up SCAPA