

# REPAIRE

Research and dEvelopements for the Production of innovative RadioElements



Design systems for the production of innovative radioelements, emitting particles  $\alpha$

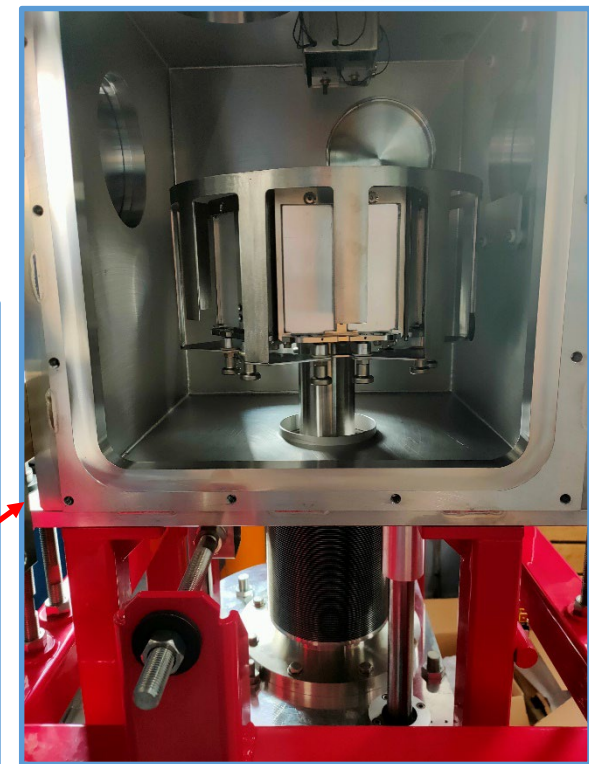
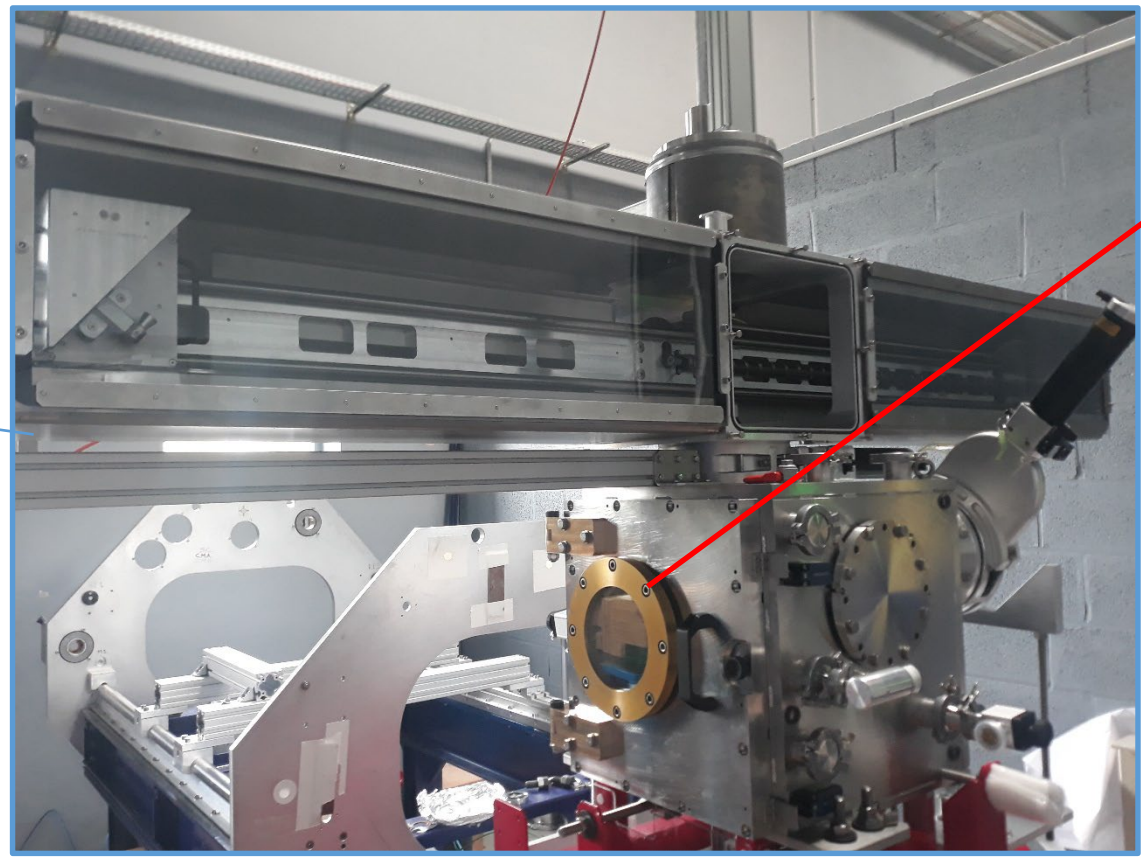
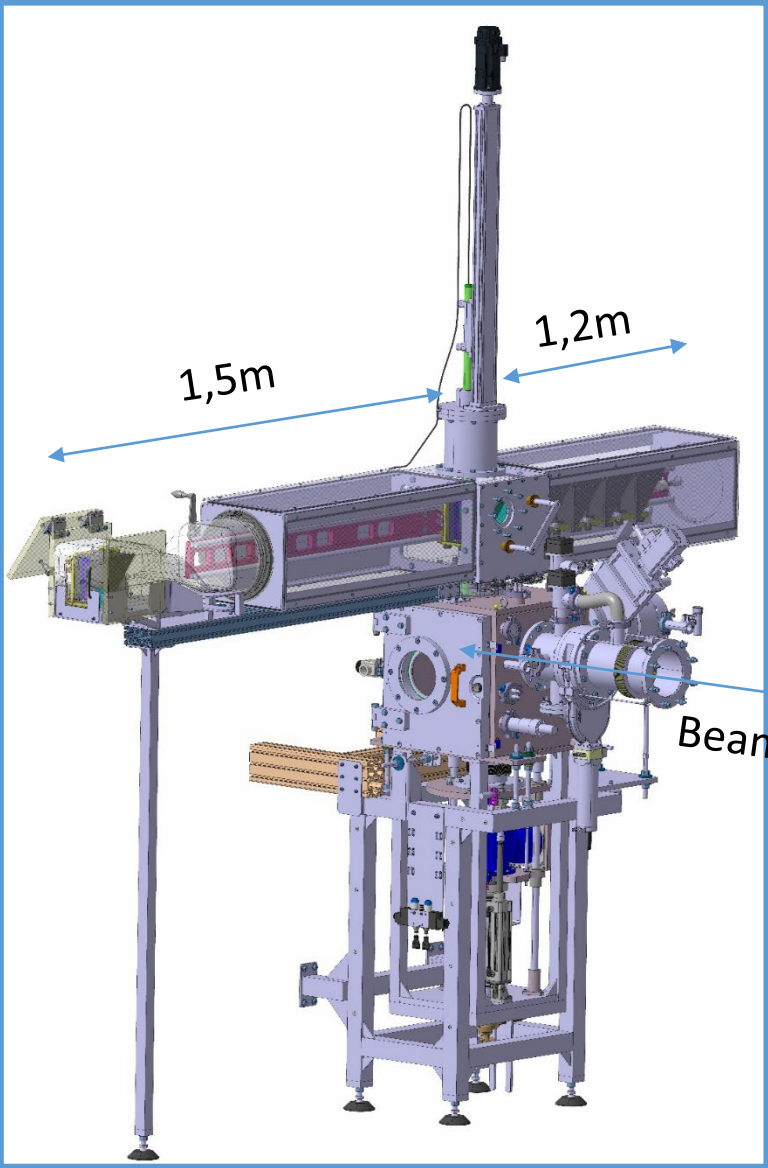
- WP2 solid target

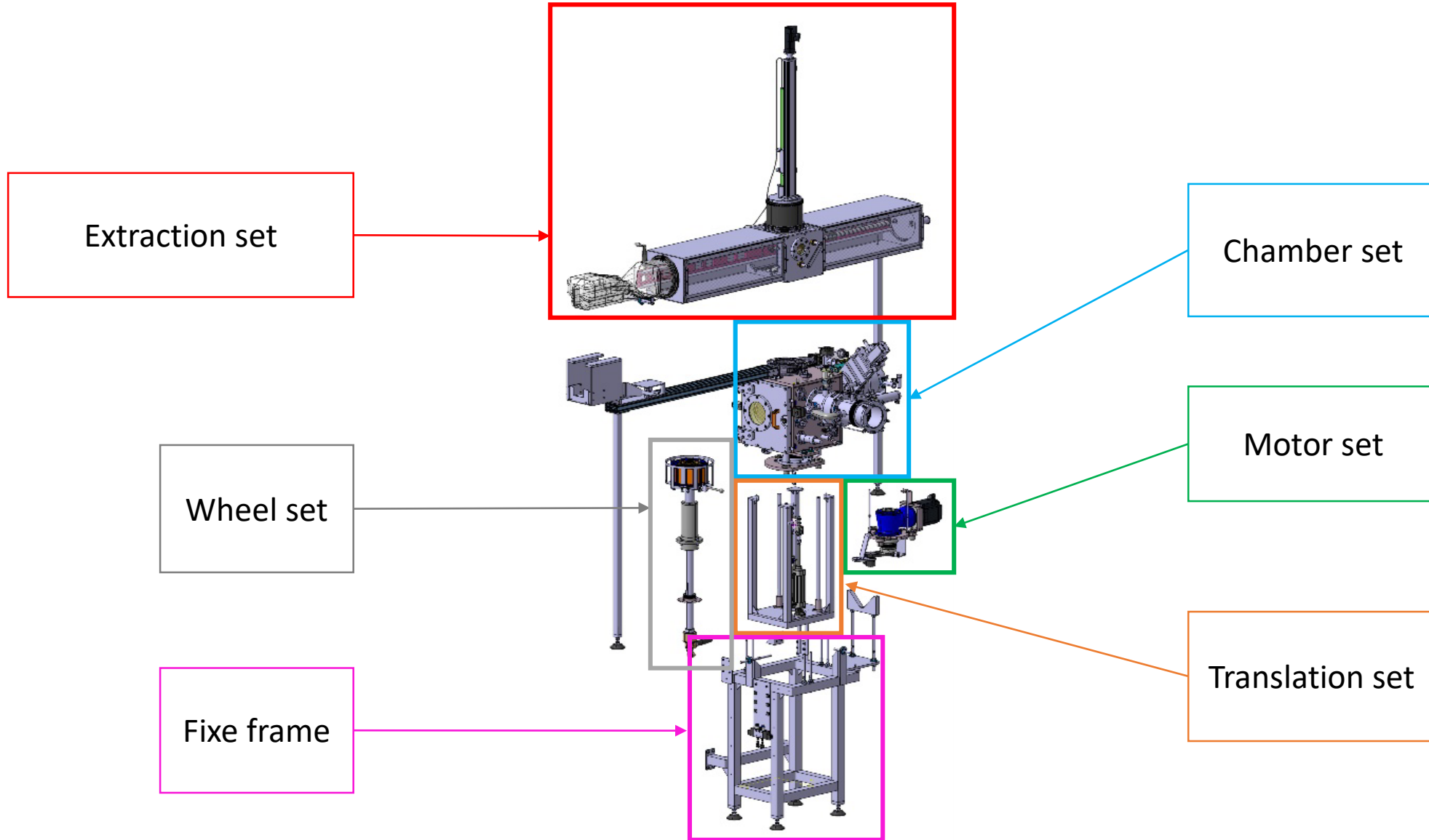


- Cool targets (water touch+ rotation)
- Set beam/read current
- radiological containment & handling

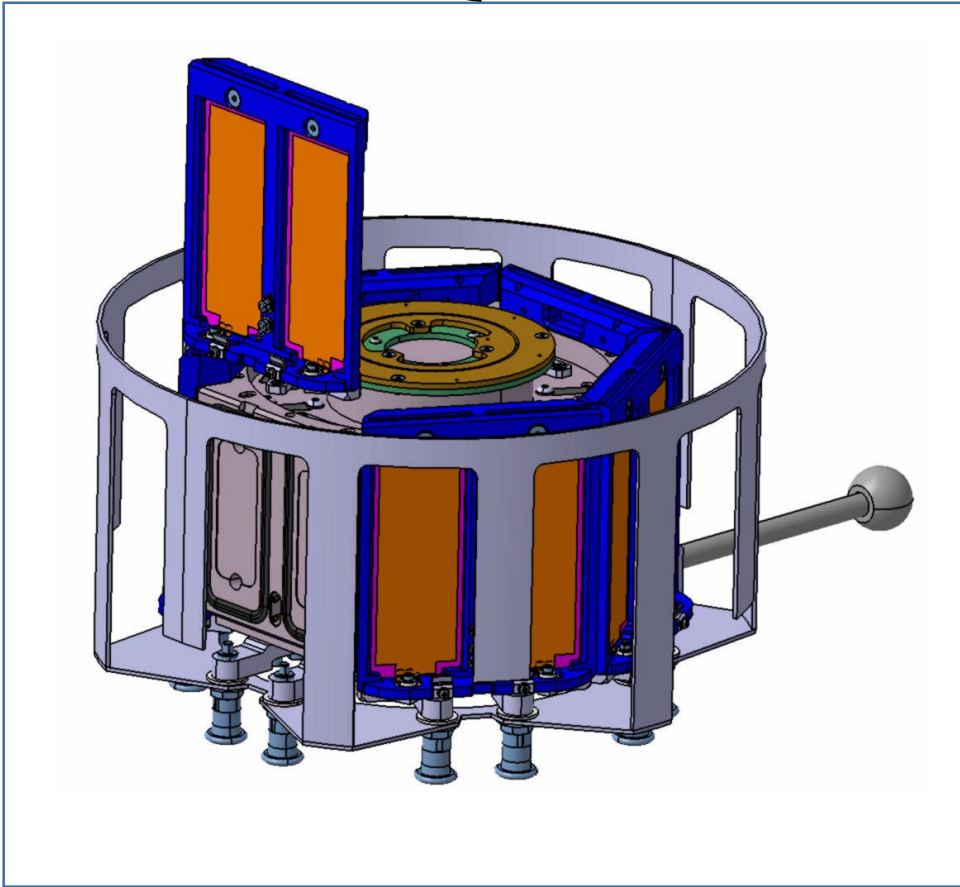
# Description

- Weight : ~660 Kg
- H beam : 1500 mm (Spiral 2)
- Height: 3500mm

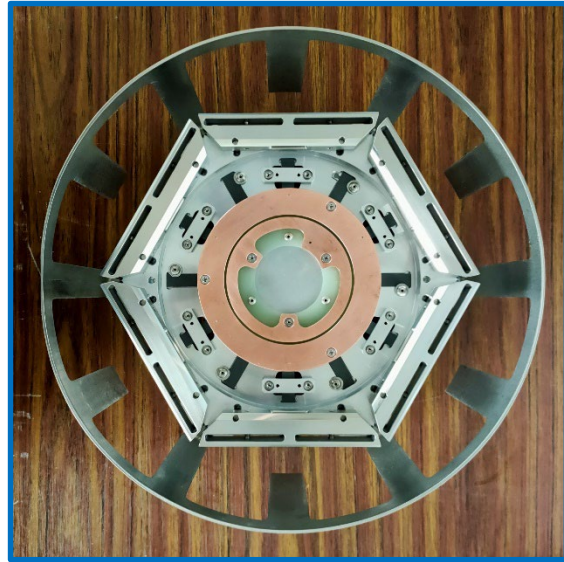




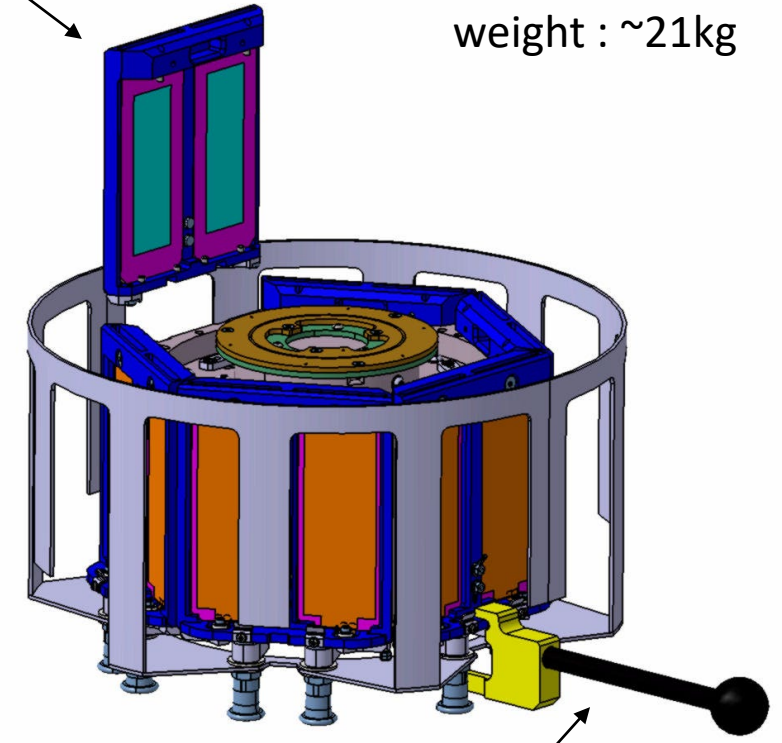
Wheel mounted



« Racket »



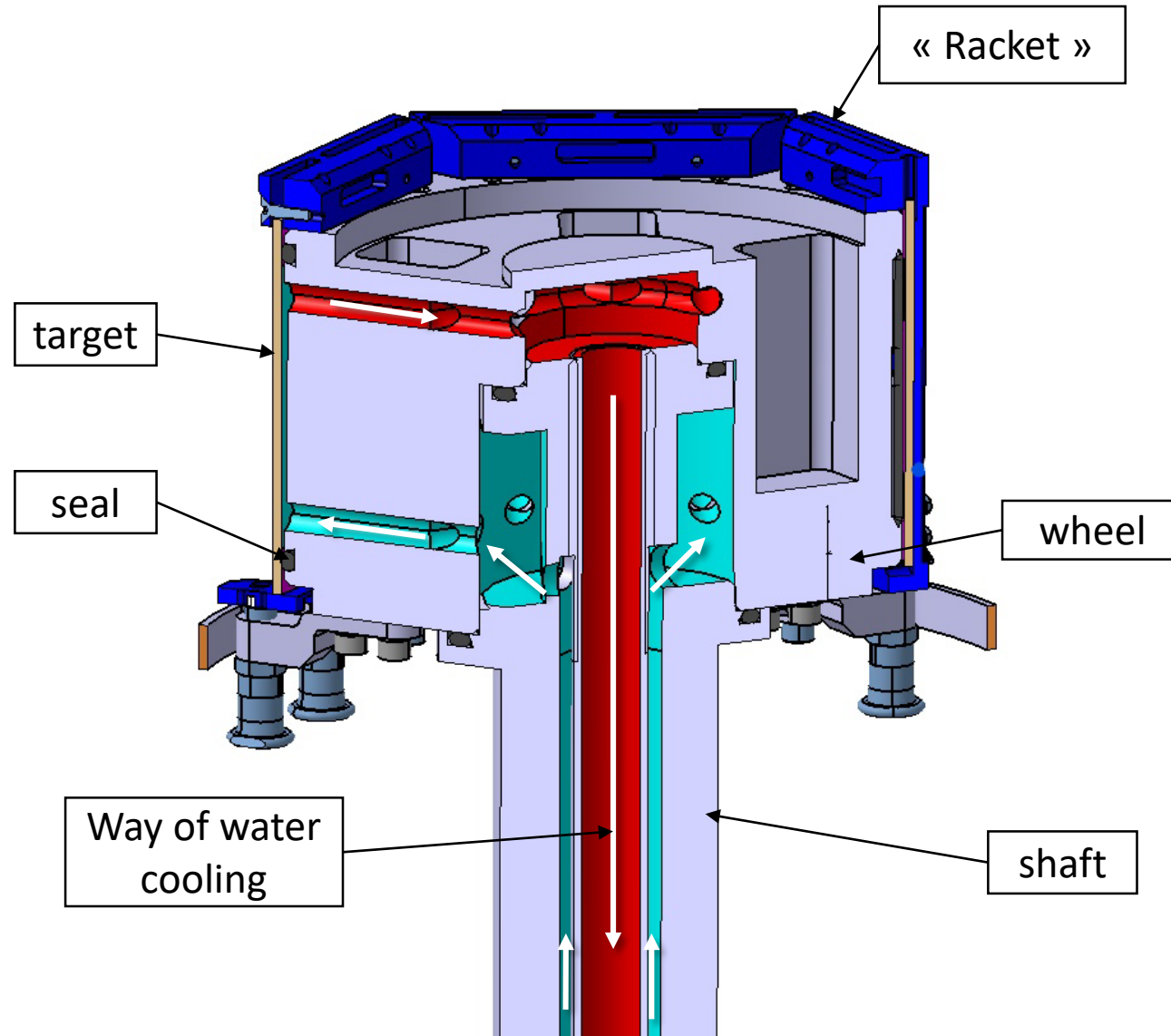
High : 240mm  
Ø : 250mm  
weight : ~21kg

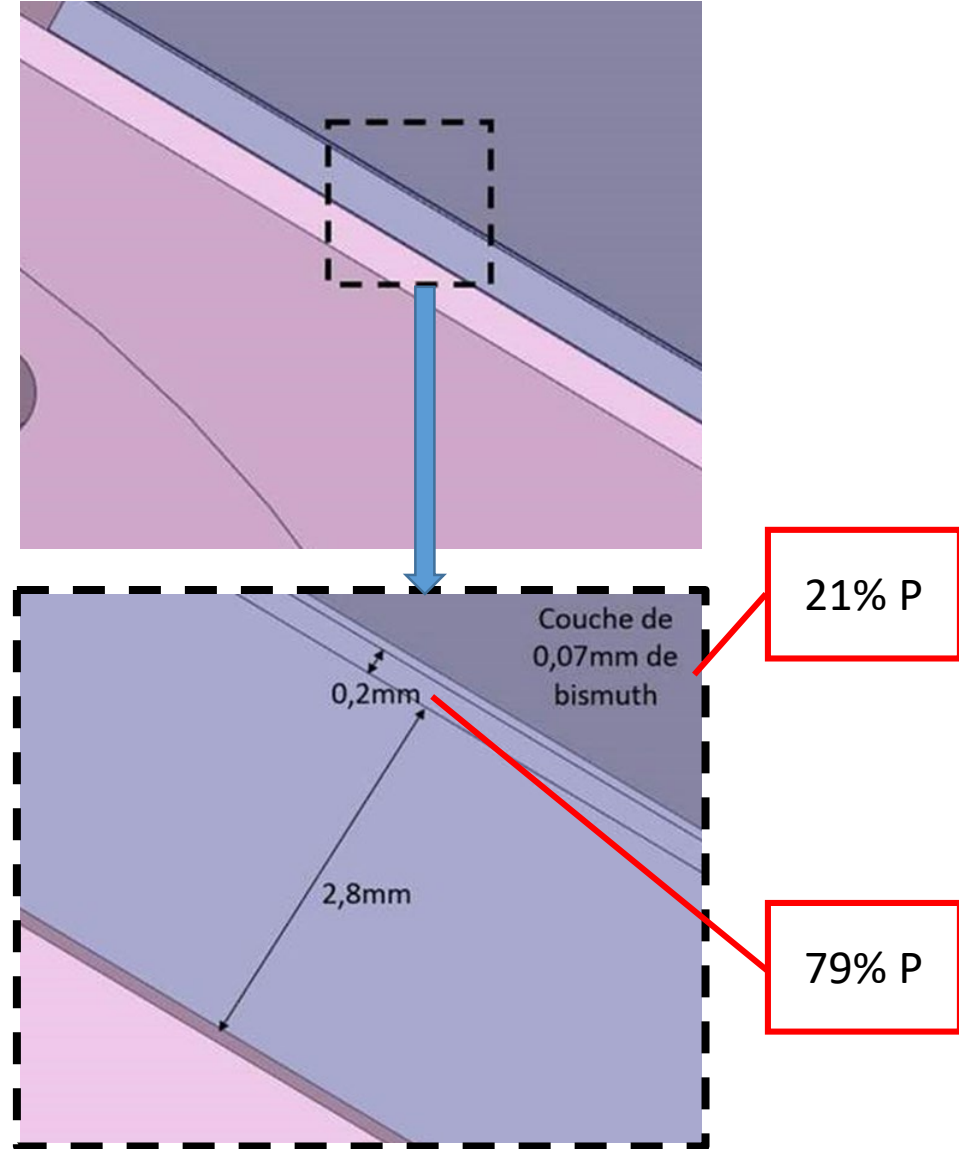
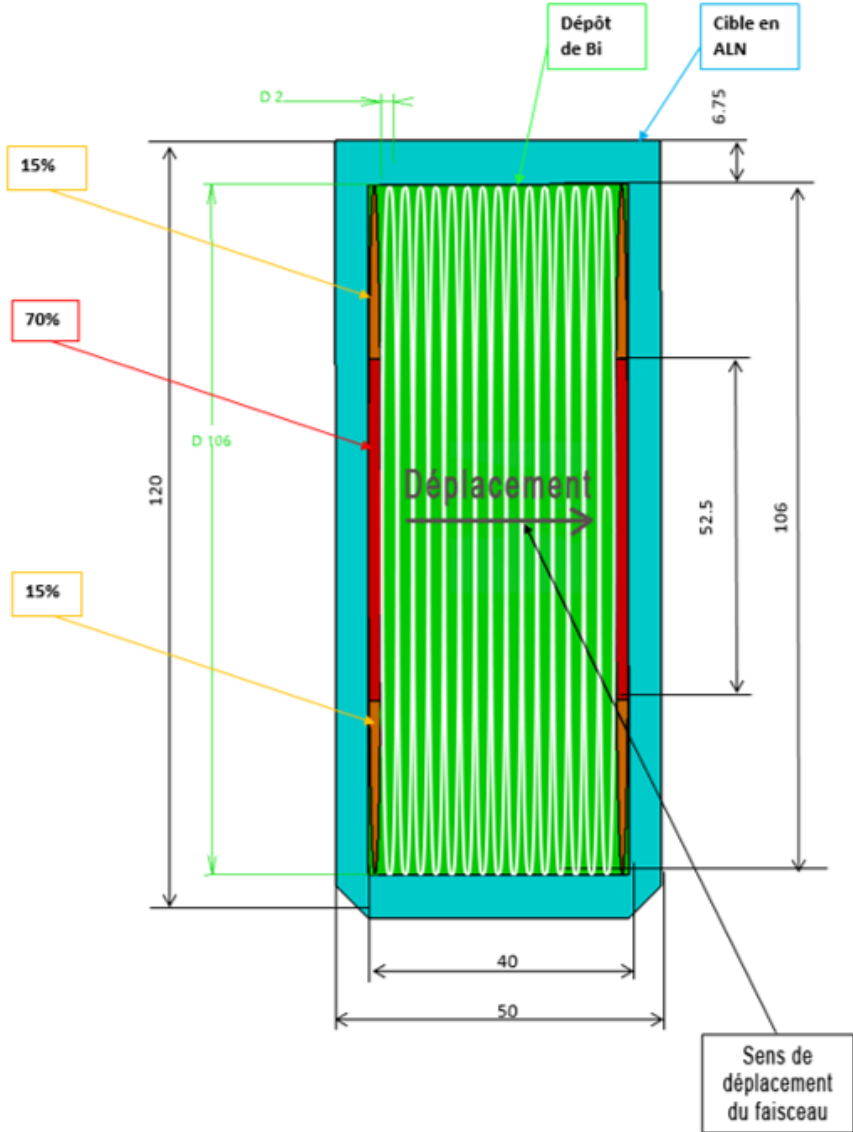


Tool to set the « Racket »

# cool and turn

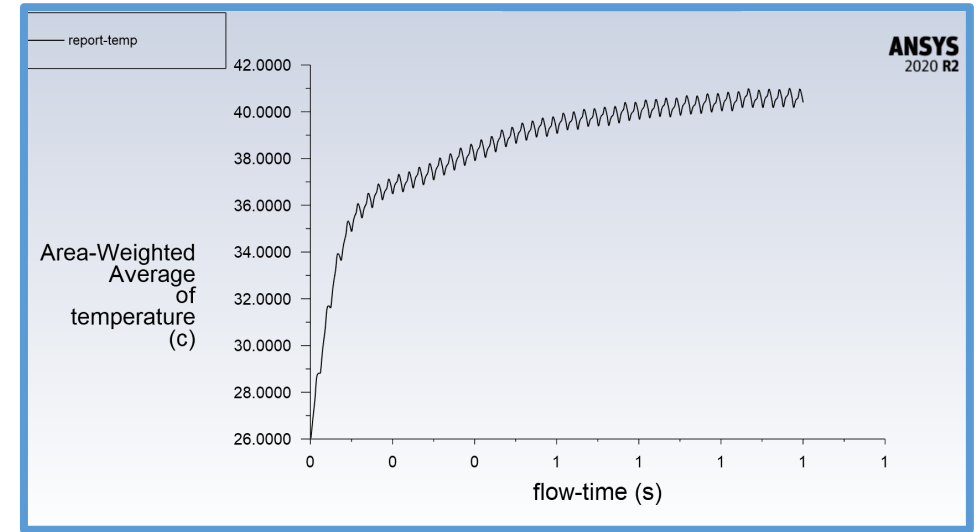
CFD simulation



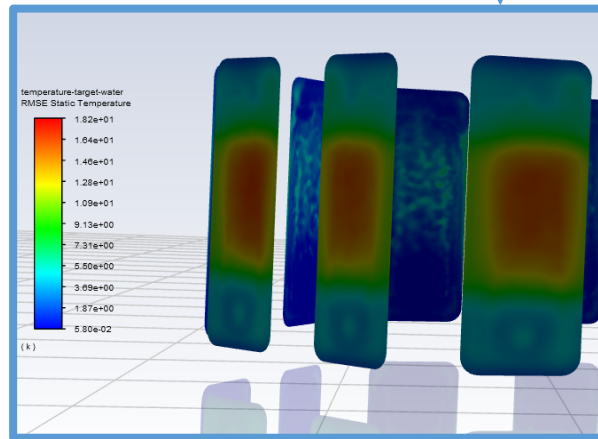


### → 4 Goals :

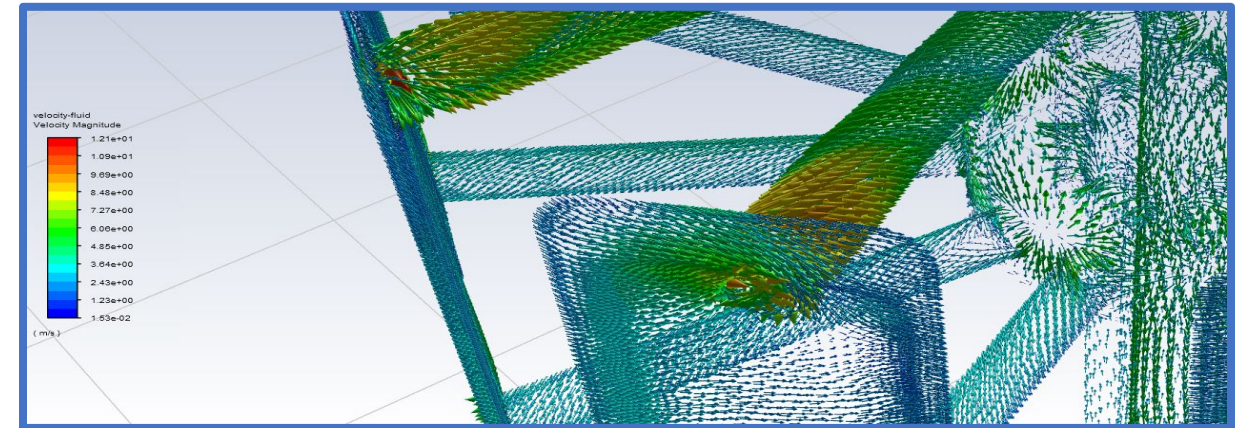
- Find properly rotation speed →  $T^\circ$  target < à  $150^\circ\text{C}$ 
  - $41^\circ\text{C}$  @100tr/min,  $31^\circ\text{C}$  @400tr/min
- No « air bag »  $3\text{m/s} < V < 12\text{m/s}$  (only simulation check)
- Water temp. <  $100^\circ\text{C}$  →  $18^\circ\text{C}$  (only simulation check)
- Set water pressure → 3 bars inlet ( $1,3$  bars target face)



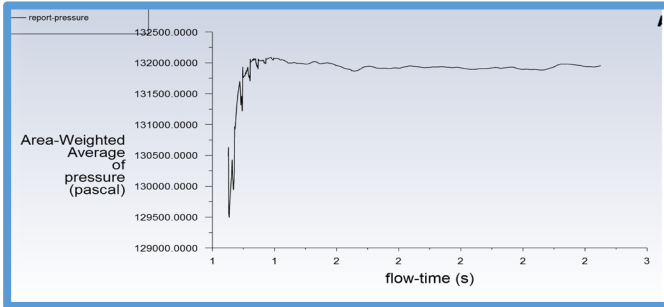
Évolution of the temperature @10KW 100 tr/min 2bars



Temperature of water @200tr/min, 2bars

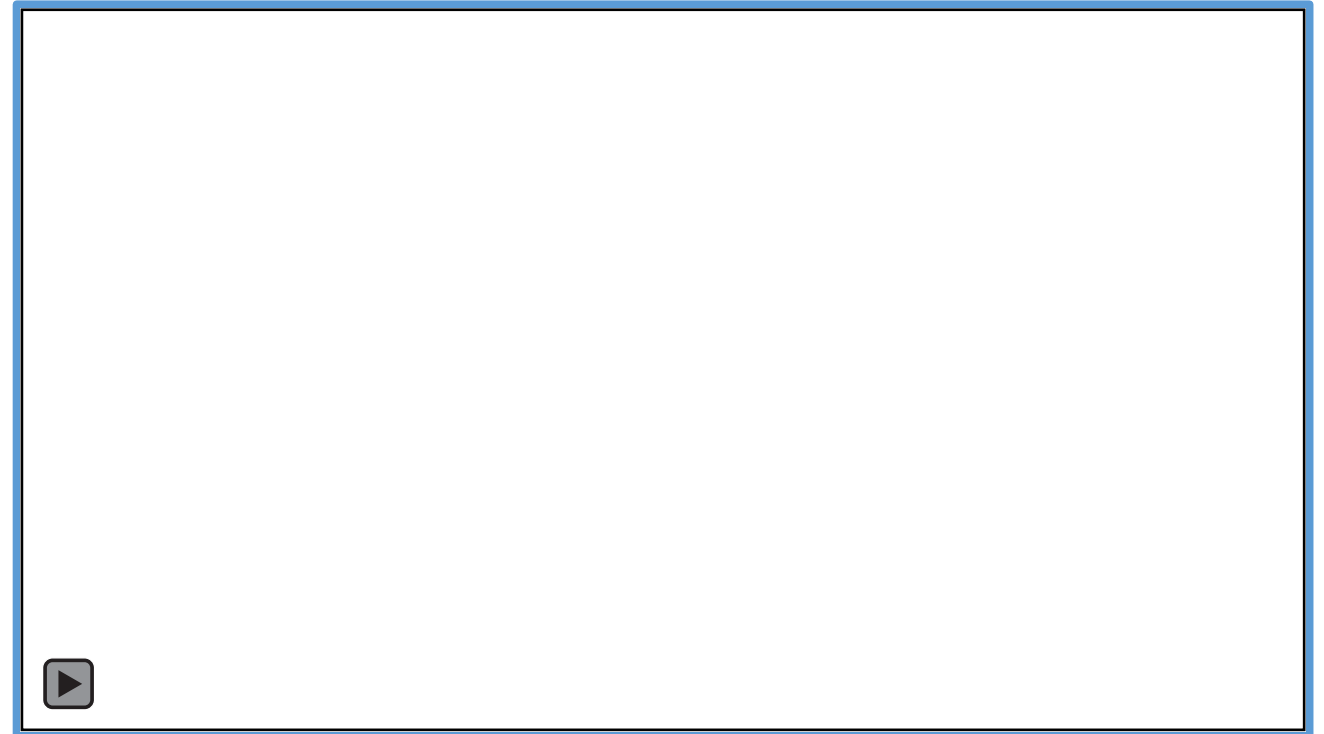
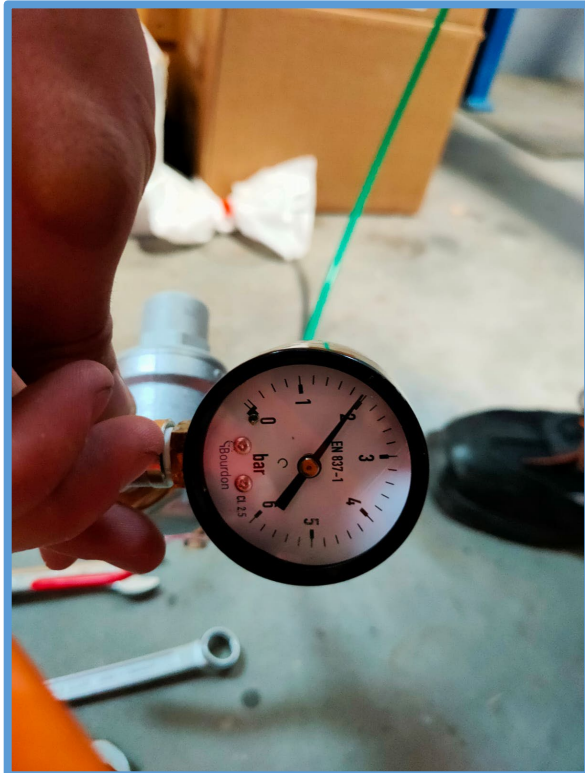


Speed of the water @10KW 200 tr/min 4bars



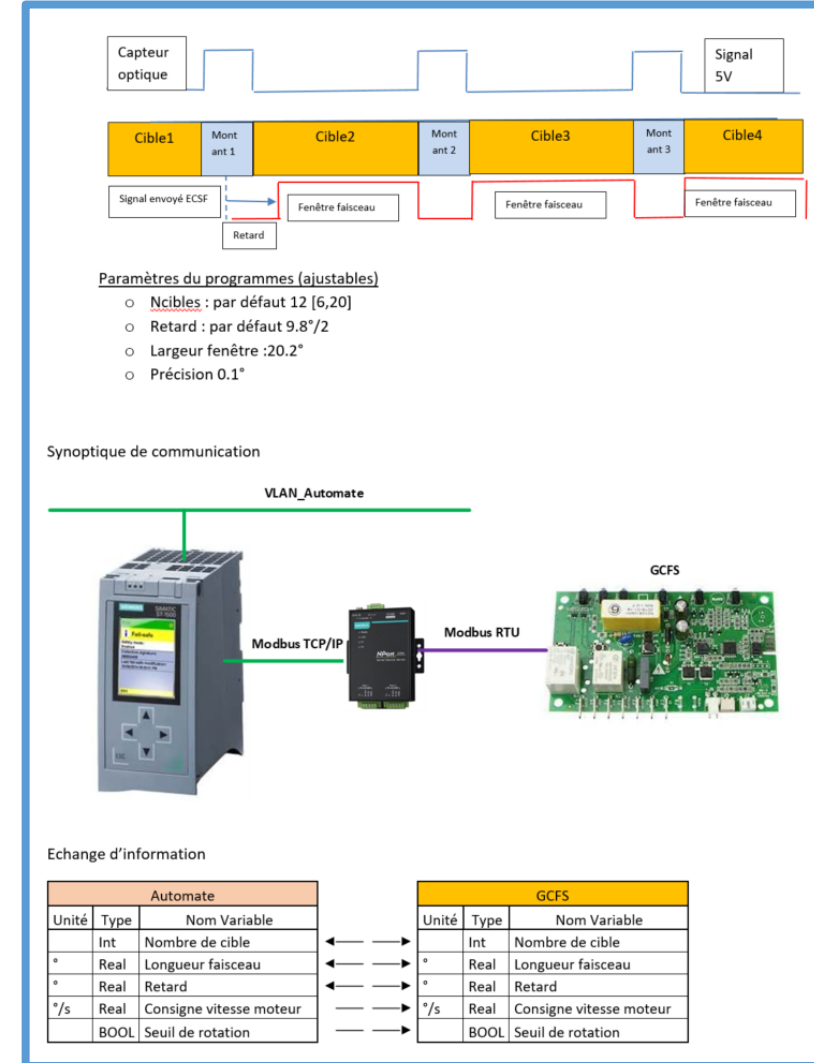
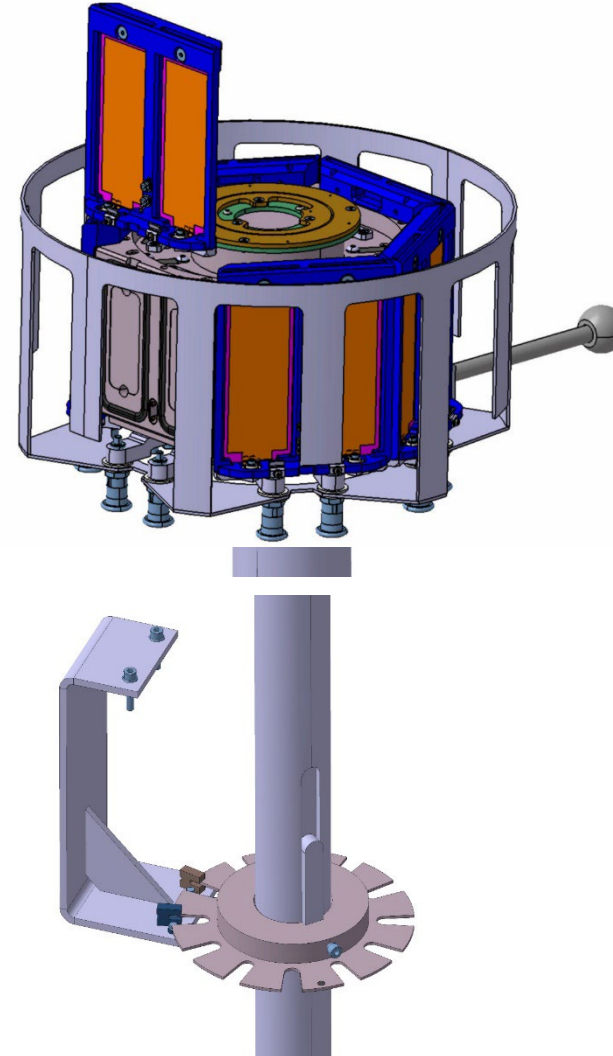
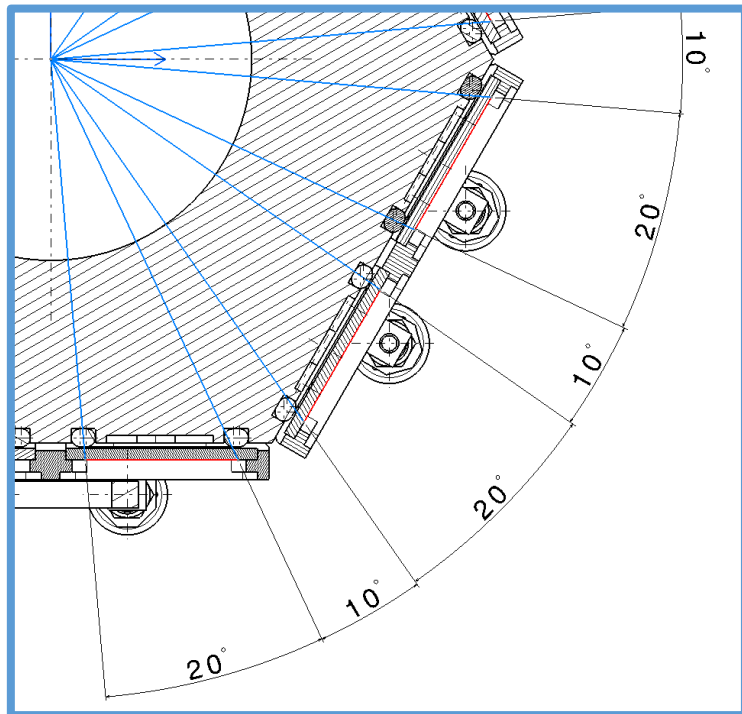
Pressure of boundary @100tr/min, 3bars

- Sealing test :
  - Vacuum (qq  $10^{-2}$ mbars)
  - Speed 100tr/min.
  - Delta P 3bars





- Regulars Angles
- Efficiency 66%
- Wheel gost ON/OFF

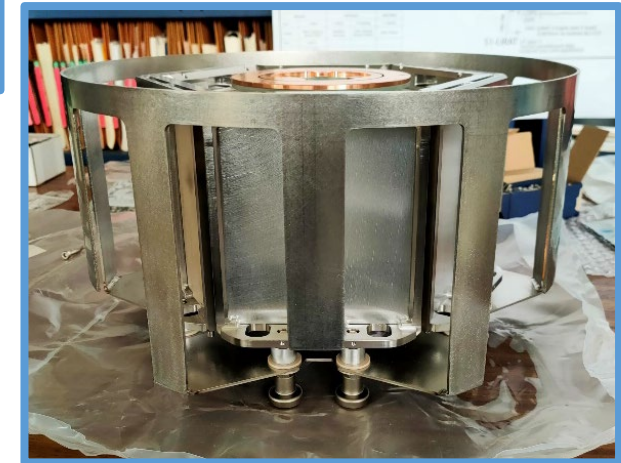
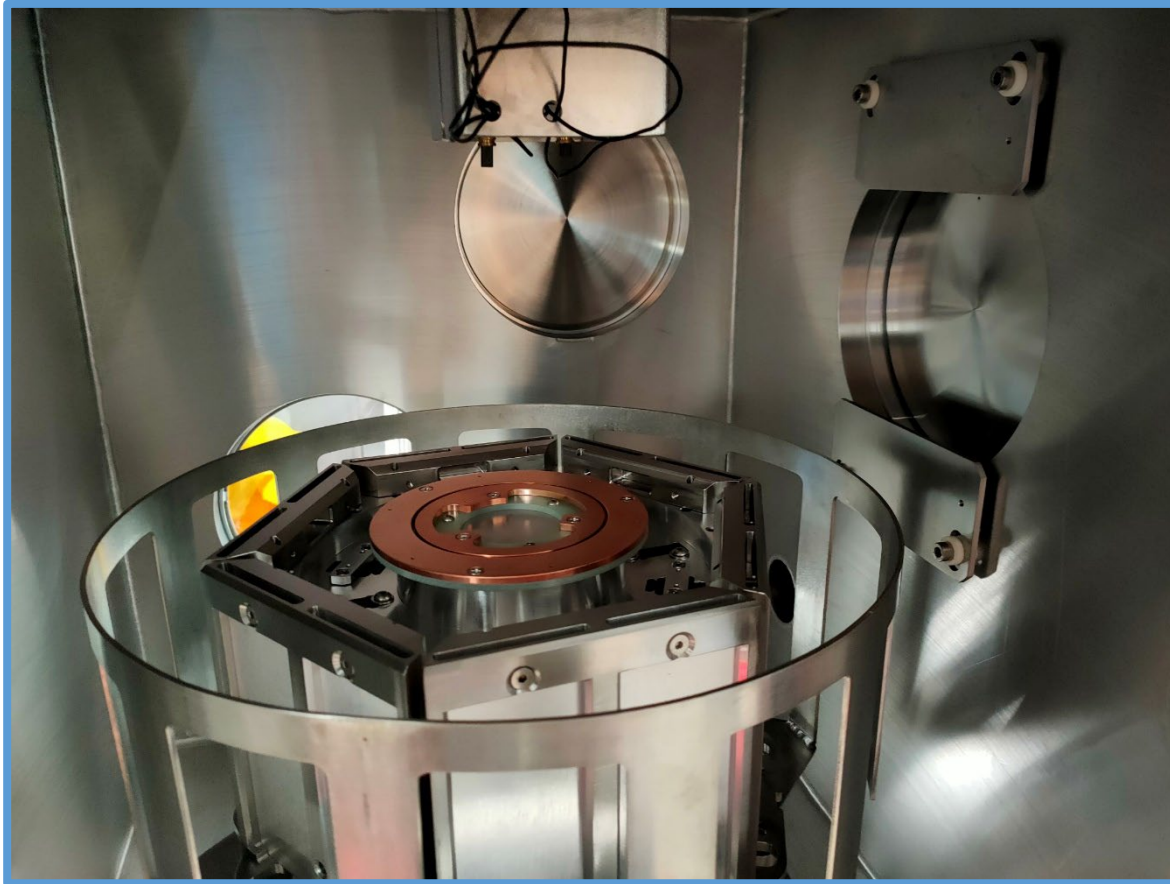


# Set beam/read current



- 2 currents
  - On target [ 5microA- 500 microA]
  - Diagnostics of loss [ 100 nA- 10 microA ]

- Horizontals Collimator
- A « shield »
- Touch pen
- Brush Carbon +runway cu/epoxy



## trouble

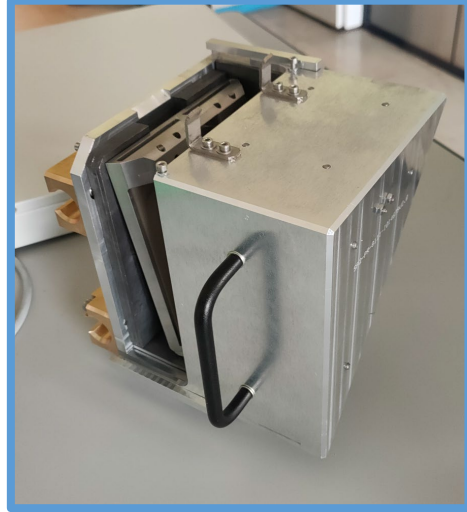
- The secondary electrons emitted by the irradiation of the targets, will be captured by the diagnosis of loss, thus distorting the measurement

## solution

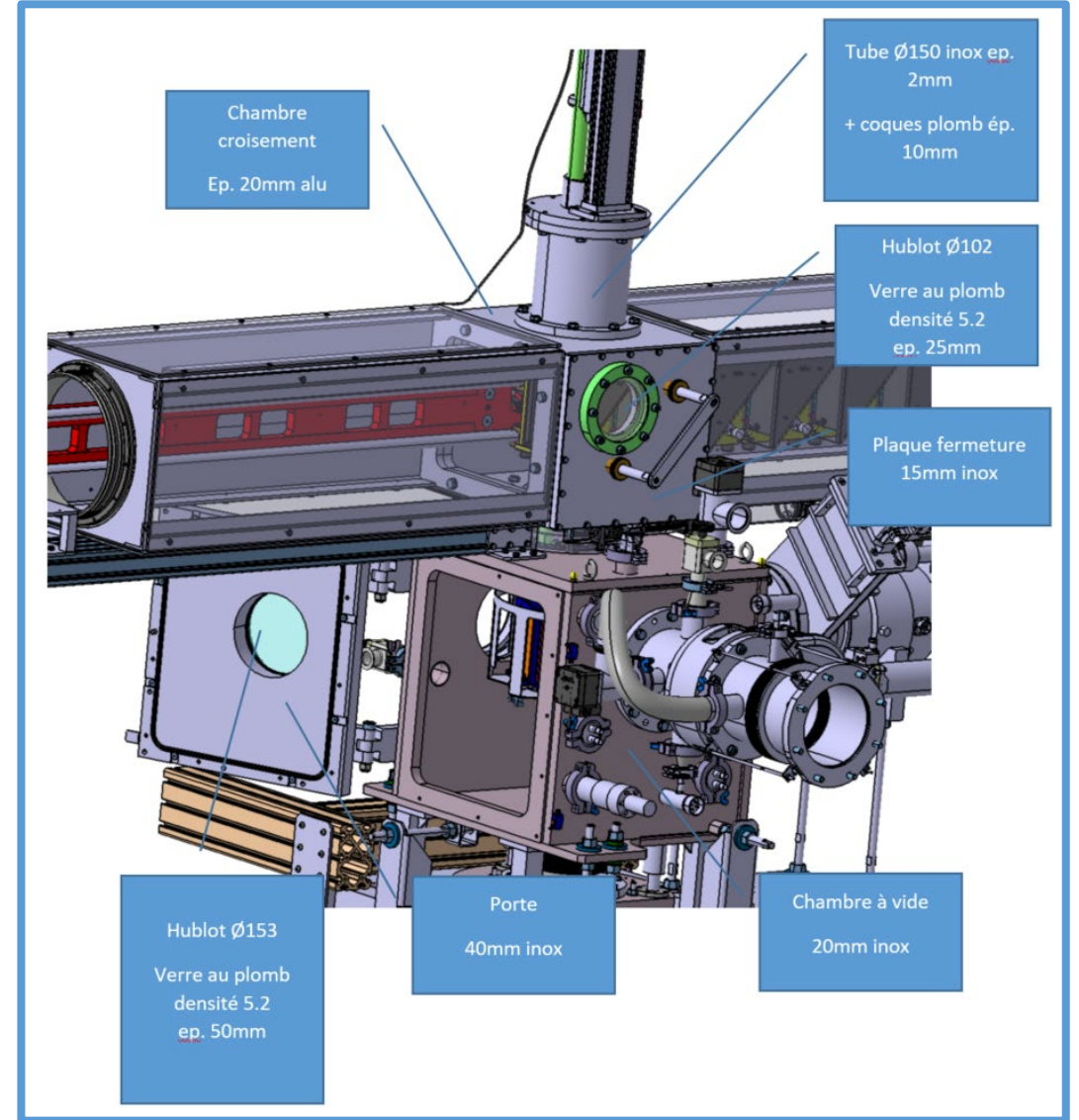
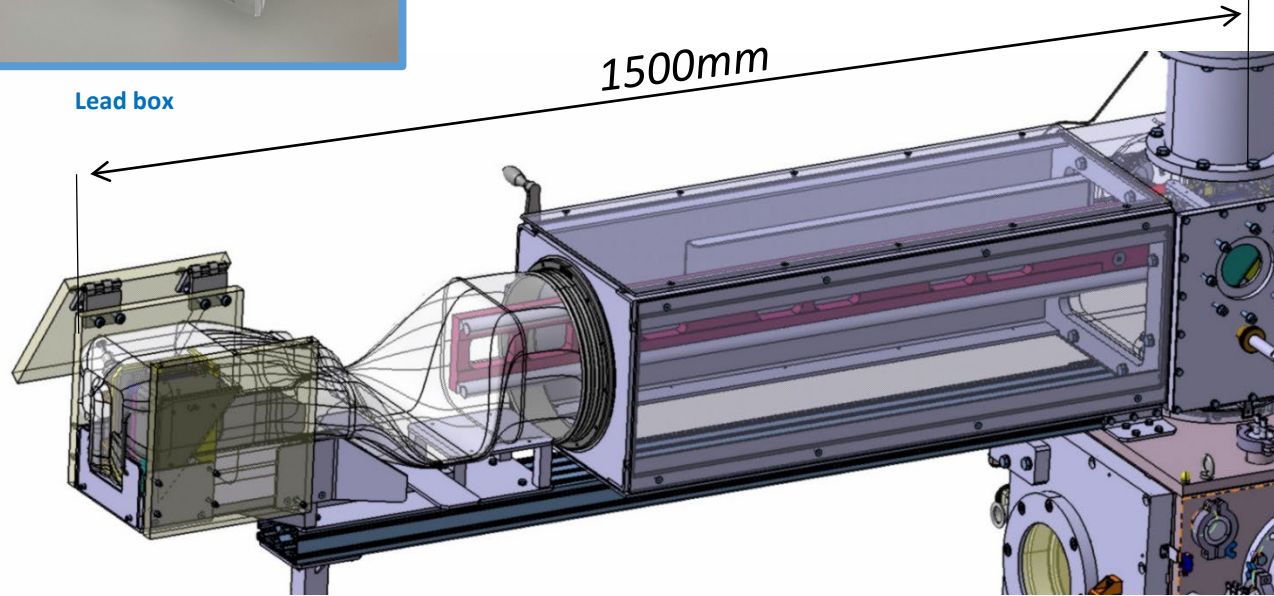
- Magnets

## Tests are planned

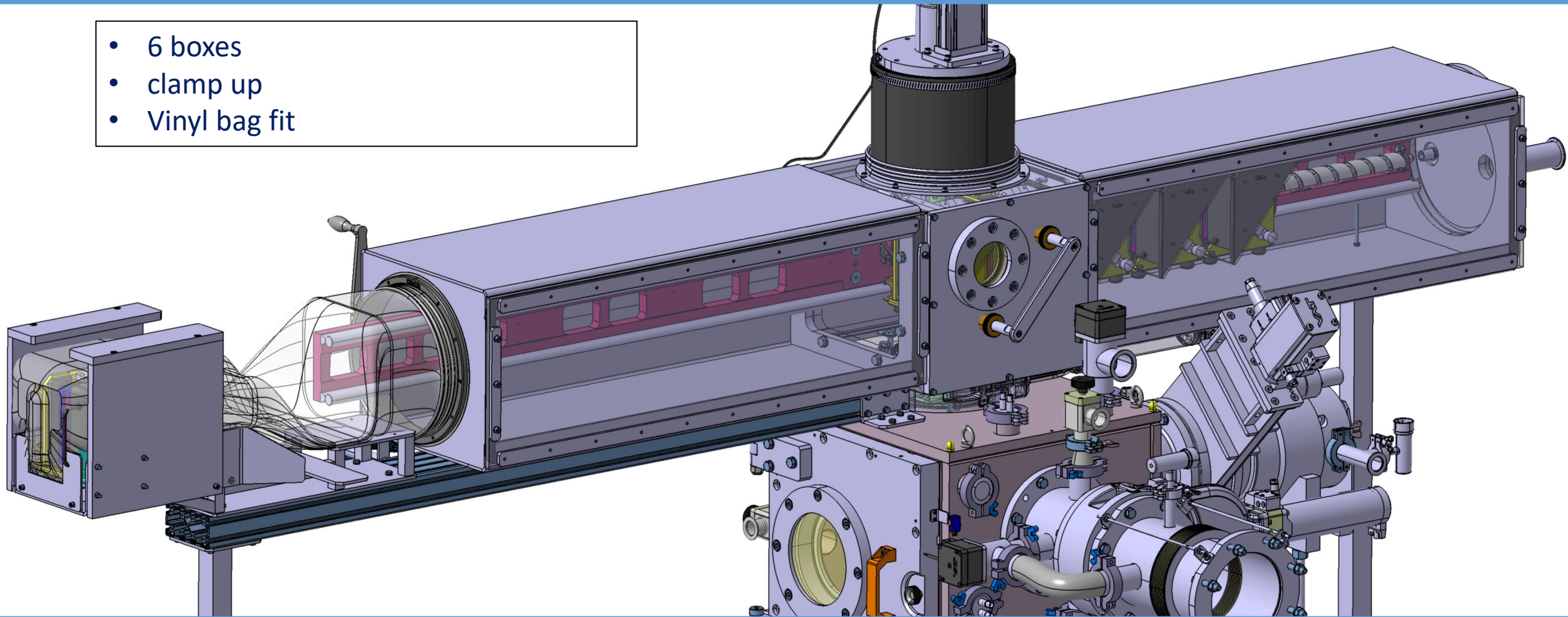




Lead box

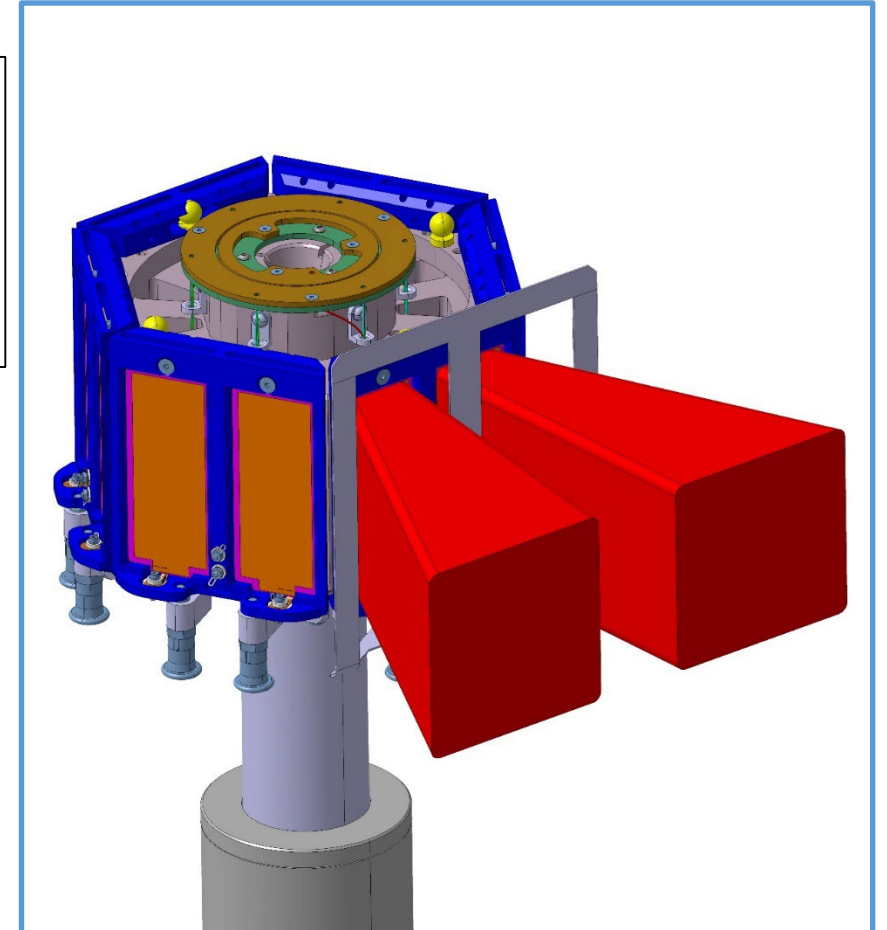


- 6 boxes
- clamp up
- Vinyl bag fit

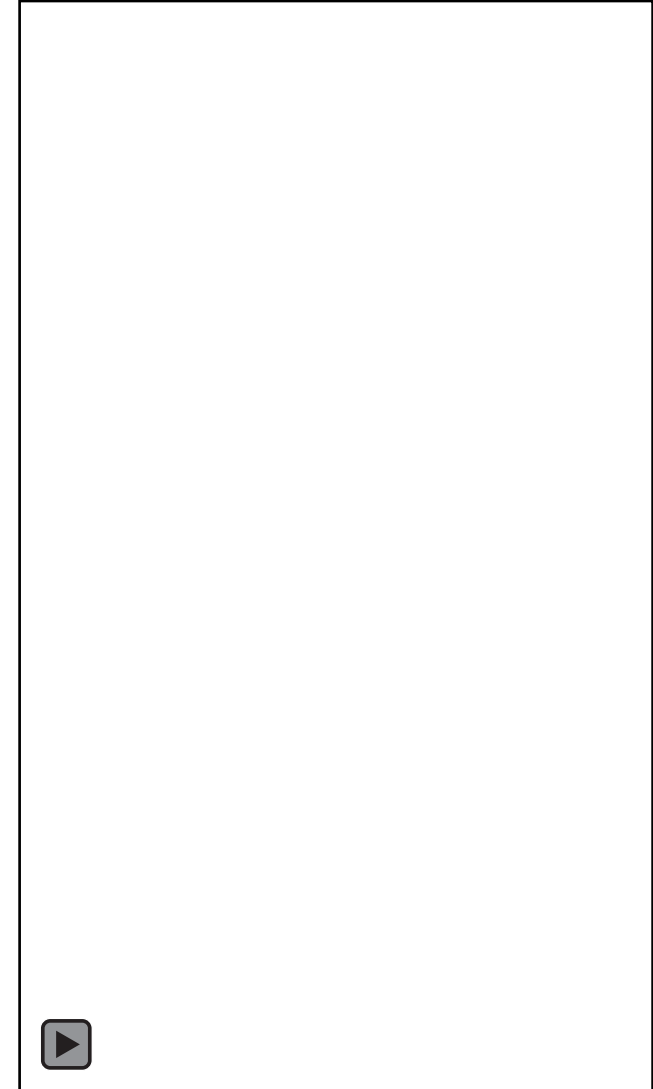
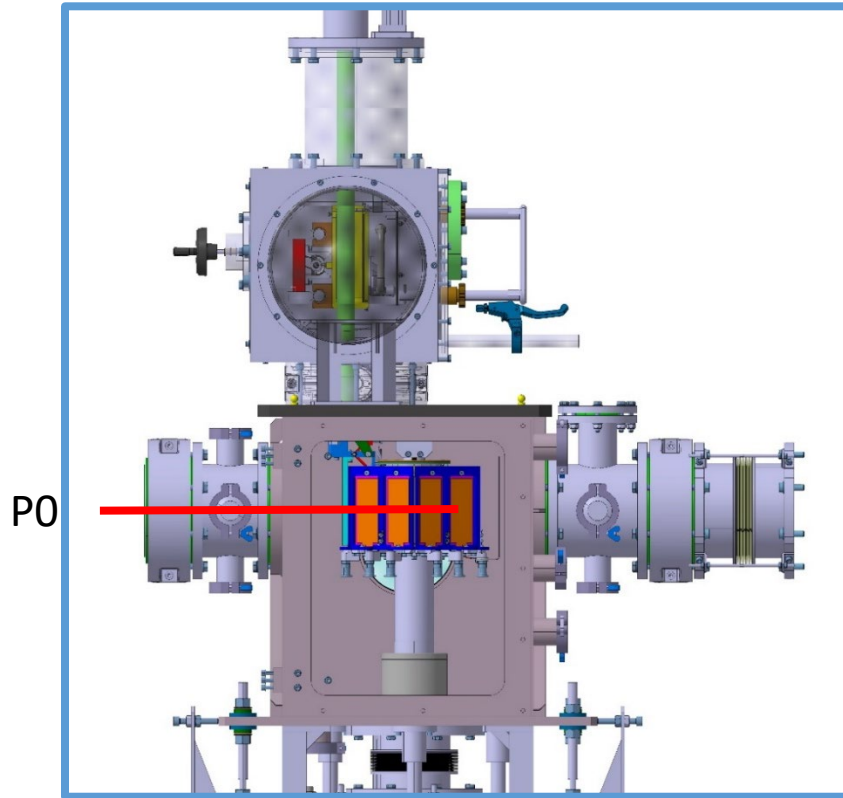


- shooting

- 8h
- 100tr/min
- 2bars
- $1.10^{-4}$ mbars
- Waiting decrease 30'



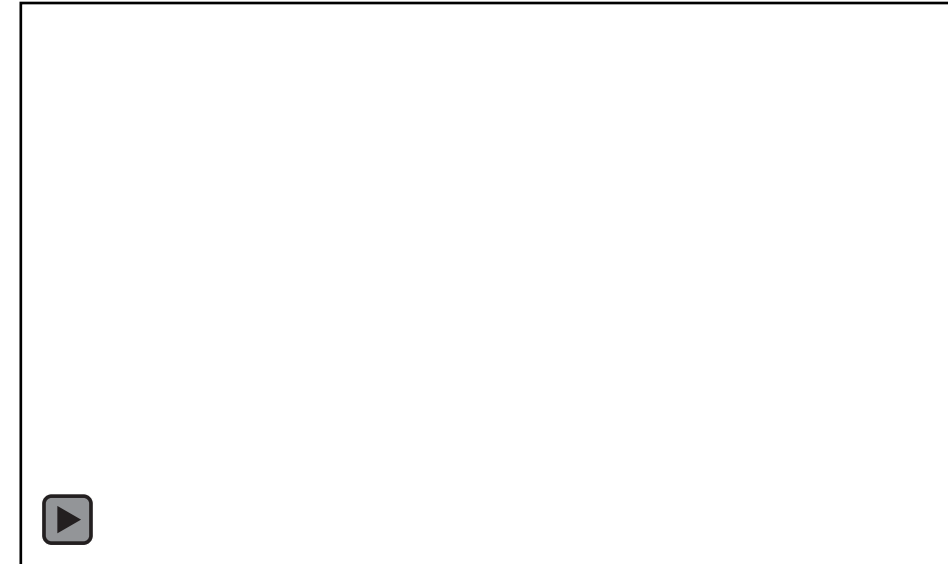
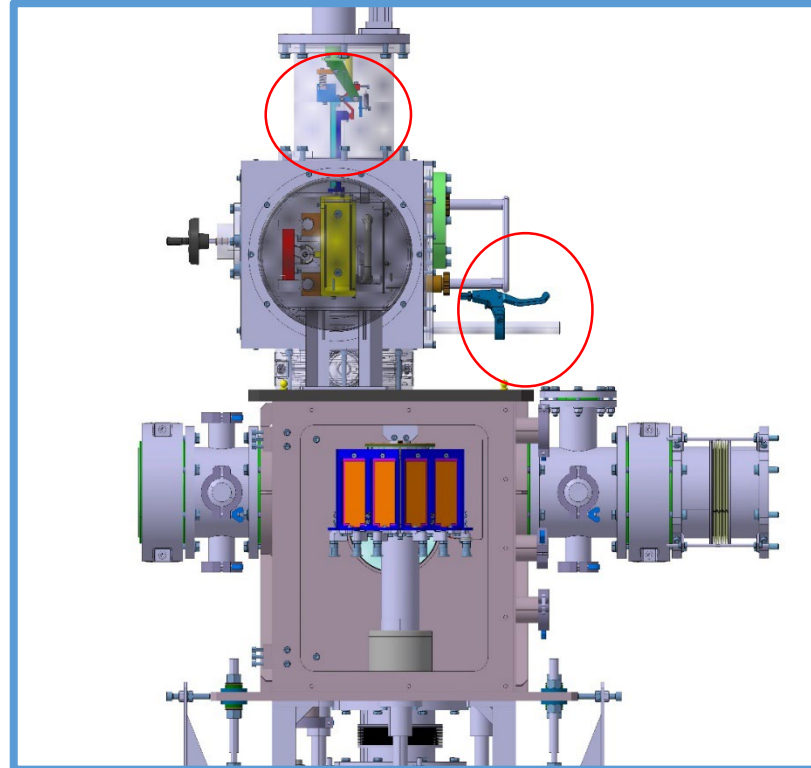
- Grap the targets (motor)



-press brake lever (tilt)

-move up the targets above box (motor)  
-release handle

-move lead box (handle)



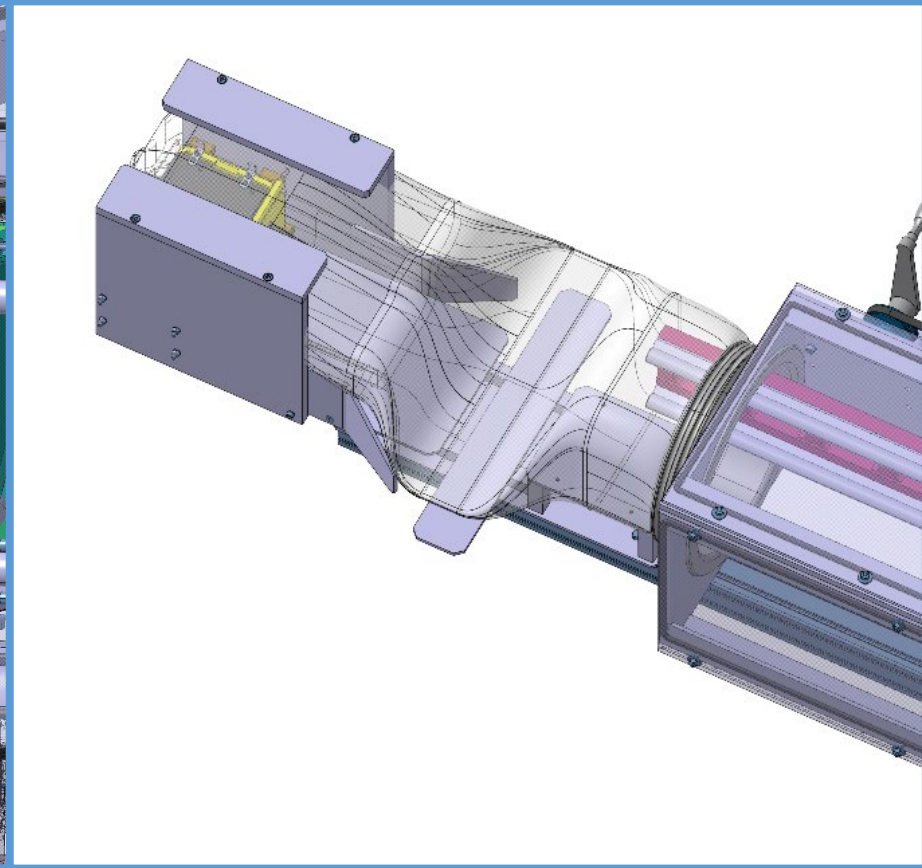
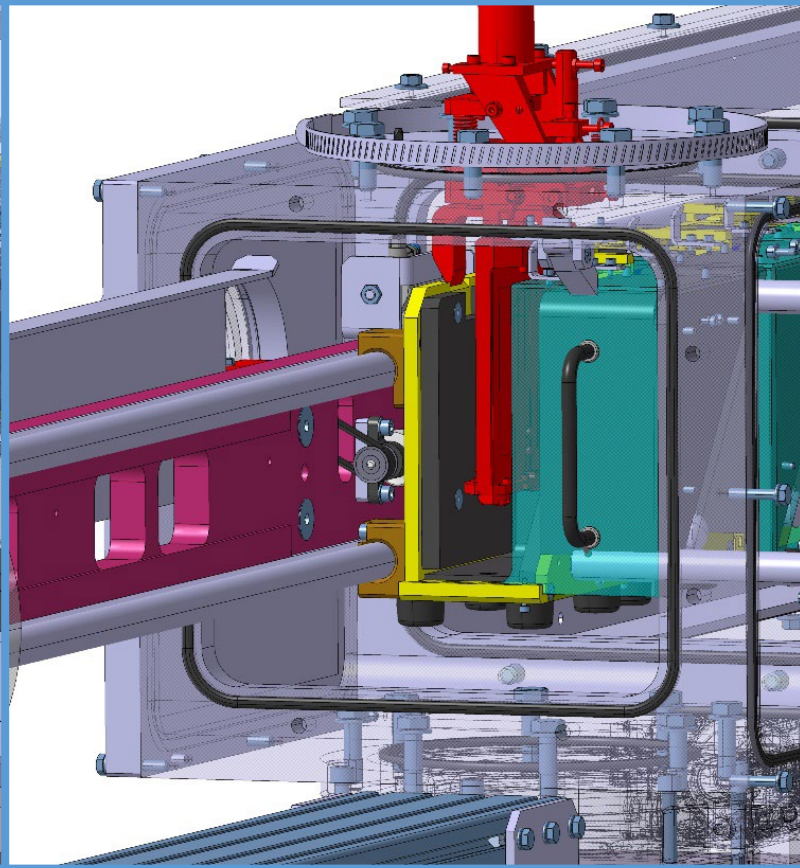
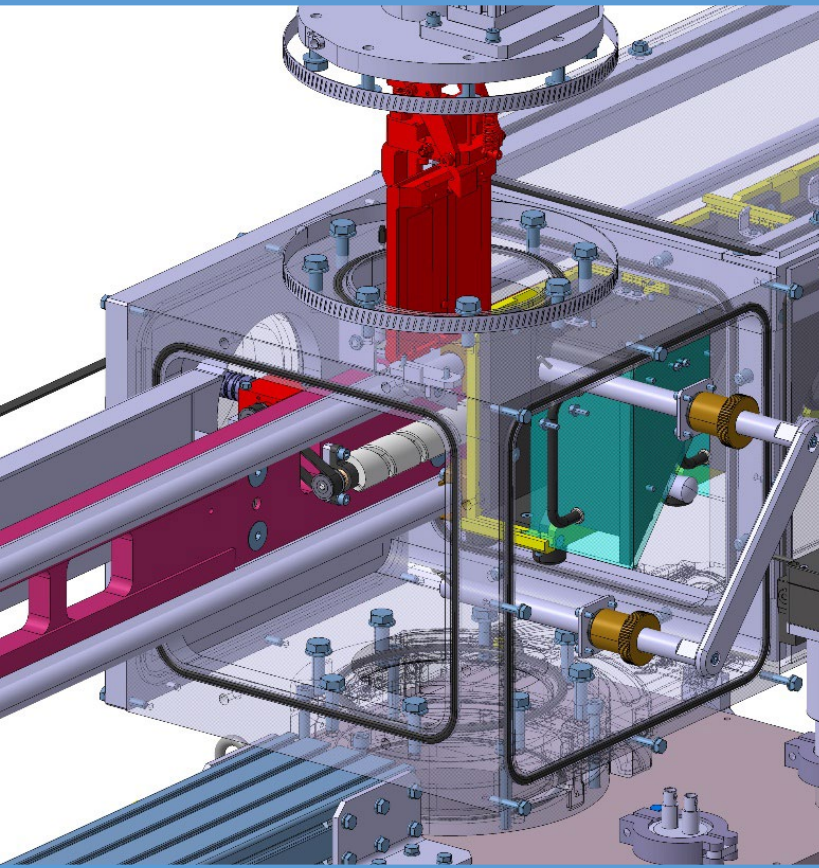


## Extraction

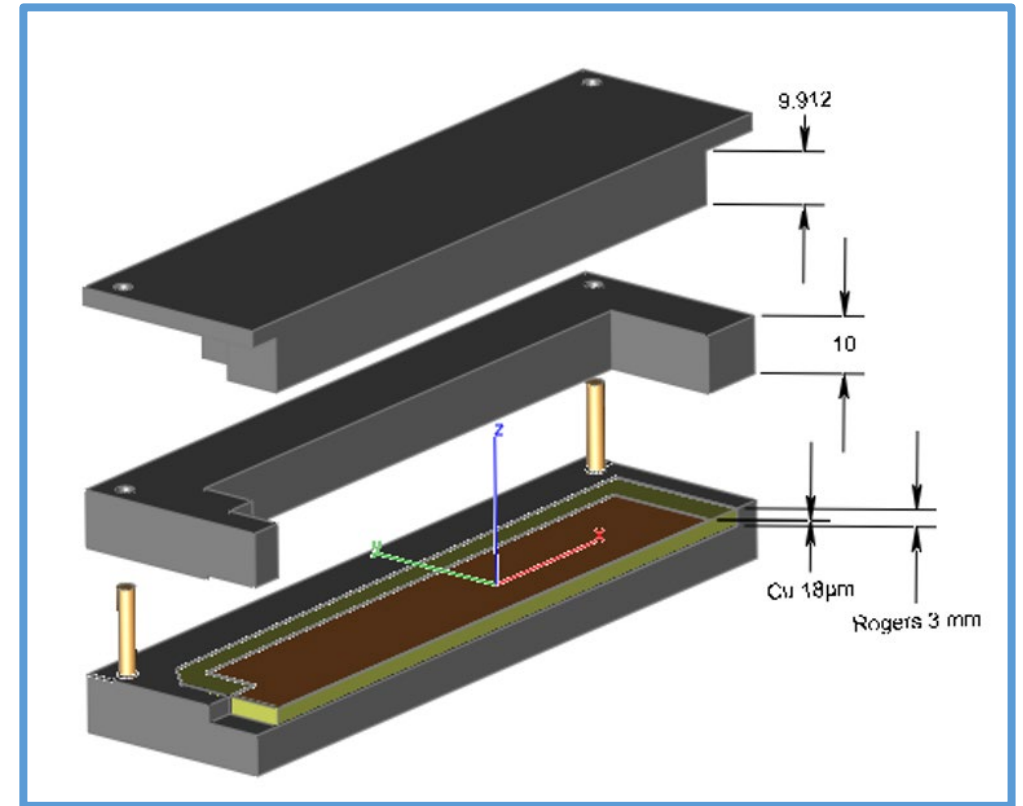
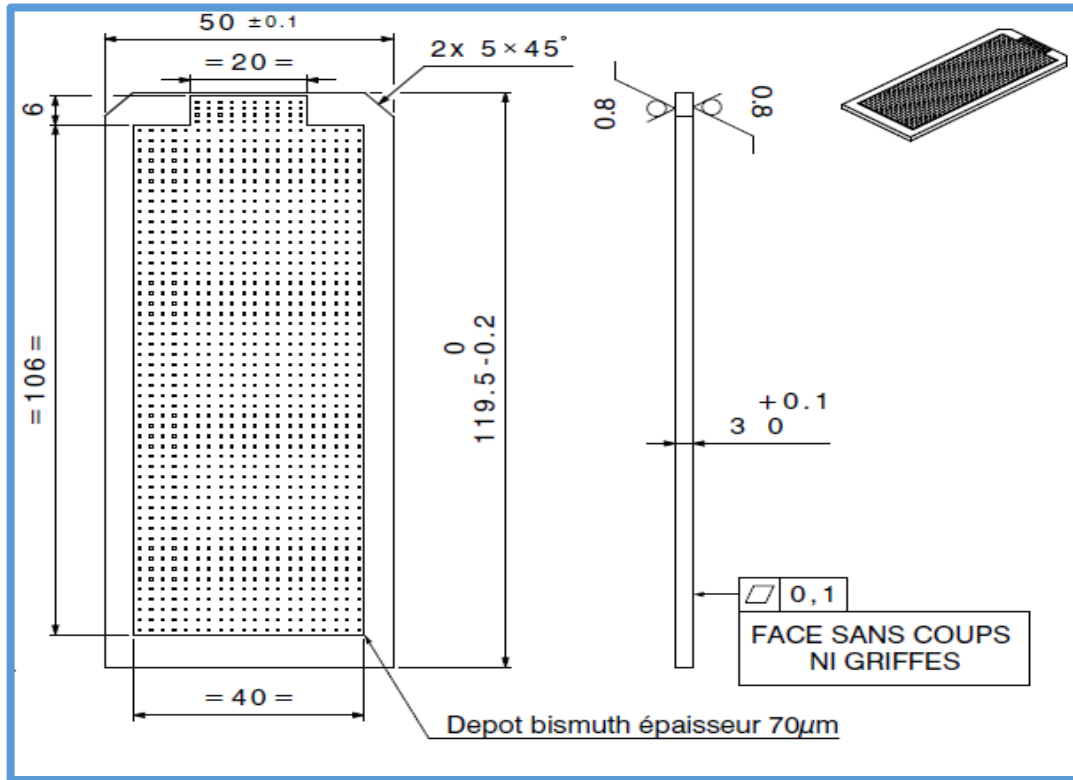
- move down the targets
- automatic release
- actuator pneumatic



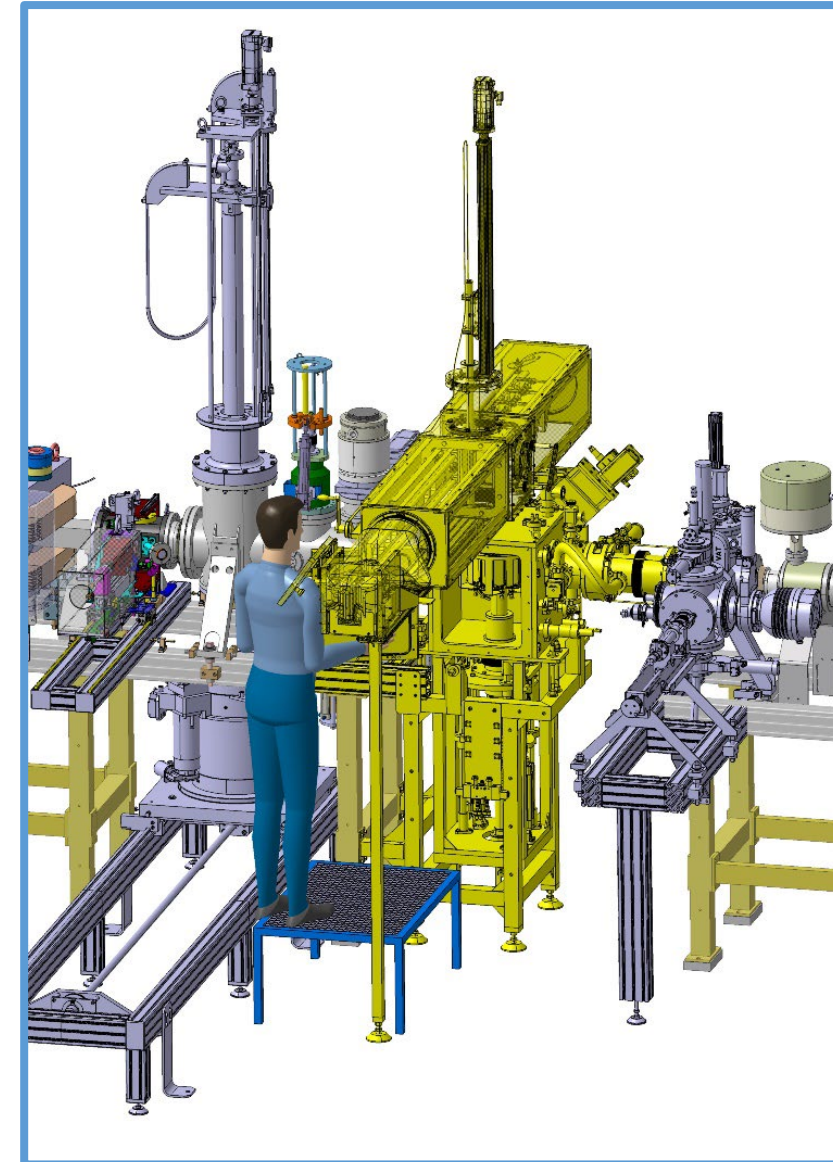
Time of extraction → 3' tested



- 12 targets/ shooting
- Evaporation (slow)
  - Melting + compact



- First production at the end 2023
- Lot of tips
- Several function remain to be tested



Defrance Gilles  
 Ferey Sébastien  
 Andre Thierry  
 Lecerf Sabrina  
 Jacquot Bertrand  
 Rossard Laurent  
 Morisset Martial  
 Gueret Jerome  
 Barthelejean Cecile  
 Collard Matthieu  
 Levallois Romuald  
 Lefevre Alexis  
 Legruel François  
 Desmezières Vincent  
 Perocheau Franck  
 Stodel Christelle  
 Foy Jean-Claude  
 Hocini Clement  
 Simon-Bauduin Nicolas  
 Patrice Gangnant  
 Clément Michel  
 Yoann Tréhudic