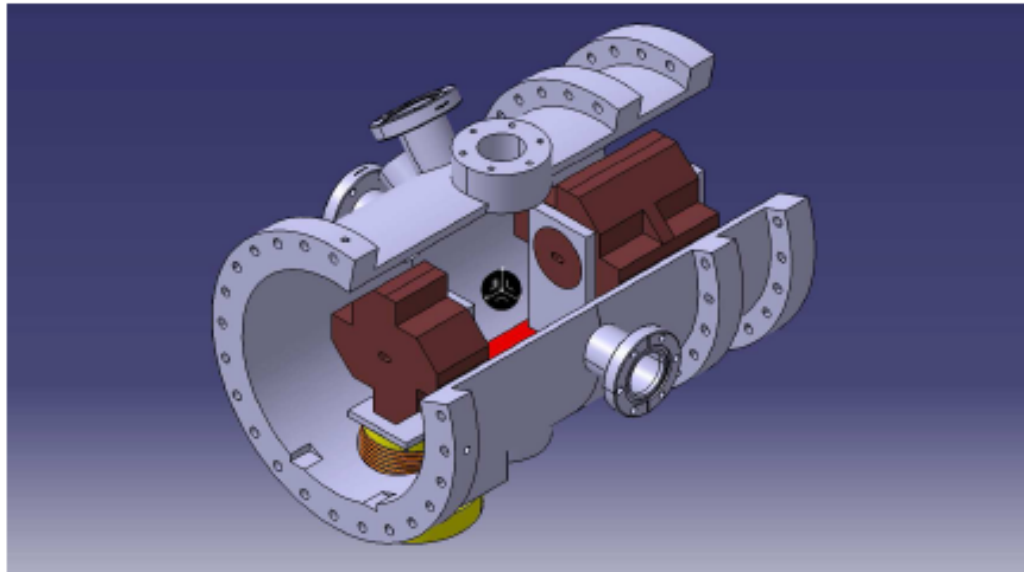


Preparing new IP beam pipe for goal-2

P. Bambade, F. Bogard, S. Wallon

Laboratoire de l'Accélérateur Linéaire
Université Paris 11, Orsay, France

ATF2 IP Chamber Lastest Designs



LAL-IN2P3-CNRS and Paris-Sud Orsay University
Frédéric BOGARD, Sandry WALLON – 12 janv. 2011

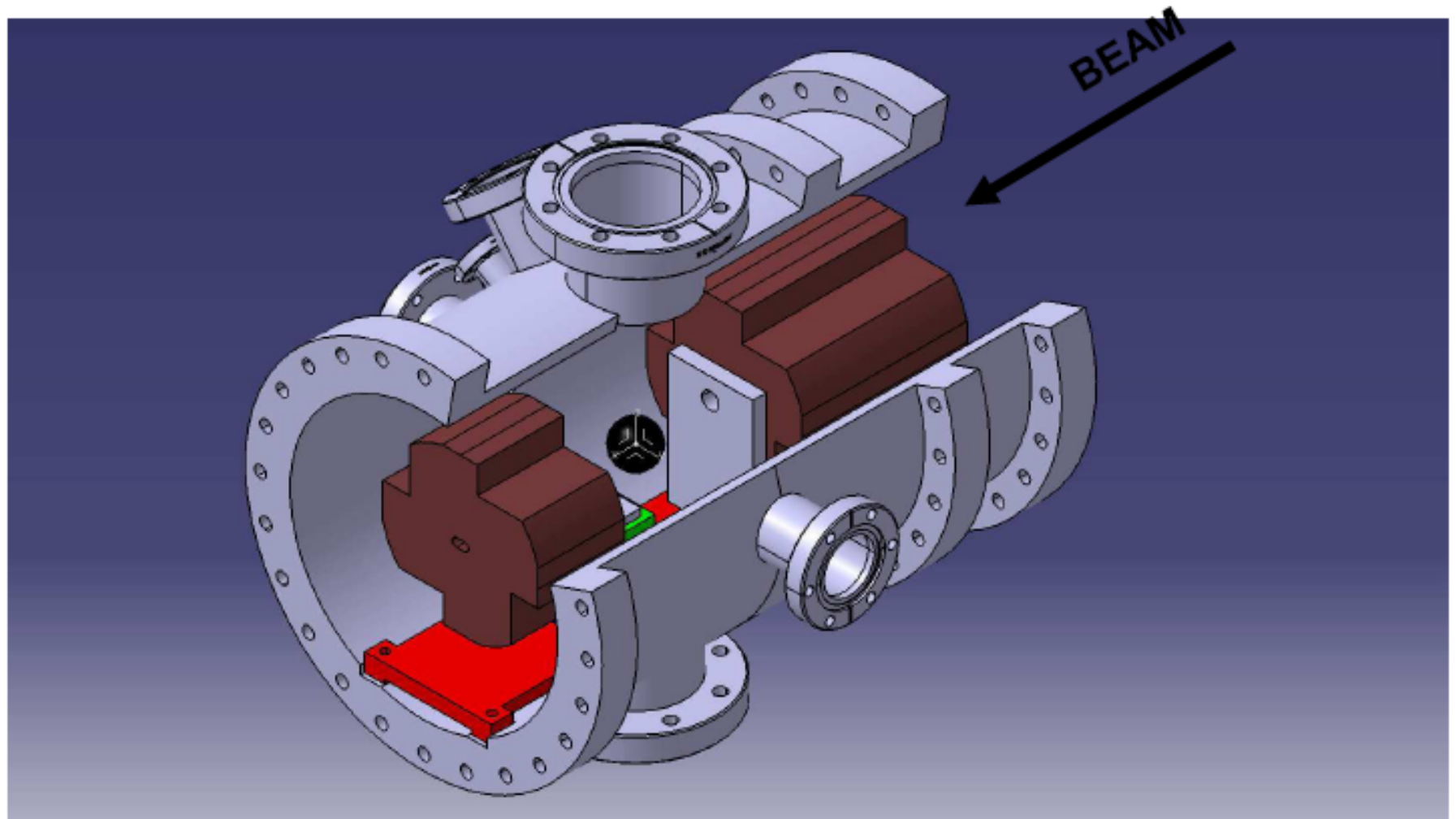
2 new designs based on new linear stages for BPM movements

Actuators main data :

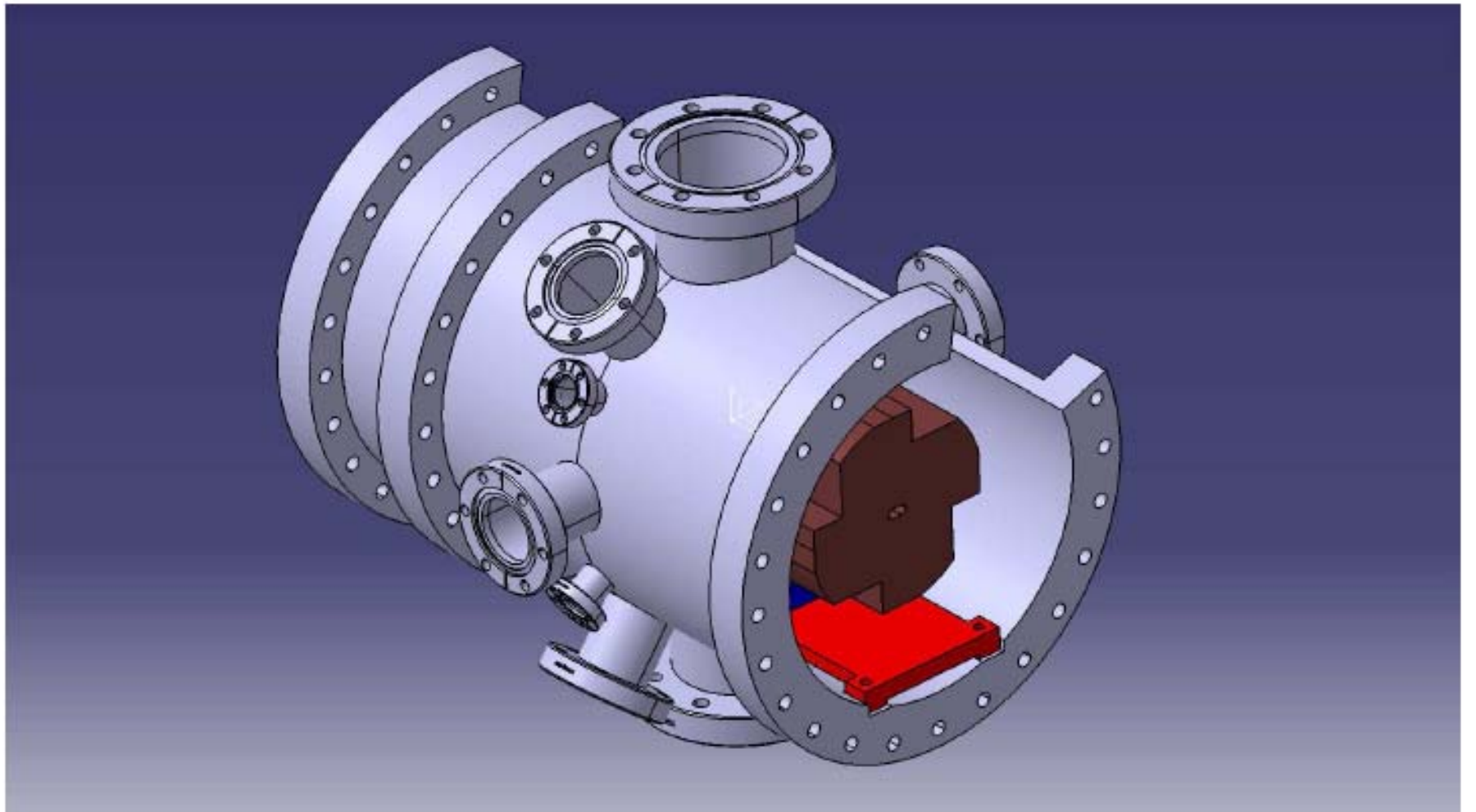
- Resolution : 8 nm (close loop) / 0.8 nm (open loop)
- Repeatability : 10 nm (vertical motion) & 47 nm (lateral motion)
- Stroke : 320 μm (close loop) / 400 μm (open loop)
- Integrated feedback (strain gage sensor)
- Vacuum version : 10^{-5} to 10^{-10} mbar ($6 \cdot 10^{-8}$ mbar requested)

Linear stages inside chamber

(design # 6a)

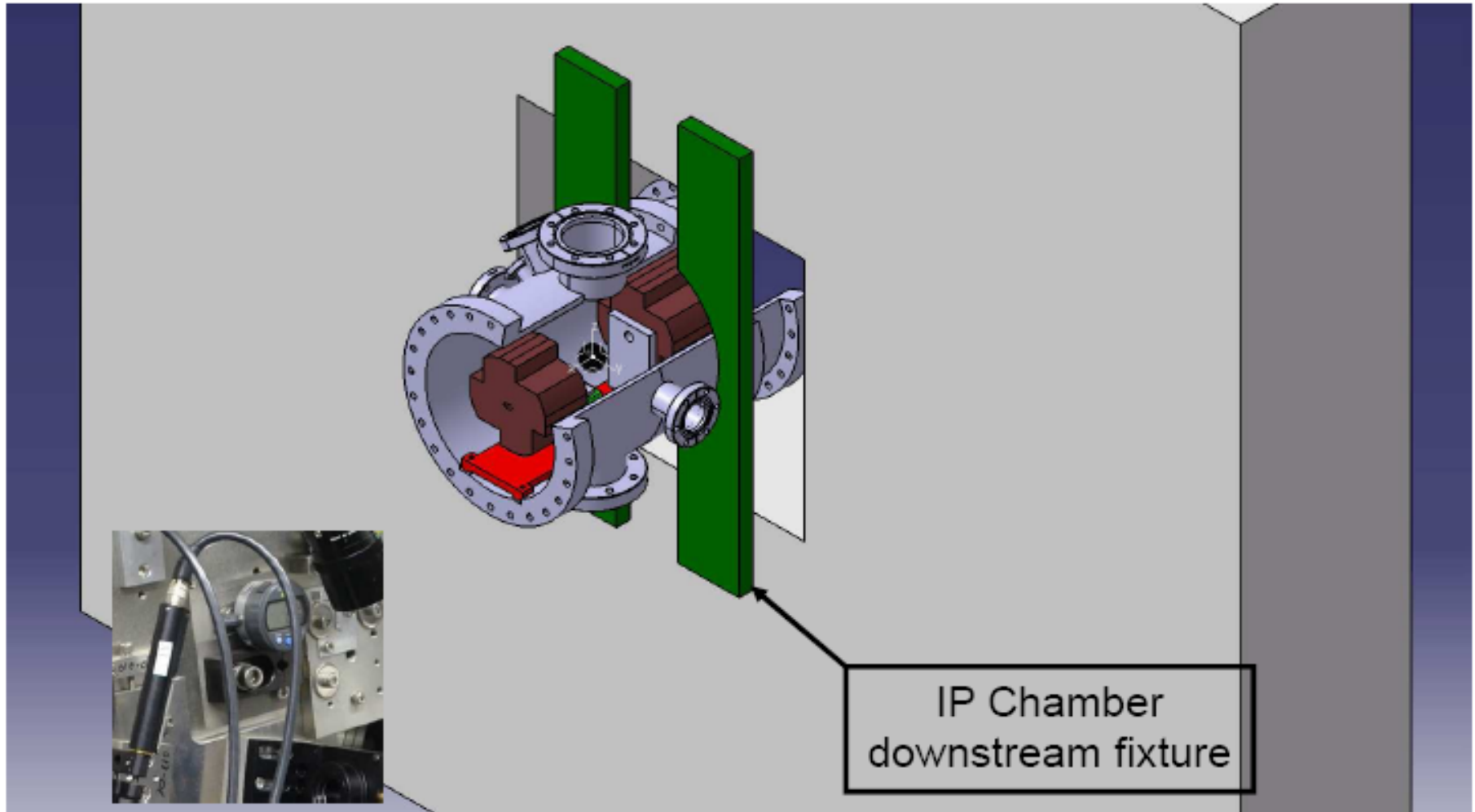


Design shown with previous BPMs

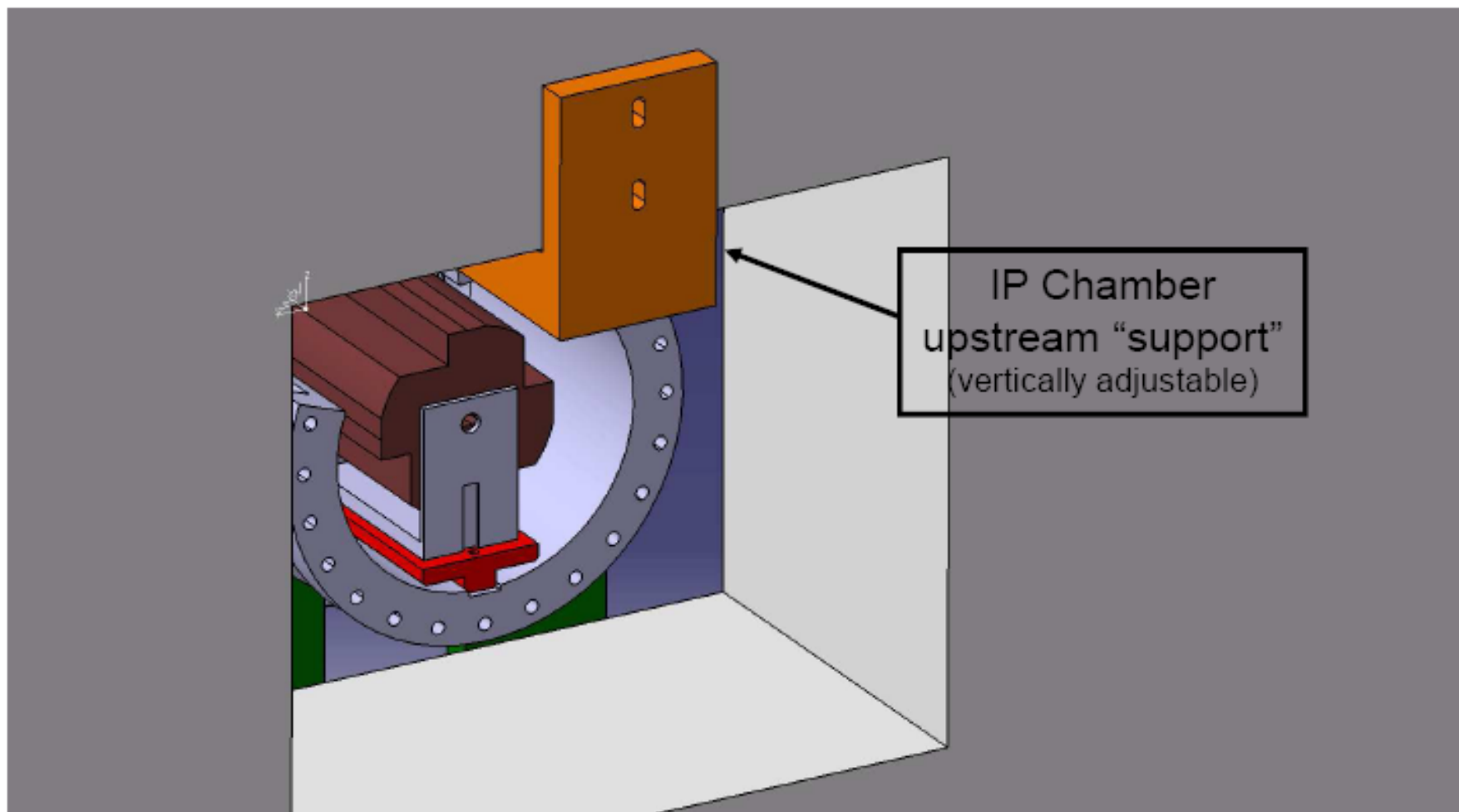


IP chamber mounted on optical table

(design # 6a)



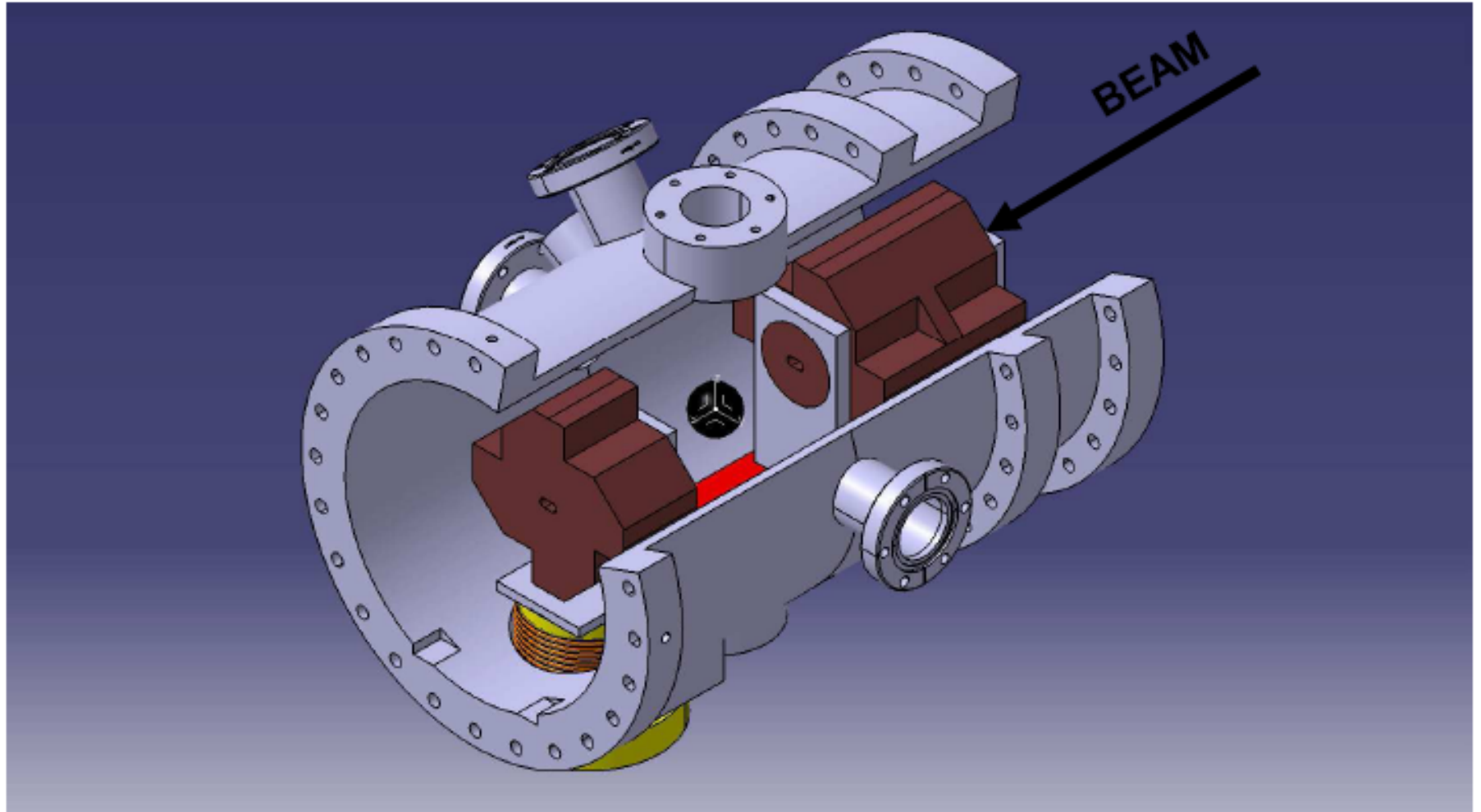
External position adjustment (of IP chamber)
enable to adjust BPM1-2 with respect of beam position (see pic above)



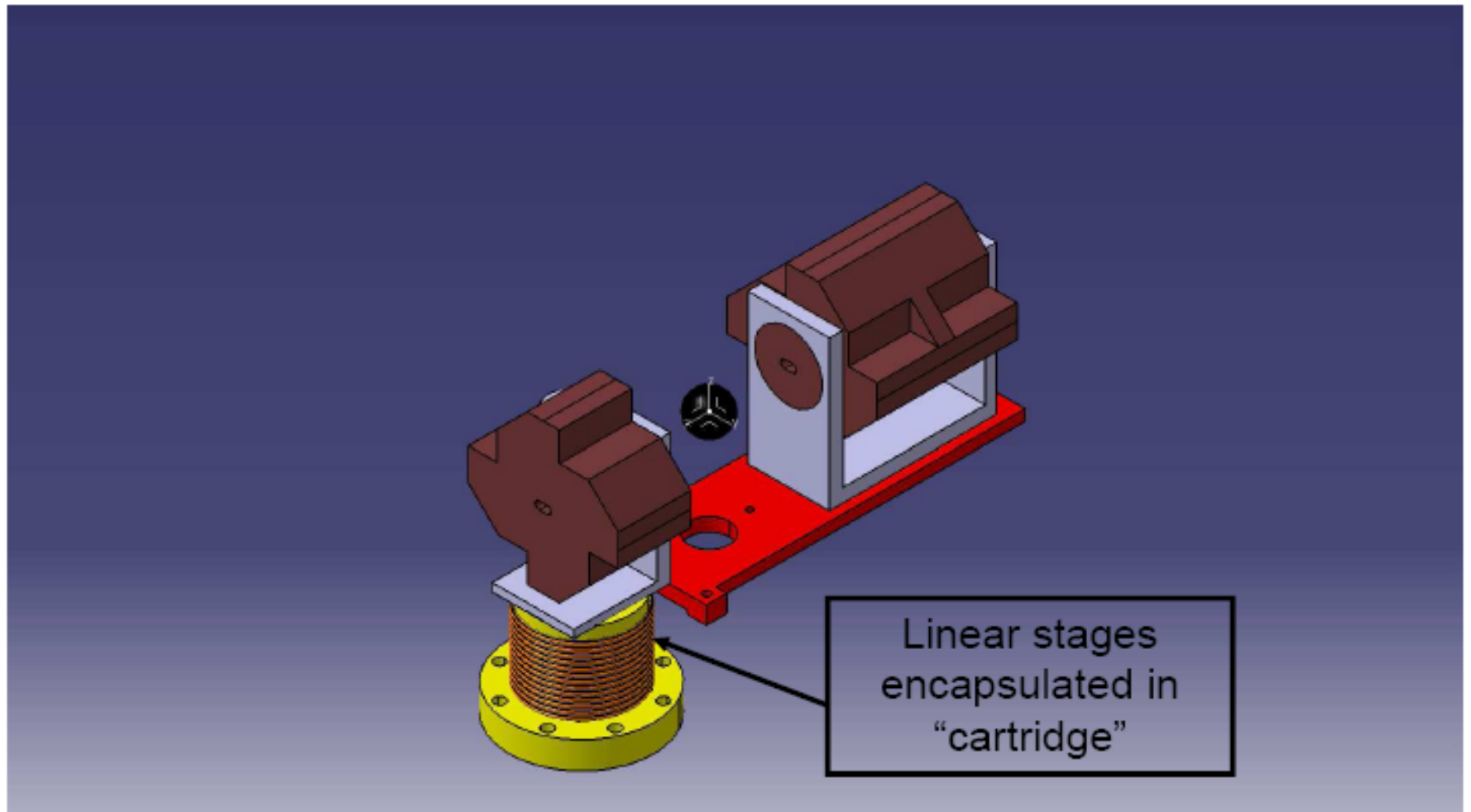
Upstream support reduces optical table deformation. (Both side of sandwich structure "take" the bending moment.)

Linear stages outside chamber

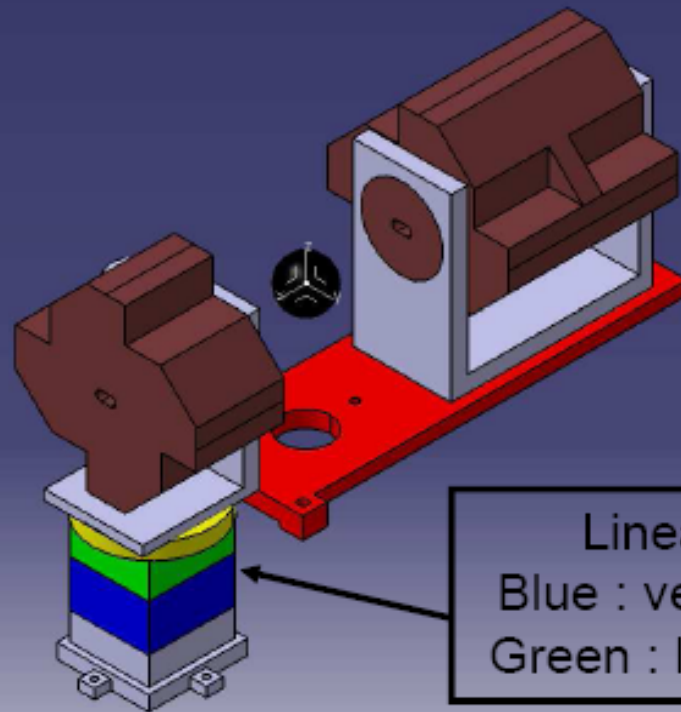
(design # 6b)



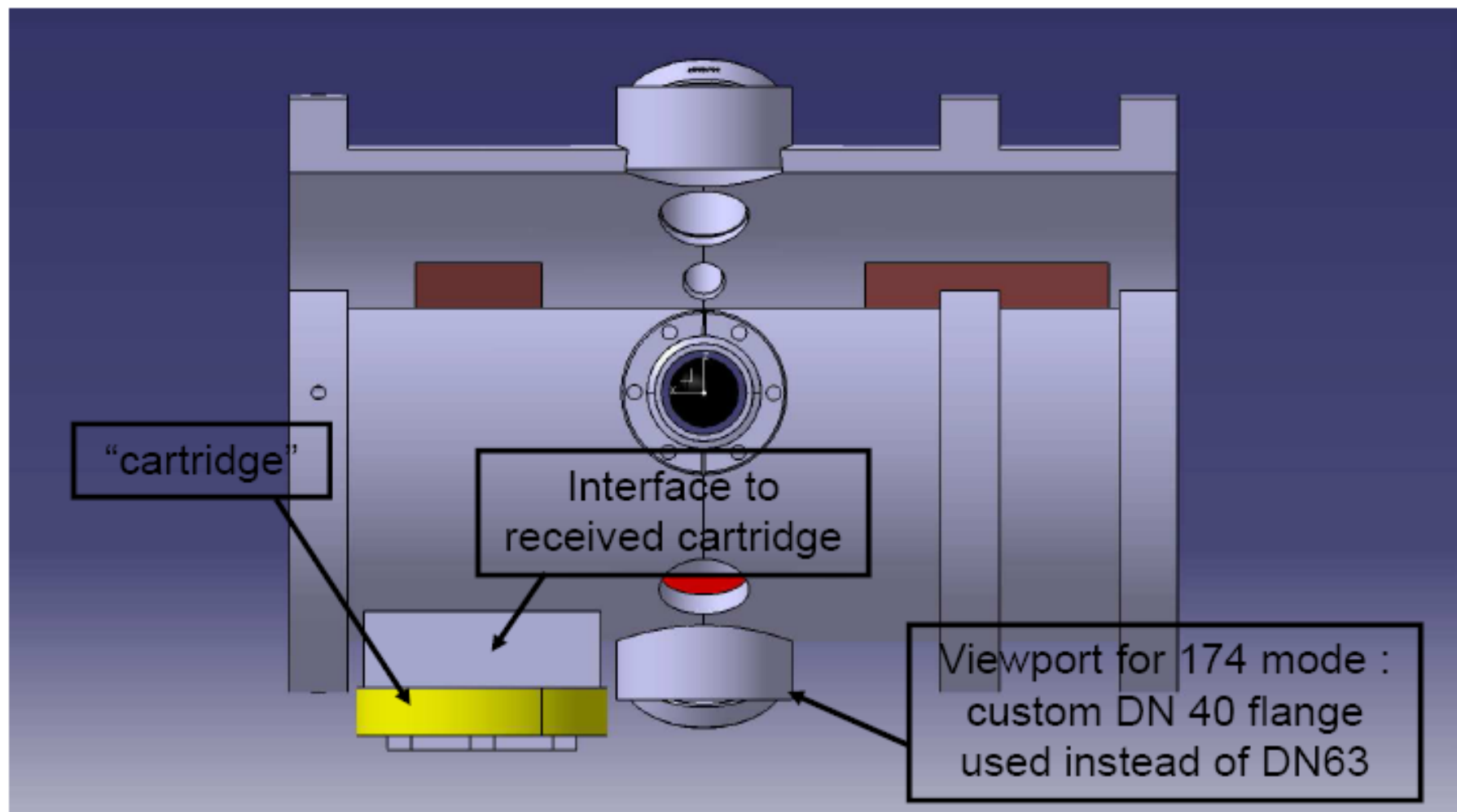
Design shown with latest BPMs



Linear stages are said to be vacuum "ok" according manufacturer.
In case of unexpected behavior during vacuum tests, they could be encapsulated.



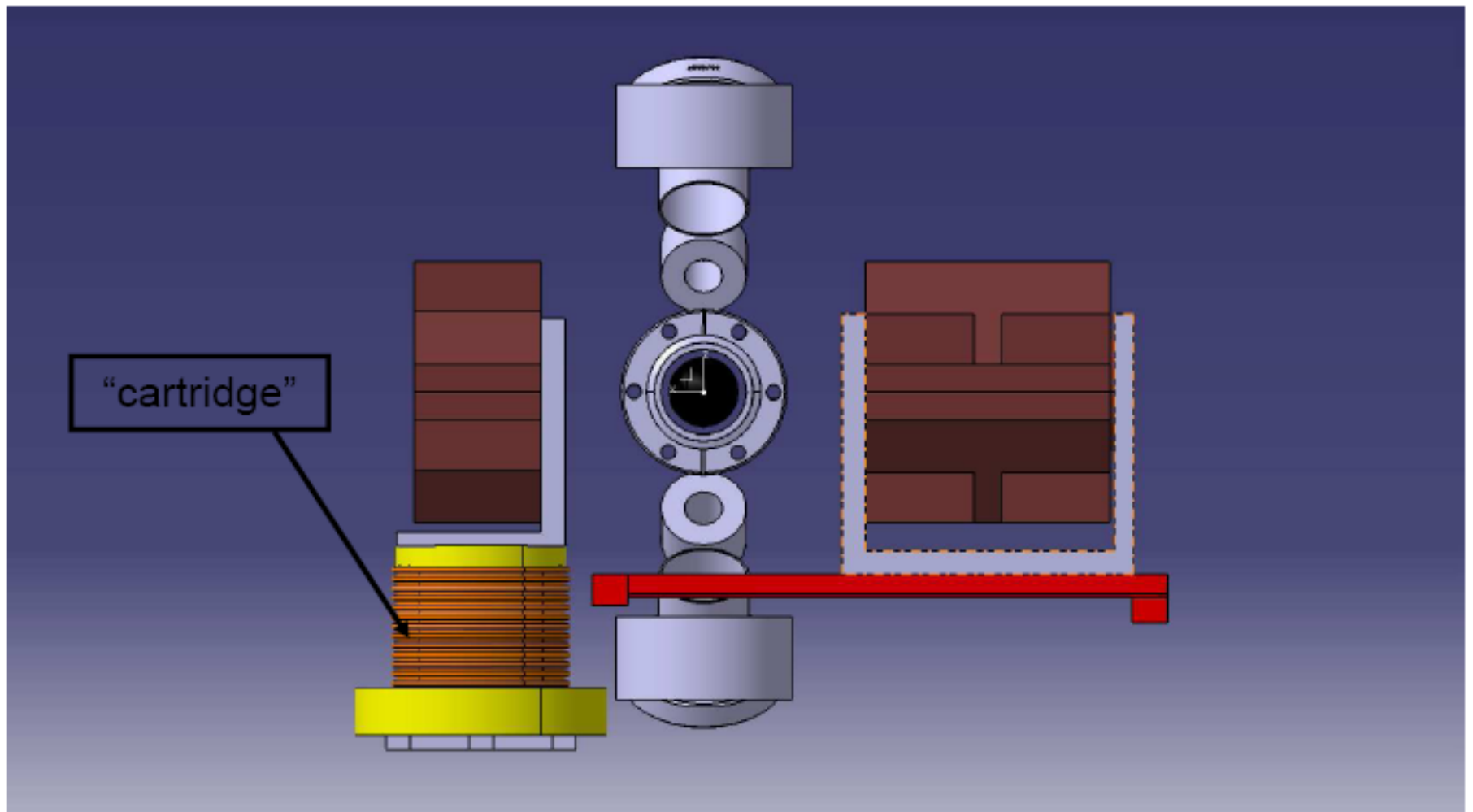
Linear stages
Blue : vertical motion
Green : lateral motion

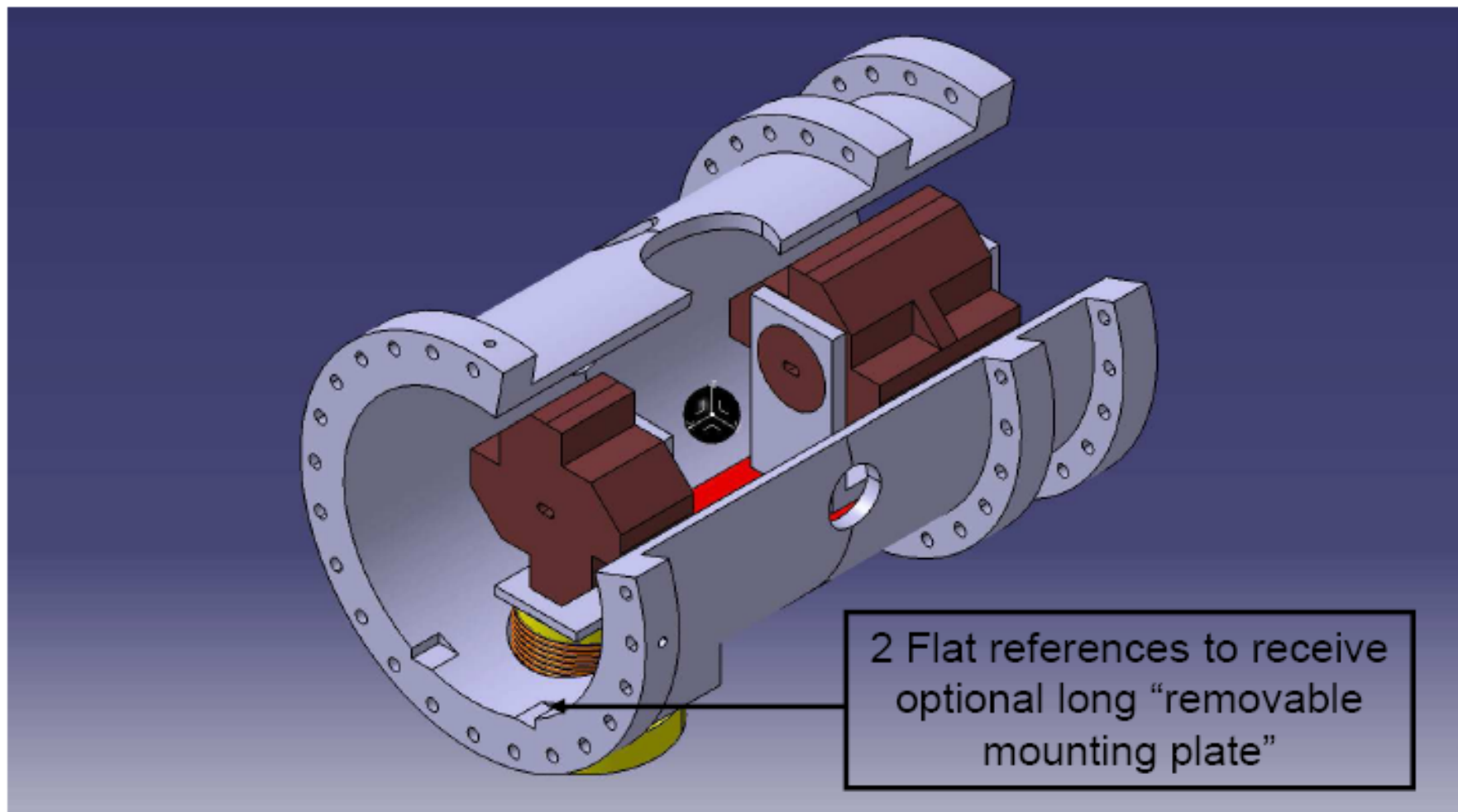


This design requests full machined aluminum chamber.

According machining feasibility considerations, some flanges are “custom” and used screws with metal inserts (*) instead of bolts.

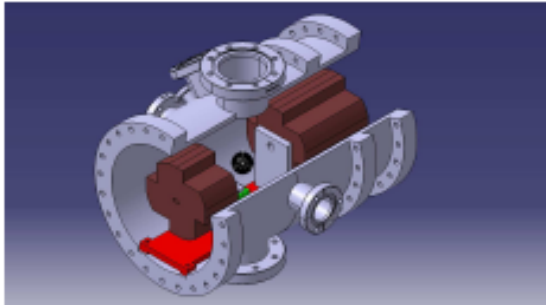
(*) used with Atlas end cap cryostat at CERN





(Linear stages could be mounted inside IP chamber thanks to a long mounting plate (see red plate p5)

Pros and cons



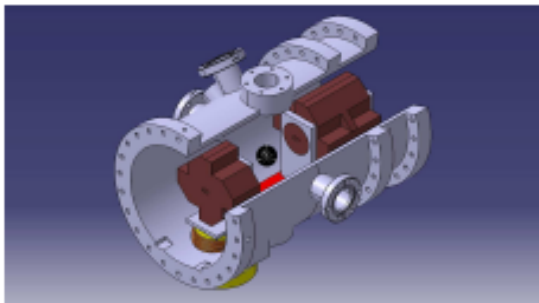
Linear stages inside chamber

CONS :

- Vacuum compatibility questionable (vacuum qualification will be done at LAL)
- BPM bending moment to take

PROS :

- Simple design (and manufacture too)
- BPM mounted on removable plate at work shop
- 3D control at workshop (BPM alignment checking)
- Linear stages just below BPM's center weight



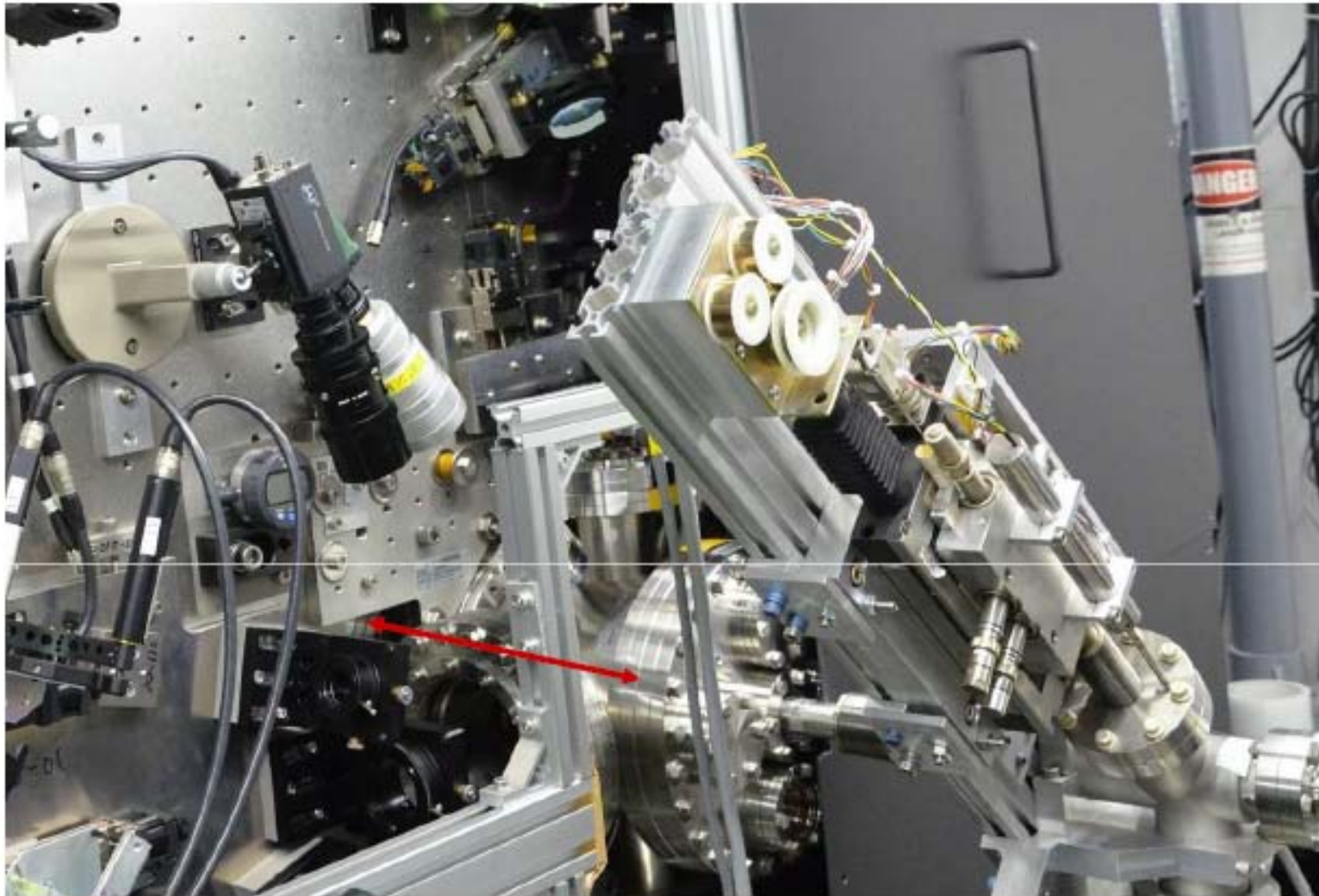
Linear stages outside chamber

CONS :

- Design more complicated (and manufacture too)
- Ip chamber slightly longer (downstream side)

PROS :

- Vacuum compatibility unquestionable
- Linear stages just below BPM's center weight



- Distance from optical table to downstream flange :
 - 170 mm (chamber installed at KEK)
 - 250 mm (linear stages inside)
 - 275 mm (linear stages outside)

Tentative planning at LAL

- Validate design (internal review)

January

- Order 2 linear stages + controls (vacuum version, 6 weeks delivery delay)

- Drawings for fabrication (versions 6a and 6b + order materials)

- Vacuum check of linear stage, decision between 6a / 6b

February
- March

- 3 IP-BPMs from KNU shipped to LAL after beam test at KEK

- Fabrication at LAL (iterated procedure combined with measurements for precision)

April - May

- Pre-installation with 3 IP-BPMs, vacuum test, 3D measurement

- Shipment to KEK for installation in diagnostic area

June...

A little tight for beam test at KEK in June

→ will check time for fabrication in workshop at LAL