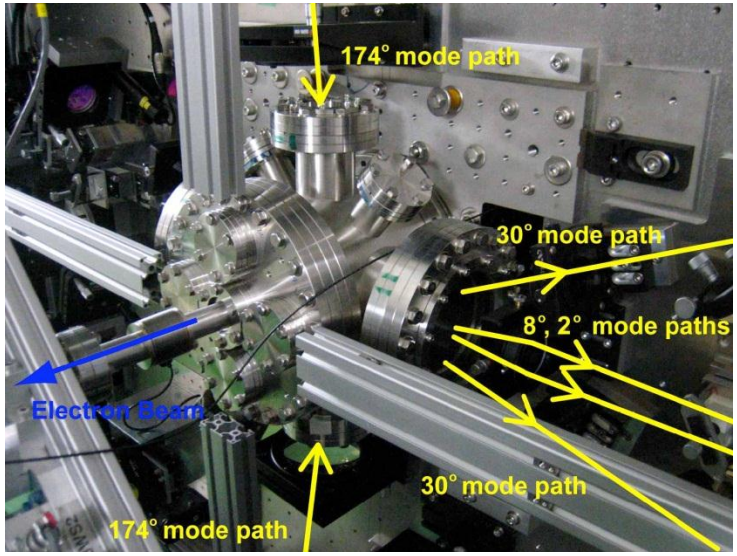
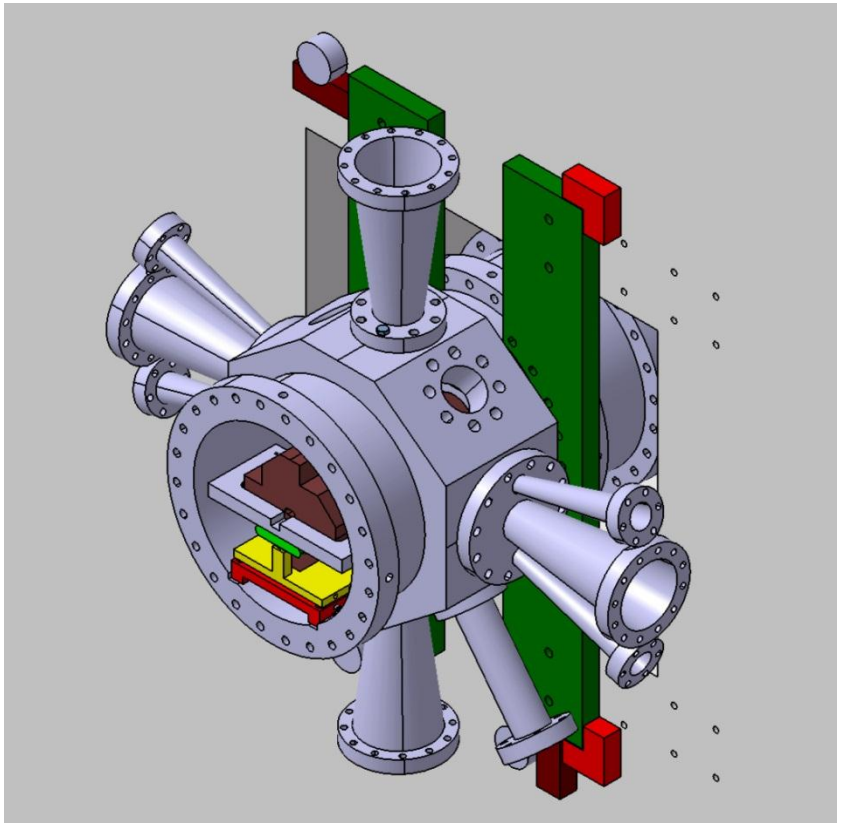
ATF2 - IP Chamber

Design and manufacturing of Chamber with high precision piezo actuators for high resolution BPMs

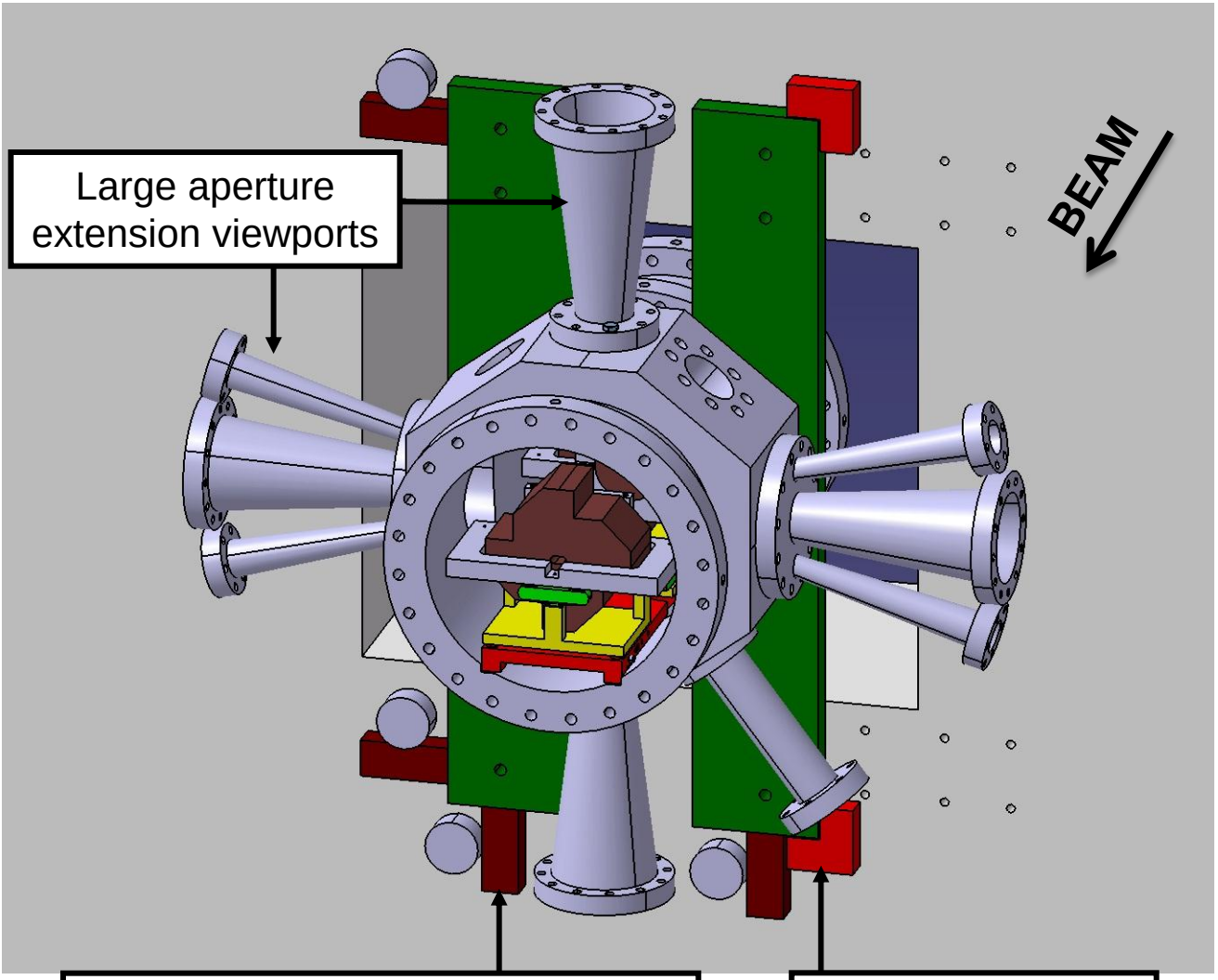
Status / progress report – 26 June 2012





LAL - IN2P3 - CNRS - Philip BAMBADE, Frédéric BOGARD, Sandry WALLON

Design status (1)

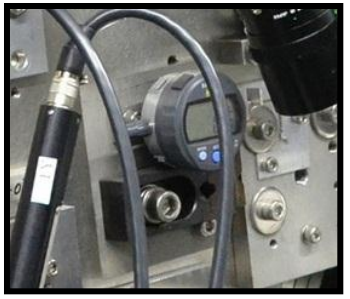


All parts have a definitive design except :

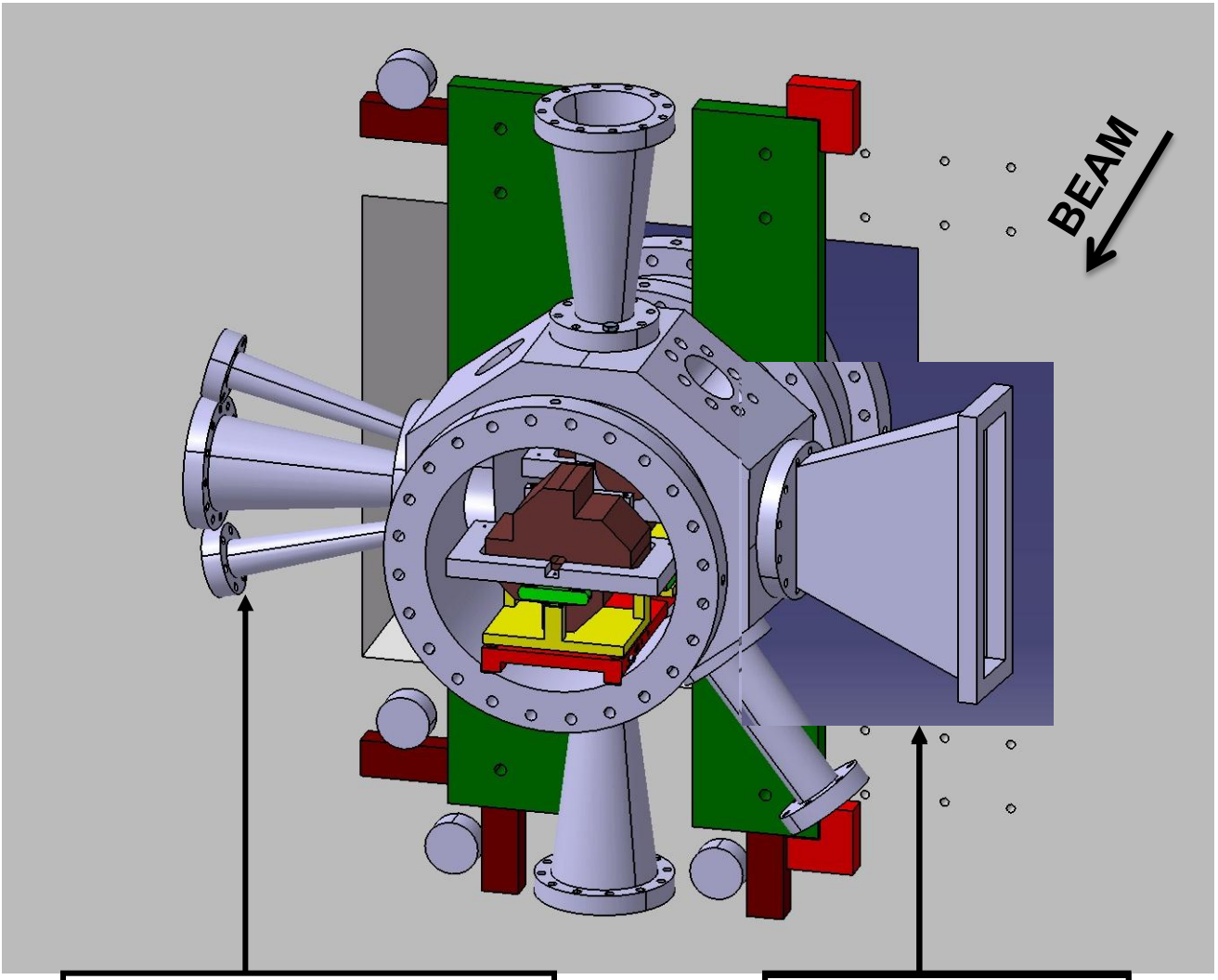
- 2-8-30 degree extension viewports
- Wire scanner extension pipe
- Parts fixing chamber to BSM table (front & back
- Shims holders

Special case :

- External (manual) movers reused (see below mover used with current chamber)



Design status (2)



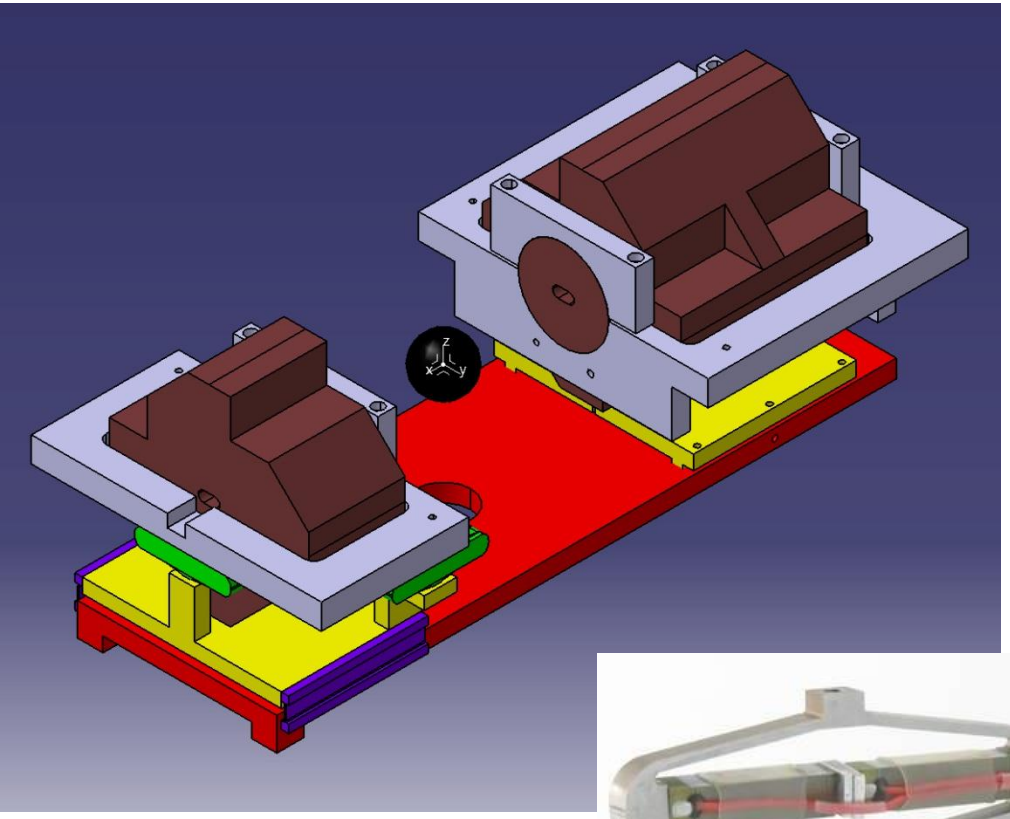
2 Alternative designs for 2-8-30 degree extension viewport :

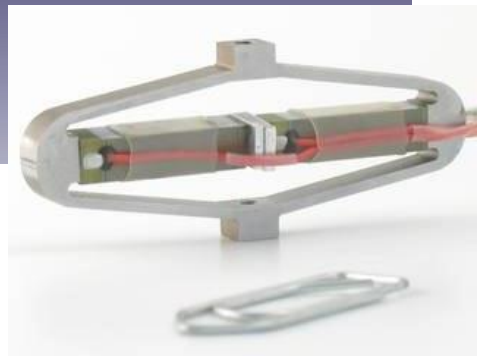
A. 3 tubes assy type
→ Aluminum machining
→ Electron beam welding (for high precision)

B. Shell box type
→ Slightly wider aperture
→ SS sheet working
→ Usual welding process
→ But some issues to fix 3 windows and guaranty a zero leakage

C. Shell box type with single windows
→ Simple & reliable
→ The largest aperture
→ Not normal to 15° laser

Piezo actuators status (1)

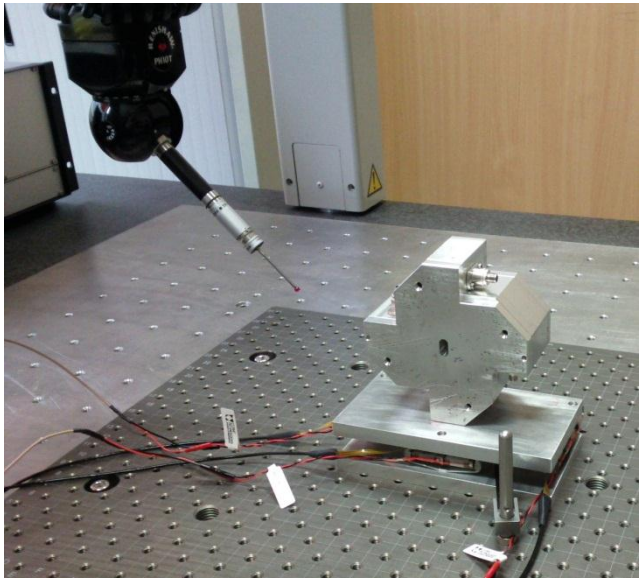




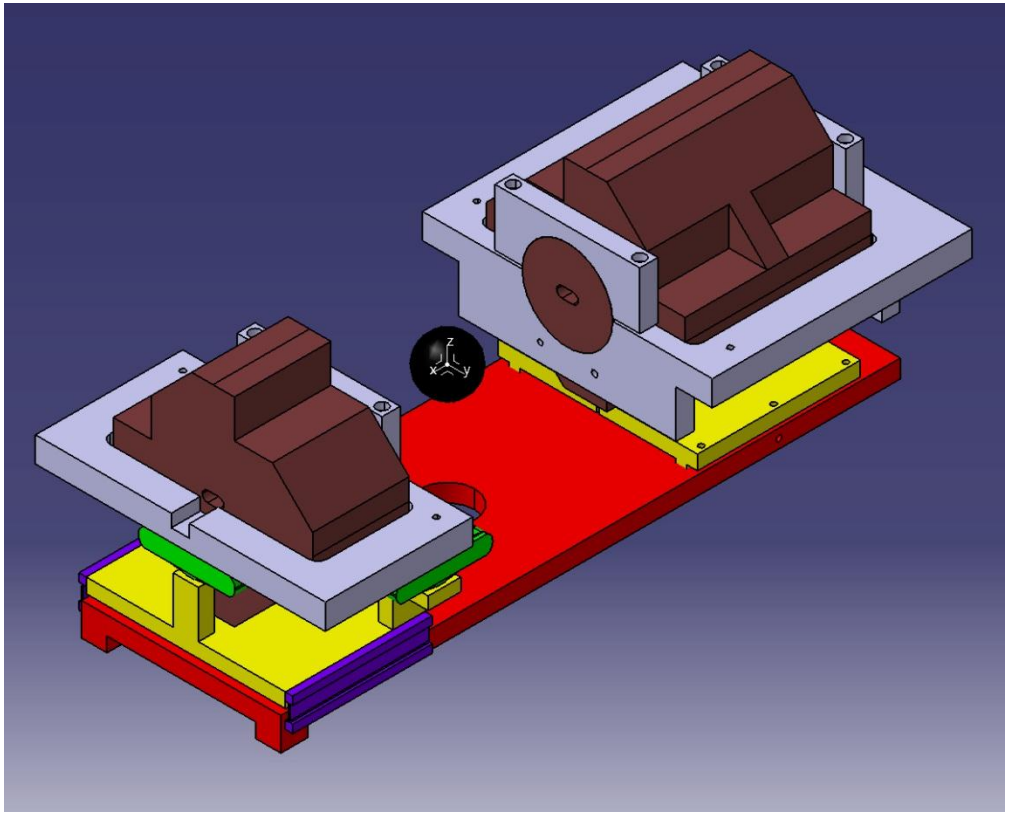
4 Cedrat actuators with controllers received at LAL (driving one BPM)

Some checks already or to be performed :

- Dimensional / displacement
- Vacuum



Piezo actuators status (2)



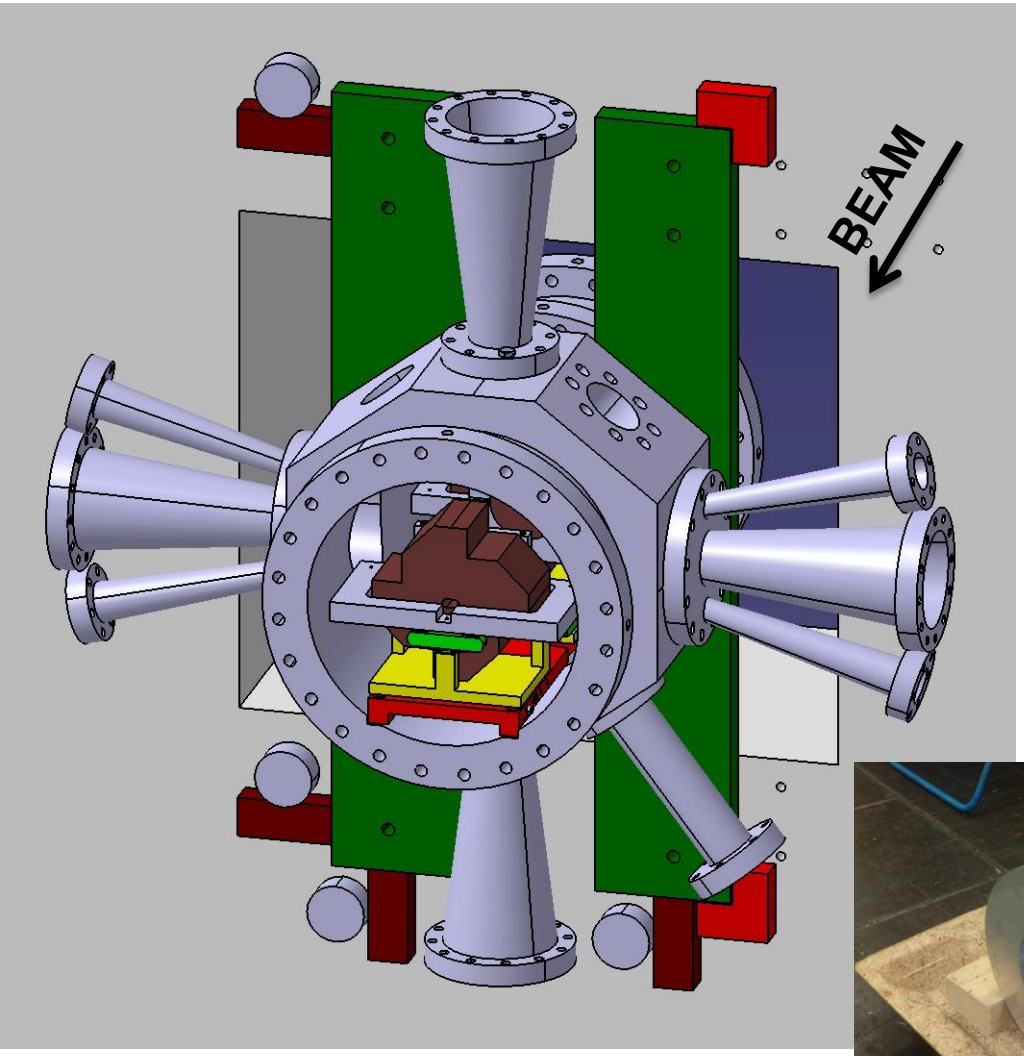
4 additional actuators have to be ordered to drive BPM1&2 block.

Idea : Get the 4 actuators without the SG and SG controller, but buy 3 external capacitive sensors with controllers

→ Higher precision measurement (< 1 nm) & true BPM displacement monitoring

This improvement can also be added later to BPM3

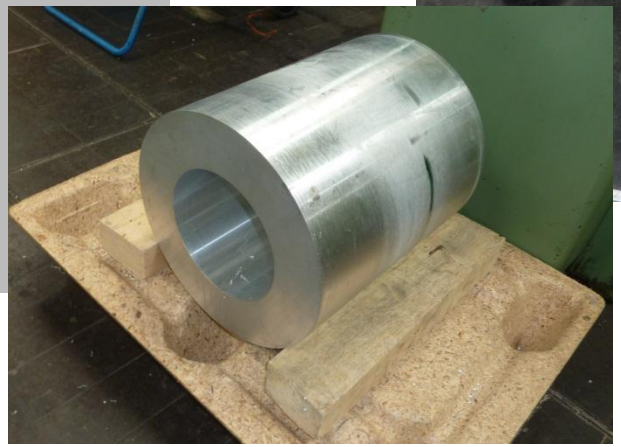
Manufacturing status



DONE :
- Base plate
- BPM1&2 intermediate plate
- BMP3 intermediate plate
- BPM3 mounting bracket

IN PROGRESS :Chamber

TO BE DISCUSSED with LAPP / others :
Viewports & fixture parts



Fabrication, Tests, Installation

Piezo actuators received for BPM3

- Tests in progress (translation, tilt) – (Bruno Leluan, LAL)
- Vacuum test (qualification) in May / June – (Bruno Mercier, LAL)

Manufacture at LAPP Annecy – (Christine Gasq & Laurent Journet, LAPP)

- May to August 2012 (machining was started)
- For some parts, supplier has to be found

Geometric and dimensional test (parts machined) : Sept. / Oct. 2012, takes ~ 6 day – (Bruno Leluan, LAL)

IP chamber vessel vacuum test : Sept. / Oct. 2012, takes 2-3 weeks – (Bruno Mercier, LAL)

"Base plate-piezo actuators-BPM" assembly & operation : Sept. / Oct. 2012, takes 1-2 weeks

Installation and tests at KEK : start beginning 2013

Additional questions / decisions & issues

- **Need to receive all final BPMs at LAL early September**
- **Is temperature monitoring needed / essential ? If so, who provides it ?**
- **External control of low voltage power supplies and readout and integration at KEK (**some specs being checked**)**
- **Staged approach or all at once ?**
  - all actuators
  - improved motion sensors
  - mechanical qualification with improved precision
- **Articulation with presently installed high-Q IP-BPM system:**

  ➔ new IP chamber for low-Q IP-BPMs & Goal 2 can be provided by LAL early 2013 if it's needed for installation at that time