Installation and alignment of the IP

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What should we do in the summer shutdown?

- **Install the IP chamber with IPBPMs for Goal-2**
  - Installation of IP chamber with three IPBPMs will be completed in a week.
  - Re-design the IP target system (Screen and Carbon wire scanner) are ongoing.
  - Reference cavity for IPBPM should be installed until October.

What should we do in the summer shutdown? – continued -

IPBSM issues raised during the last beam runs

- Uncertainties
  - Laser tilt, rotation and may be exact crossing angle too.
  - Alignment should be improved
- Stabilities
  - Laser jitters and drift on the position, intensity and profile
  - Image monitoring after IP by CCDs
- DAQ (will be fixed soon)
  - problematic VME due to the age and poor maintenance
  - beam Intensity monitoring for IPBSM was not sufficient.

Monitoring the IPBSM laser profile by CCD

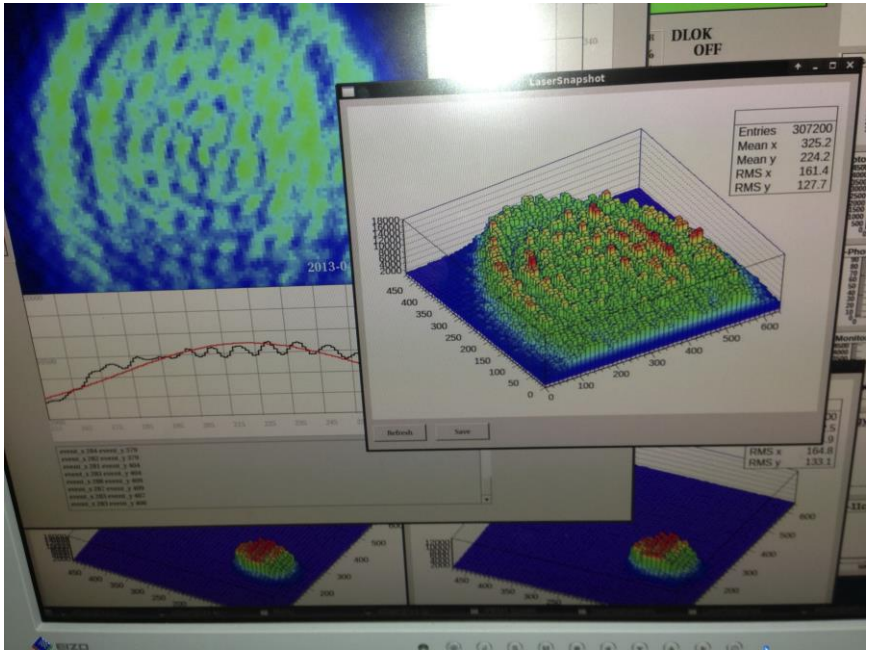


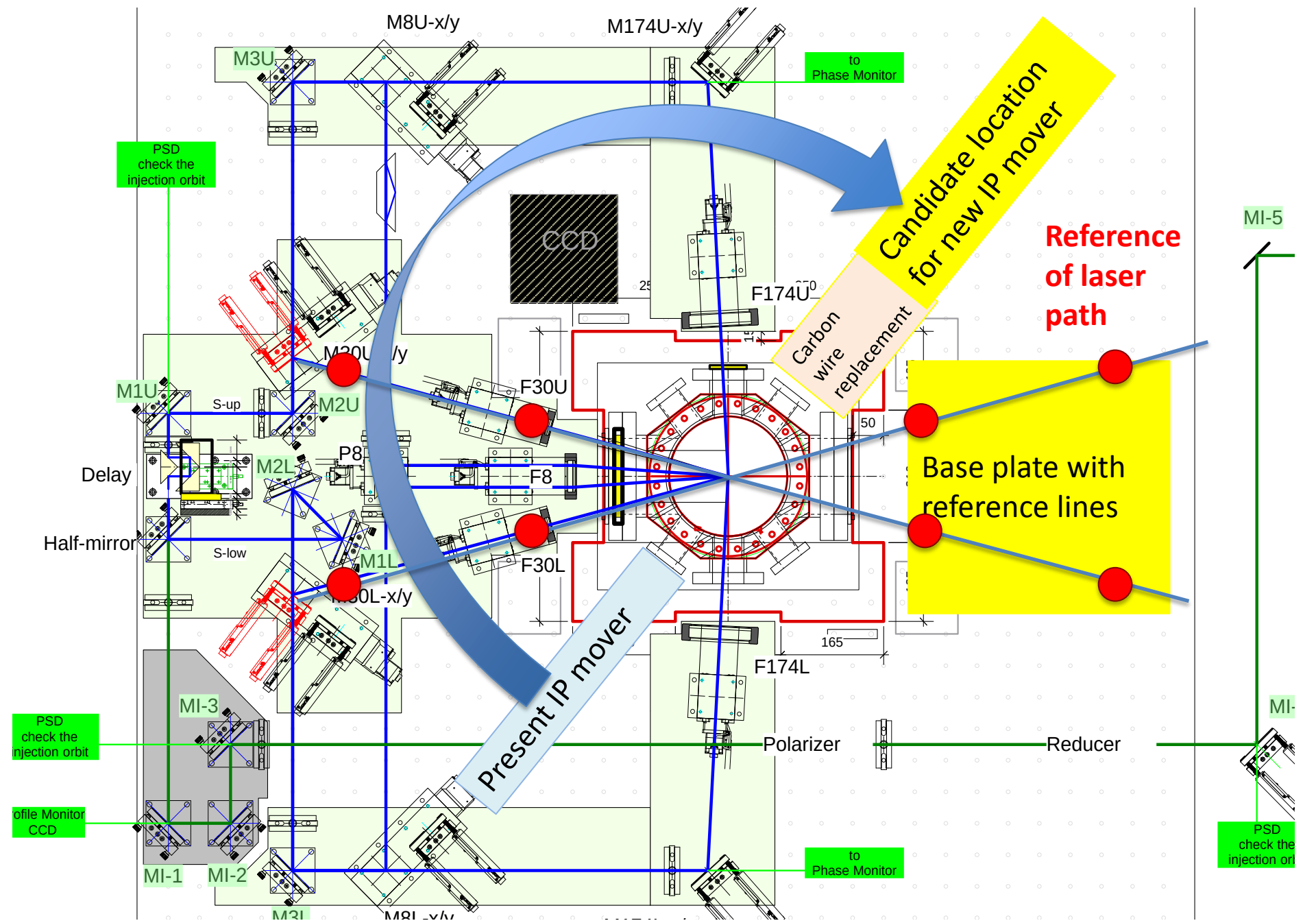
Image at the exit of laser unit

Individual monitoring of laser path

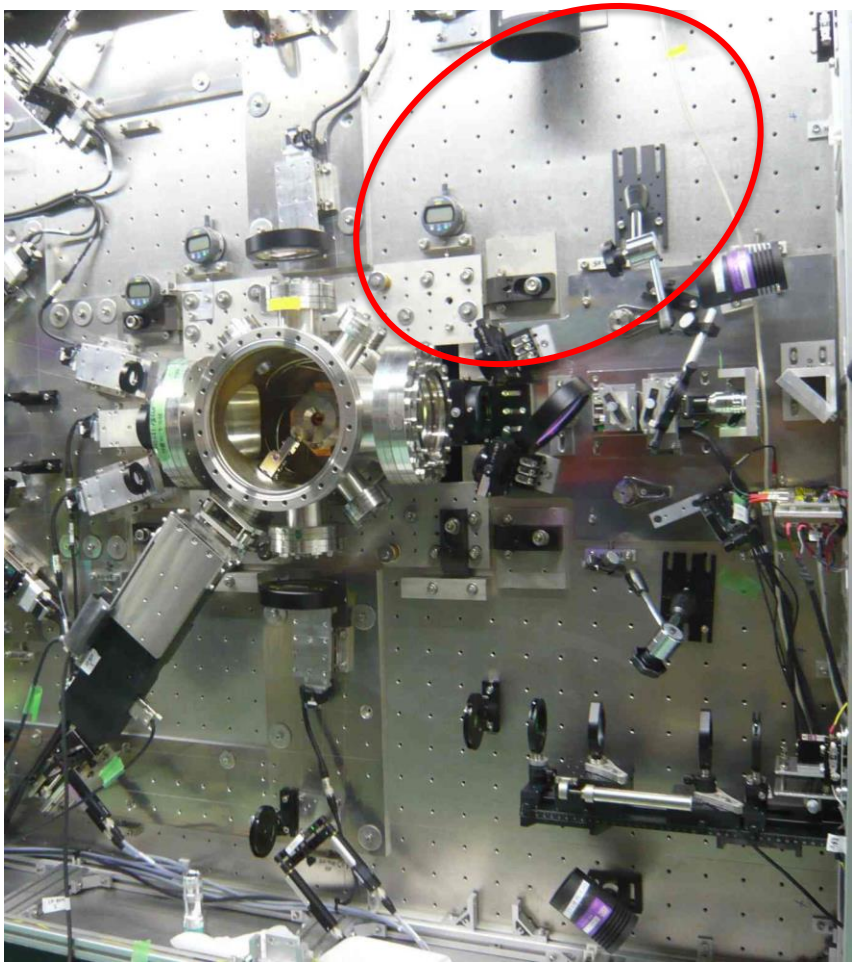
- There are two CCDs at present; at the exit of the laser unit and the vertical table.
- Add more CCDs to enable the Individual monitoring for upper and lower path but for 30 and 174.
- Sampling can be done about 1 Hz.

Interference fringe monitoring

- It is possible but may not realistic because of the difficulty of the second interference control under that of IP.
- It is really difficult to make a path after IP especially for 174 mode.

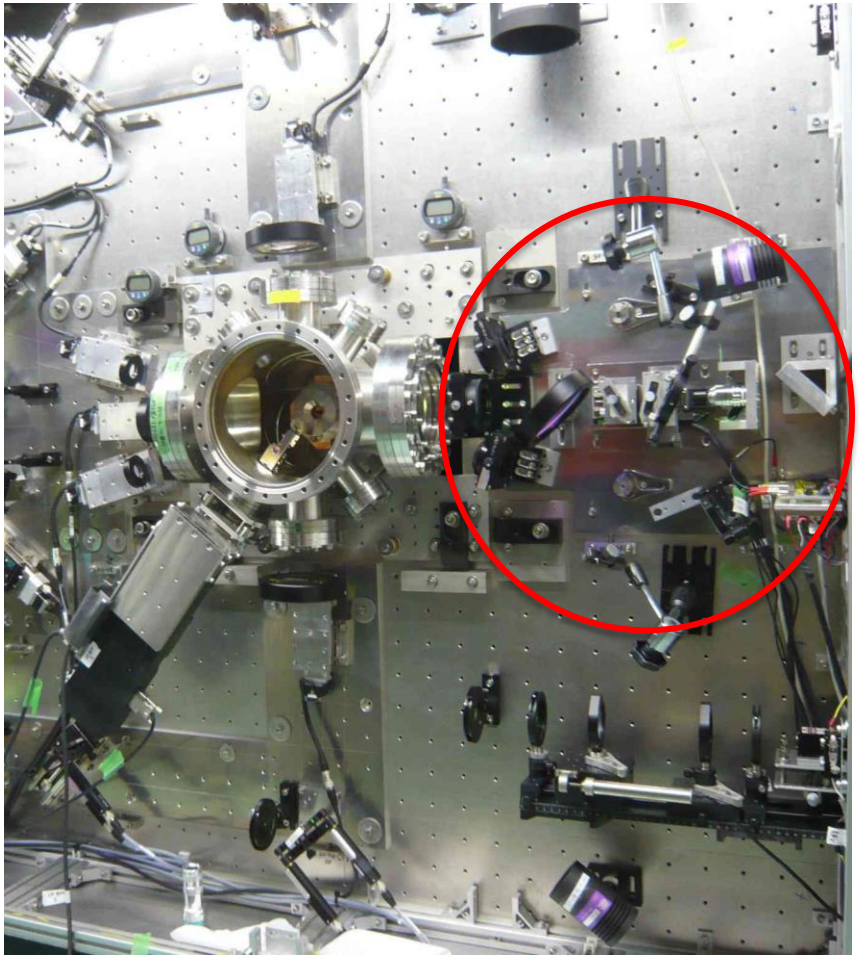

M8U-x/y
M174U-x/y
M3U
to
Phase Monitor
PSD
check the
injection orbit
CCD
Candidate location
for new IP mover
Reference
of laser
path
MI-5
F174U
Carbon
wire
replacement
M1U
S-up
M2U
F30U
P8
F8
Delay
M2L
Half-mirror
S-low
M1L
F30L
Base plate with
reference lines
50
165
F174L
MI-3
PSD
check the
injection orbit
Present IP mover
Polarizer
Reducer
MI-
ofile Monitor
CCD
MI-1
MI-2
to
Phase Monitor
PSD
check the
injection orl

IP screen and Carbon wires



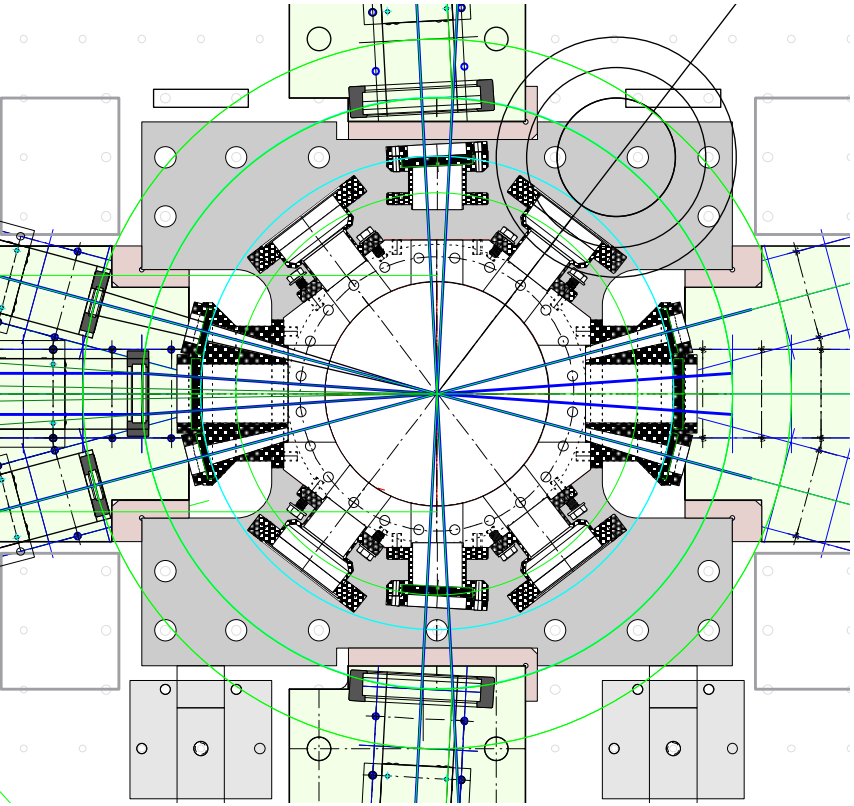
- Can not maintain the carbon wire by opening the end plate anymore. BPM is there.
- Need extension box to replace wires by moving a rod to there.
- Space for this box is available only at the upper right of a table.
- Connect all base plate with relative-position constraints.→174 degree

Remove uncertainty of laser path at IP



- Put new base plate at right side with reference lines. →8, 30 degrees
- **It makes Left-Right constraint on the laser path to minimize the uncertainty of fringe tilt, roll and pitch.**
- Connect all base plate with relative-position constraints.→174 degree

Coping the IP reference on the IPBSM table



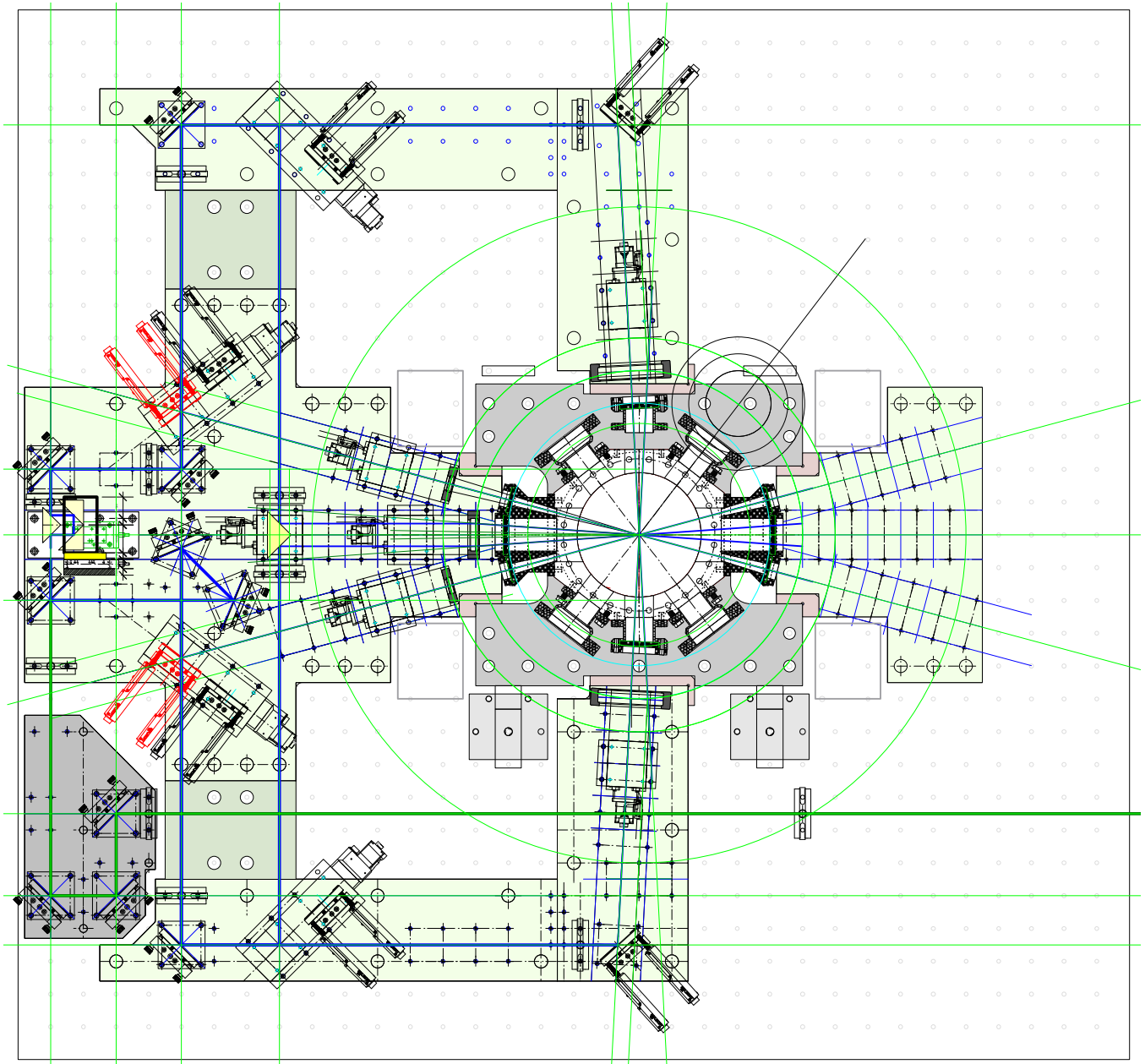
Reference by machining accracy

- New chamber and fixture on to the table (gray bigger plates) are well machined.
- They can be used to copy the IP reference on the IP table within the accuracy of 50 um or less.

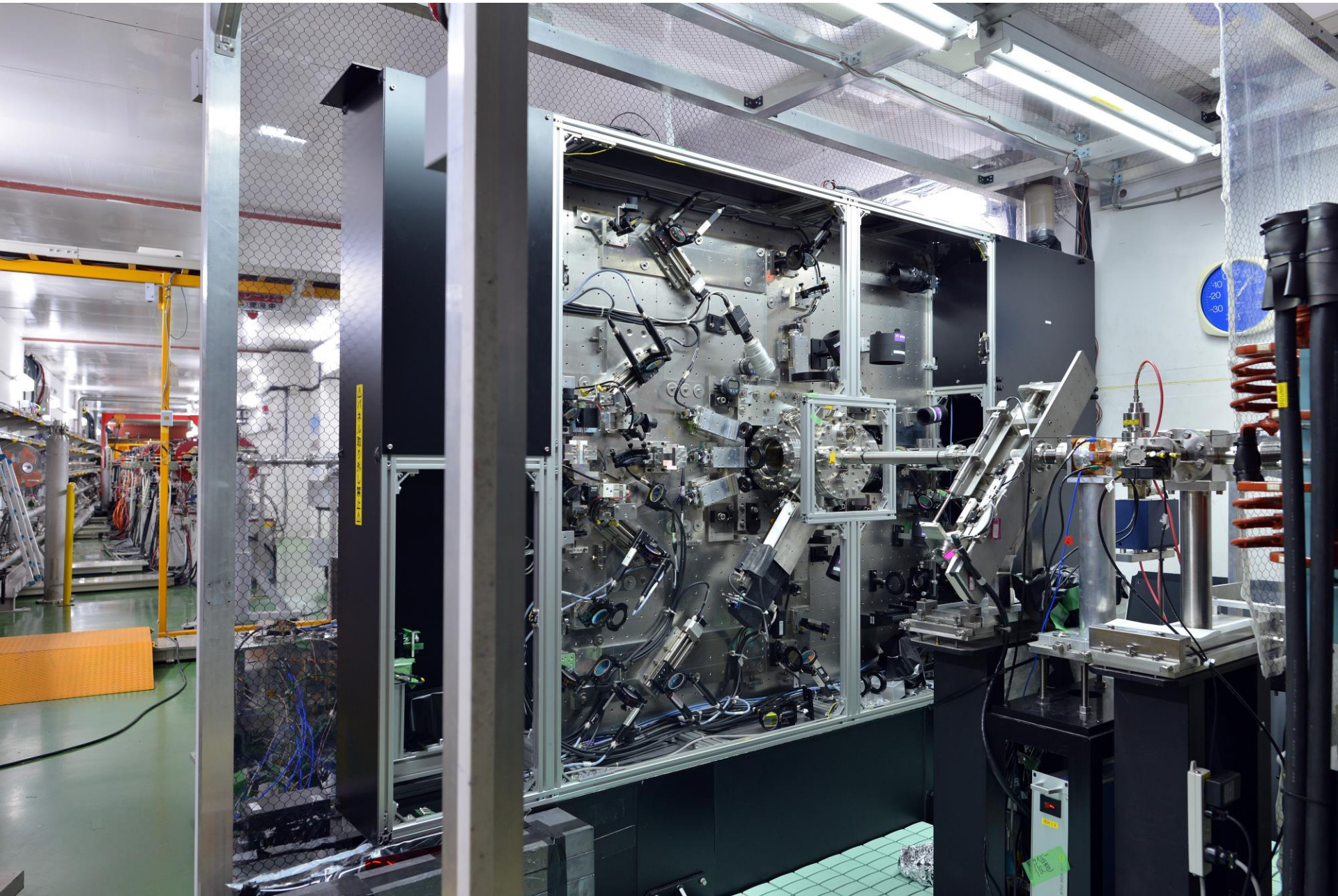
Viewport

- Previous chamber lead the slanted laser injection on the viewport.
- Then the laser path was shifted for each crossing angles due to the diffraction at the viewport. It introduced difficulty on the alignment between crossing modes.
- New chamber has corrections of viewport angles, i.e., normal incidence of laser on the viewport for 30 and 174 modes.

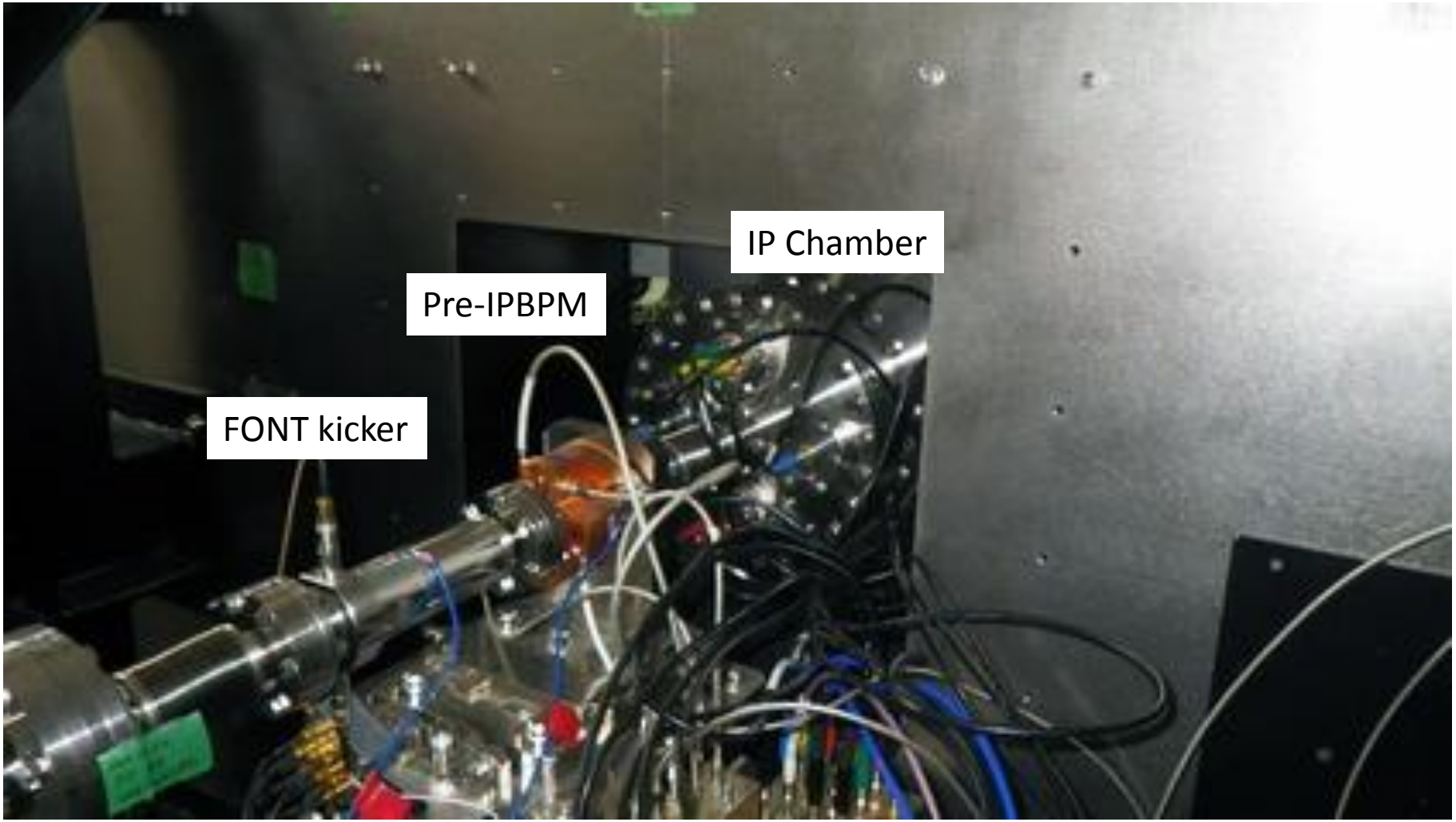
Binding reference plate for laser optics



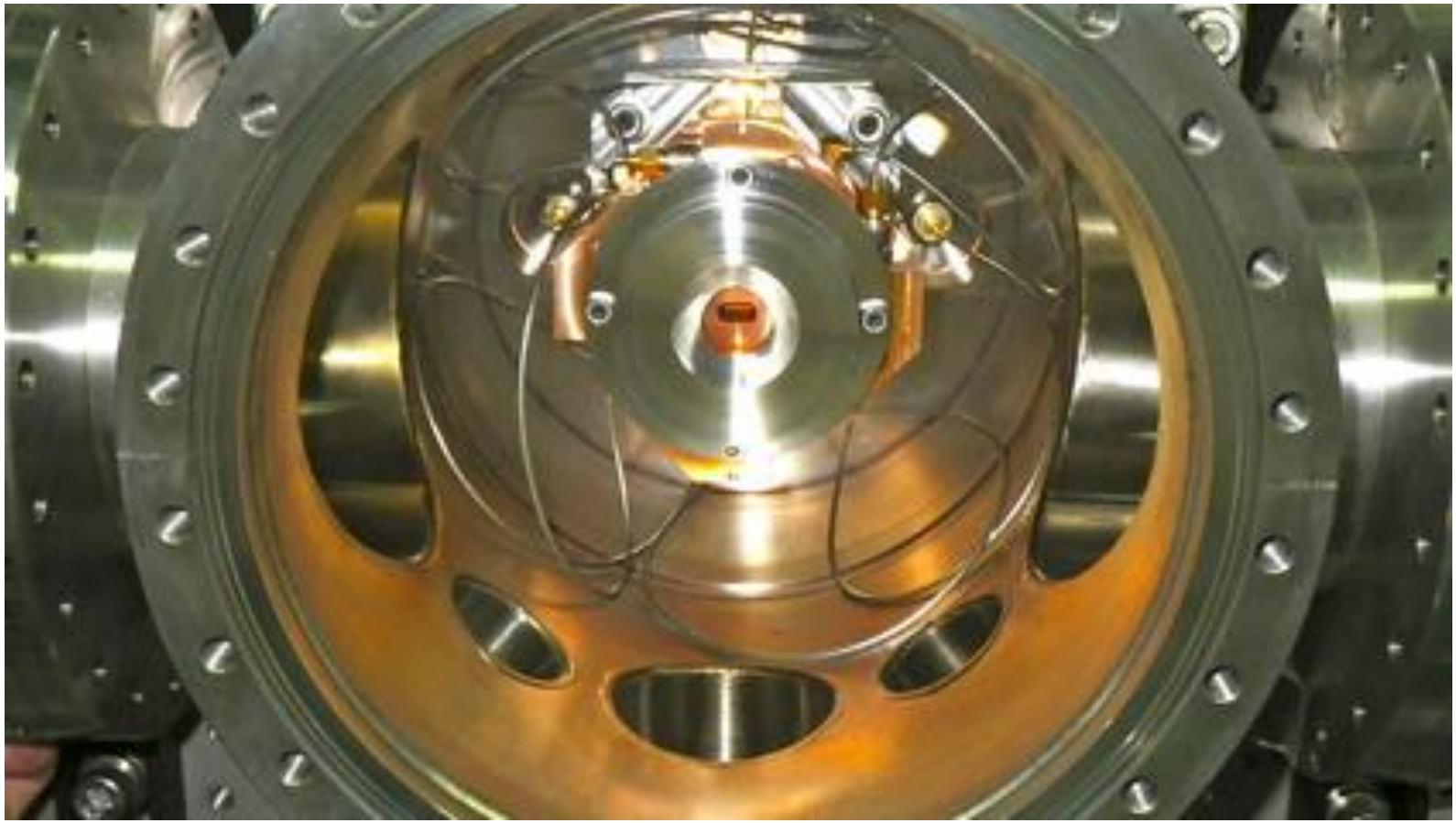
ATF2-IP until 2013 July



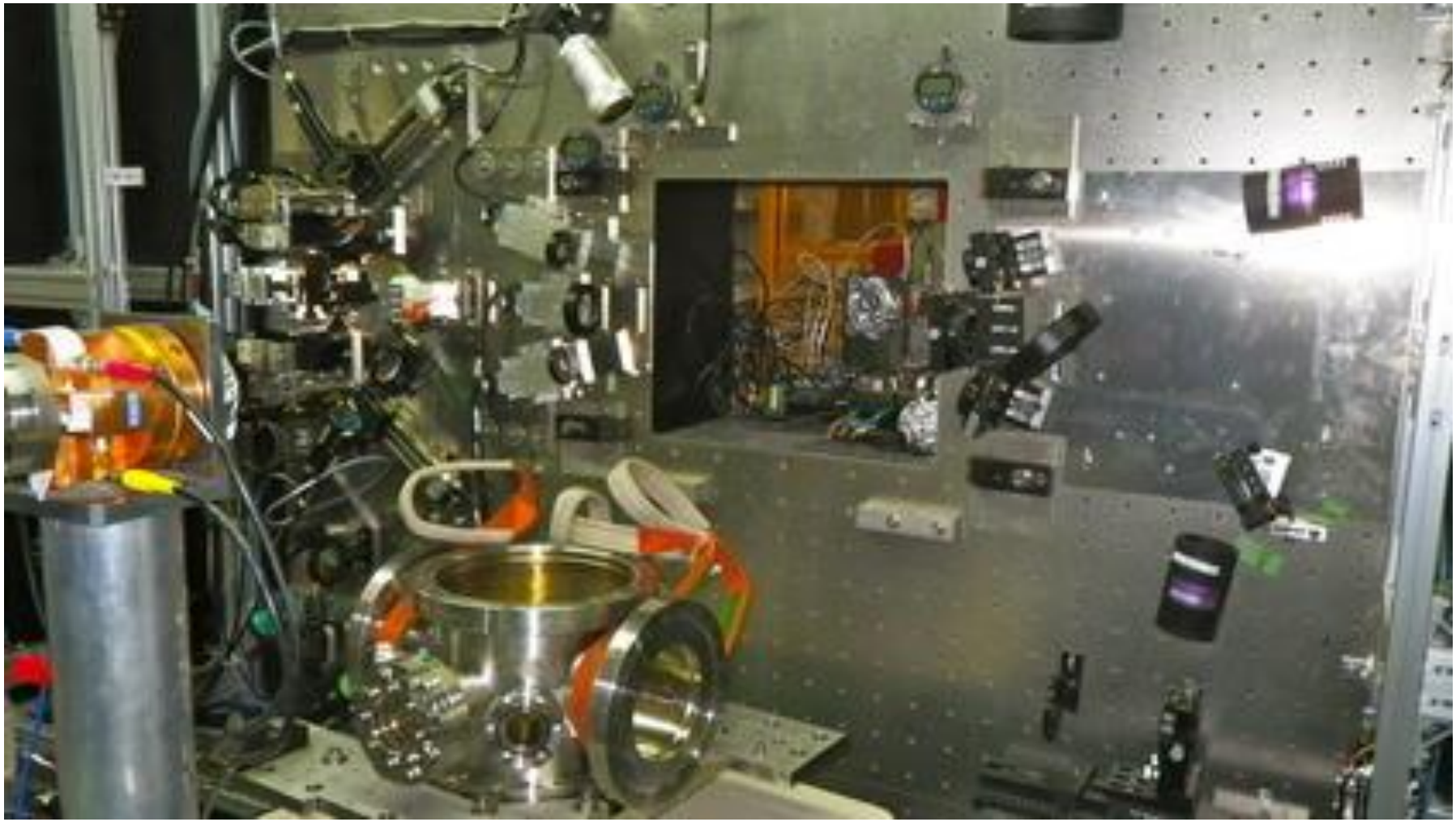
Upstream of IP (backside of the IPBSM table)



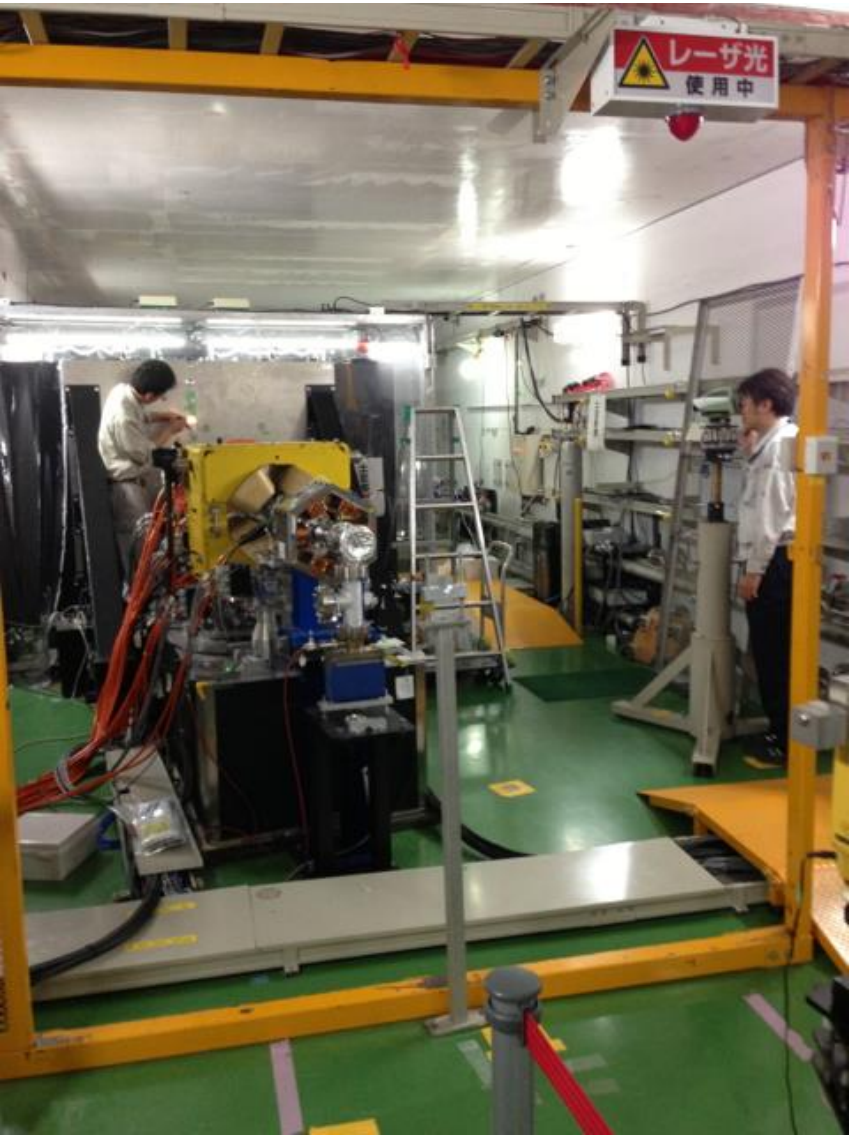
Previous IPBPM in the IP chamber



Previous IP chamber had been dismounted in last week



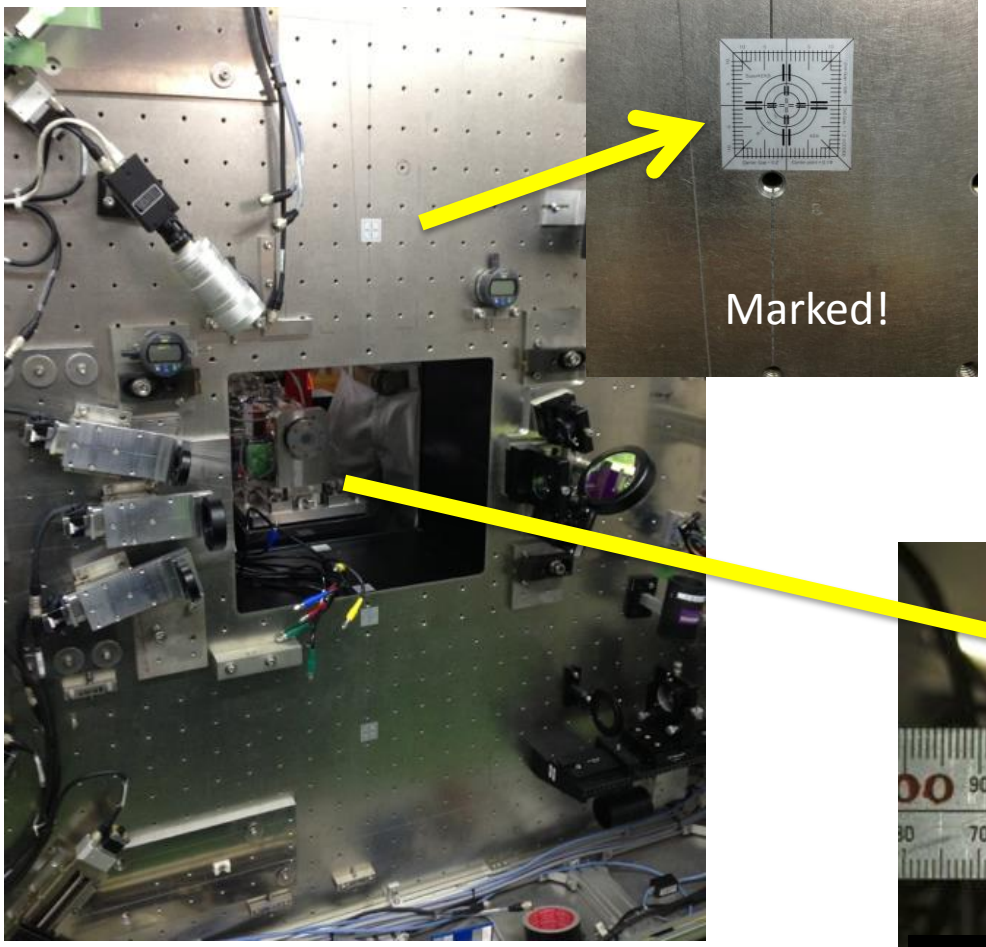
Reproduce the beam trajectory



Define the beam trajectory by using the horizontal / Vertical reference of magnets. Magnet movers were set as same as that for the last beam runs.

Alignment scope with laser is used to simulate the beam, optical straight toward the IPBSM detector.

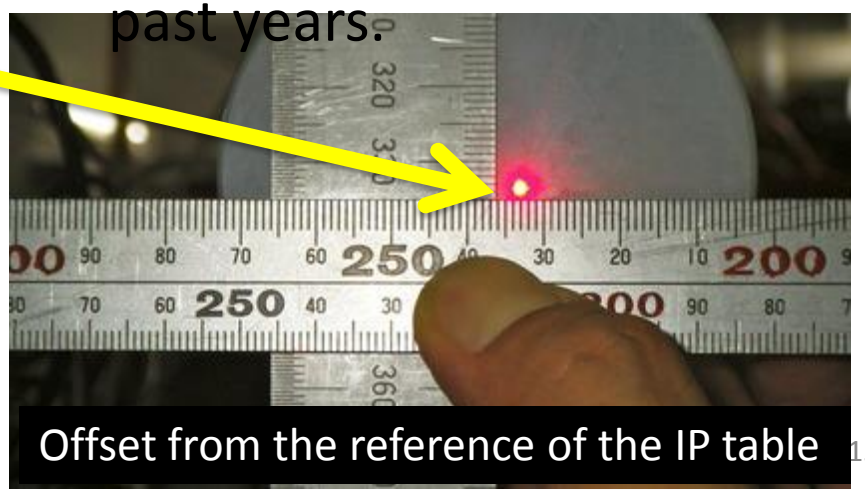
Copied beam trajectory – IPBSM table



Beam offset on the IPBSM table

- **3mm horizontally (south)**
- **2mm vertically (up)**

Same as measured in last year.
The offset is also consistent with the chamber's position shift that evaluated by a beam in the past years.

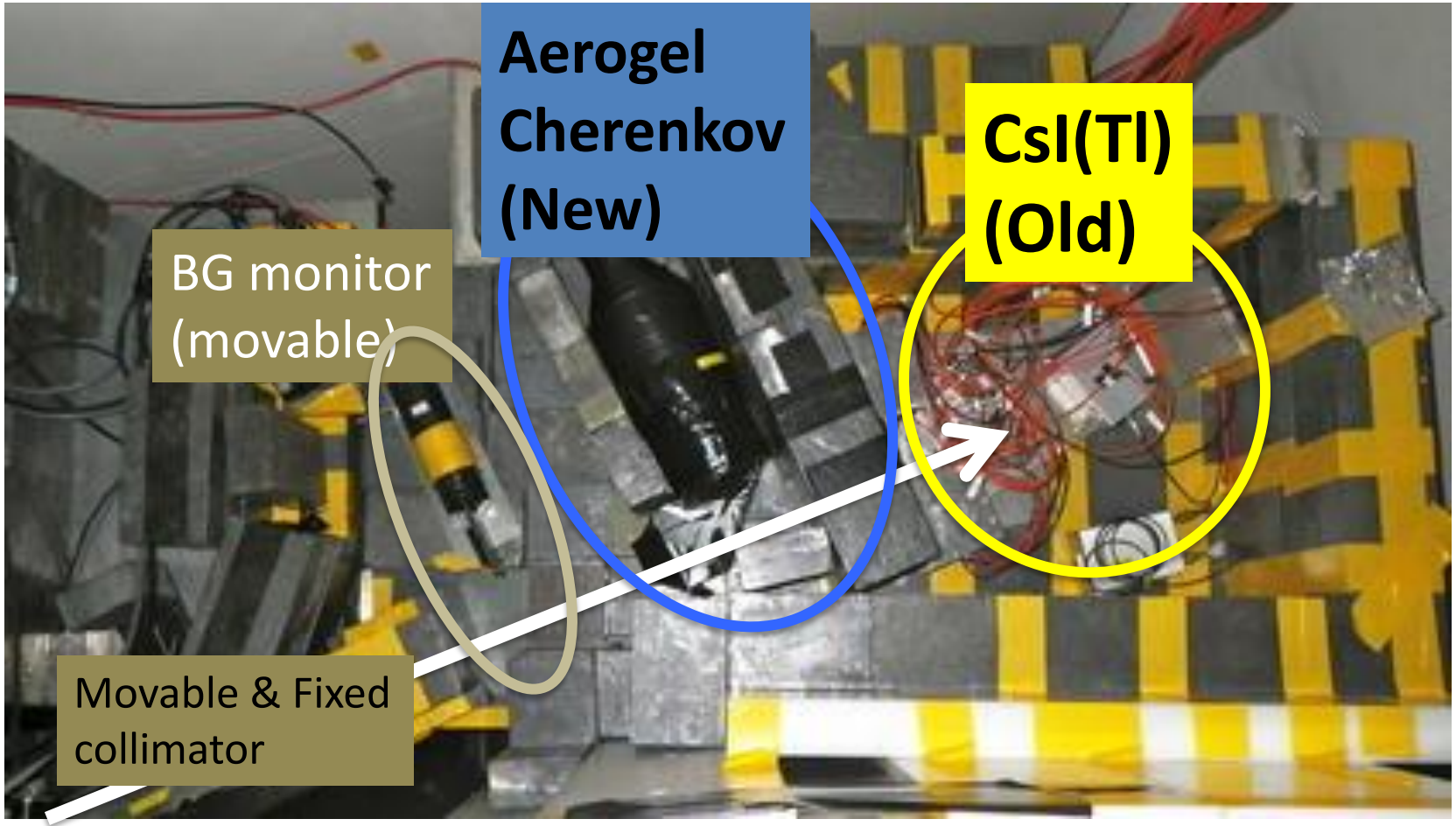


Copied beam trajectory – Gamma line

Beam straight after IP was redefined.
It is almost same as measured in the last year.
Put clear horizontal and vertical makers for the work of the detector alignment.

Gamma detectors since June 2013

Alignment of the collimators and the cherenkov head is essential for the better IPBSM measurement.



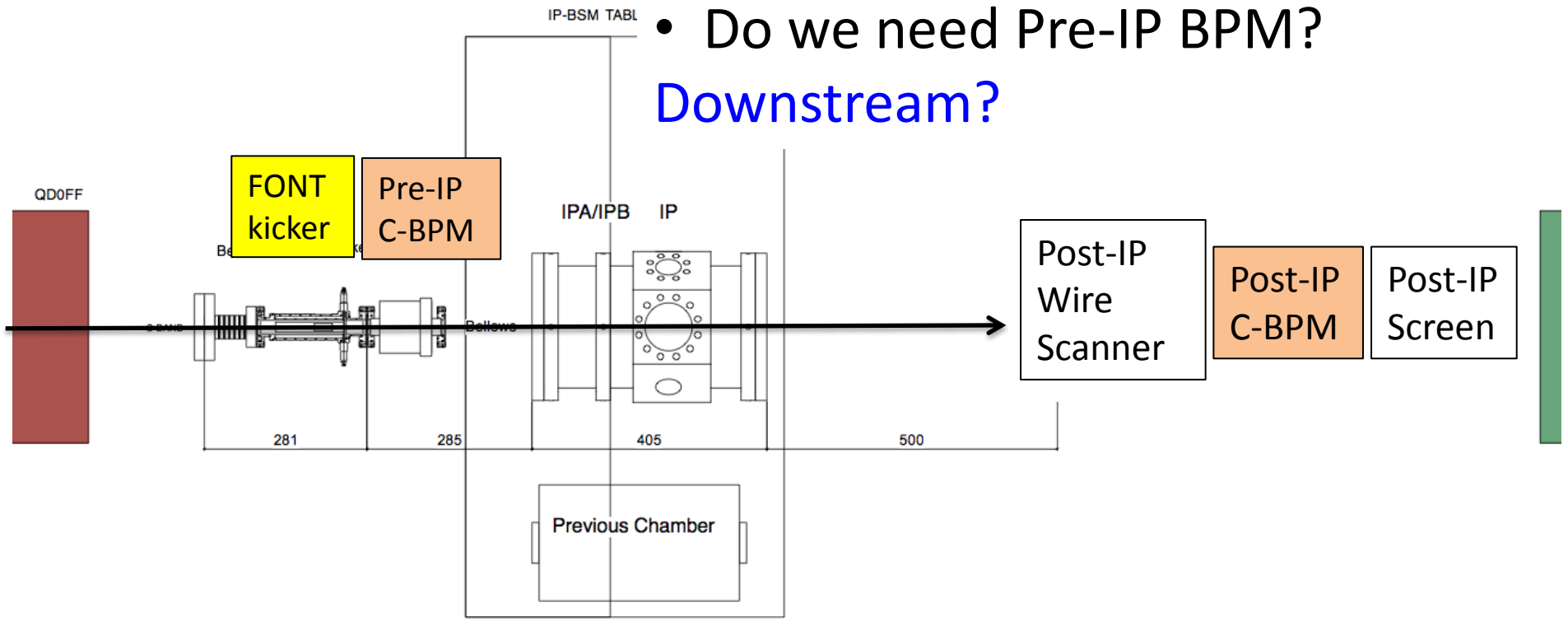
One for the discussion?

Where is the IP reference cavity?

Upstream?

- Affect on the latency of feedback?
- Do we need Pre-IP BPM?

Downstream?



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