IP-BSM Improvement Work

N. Terunuma

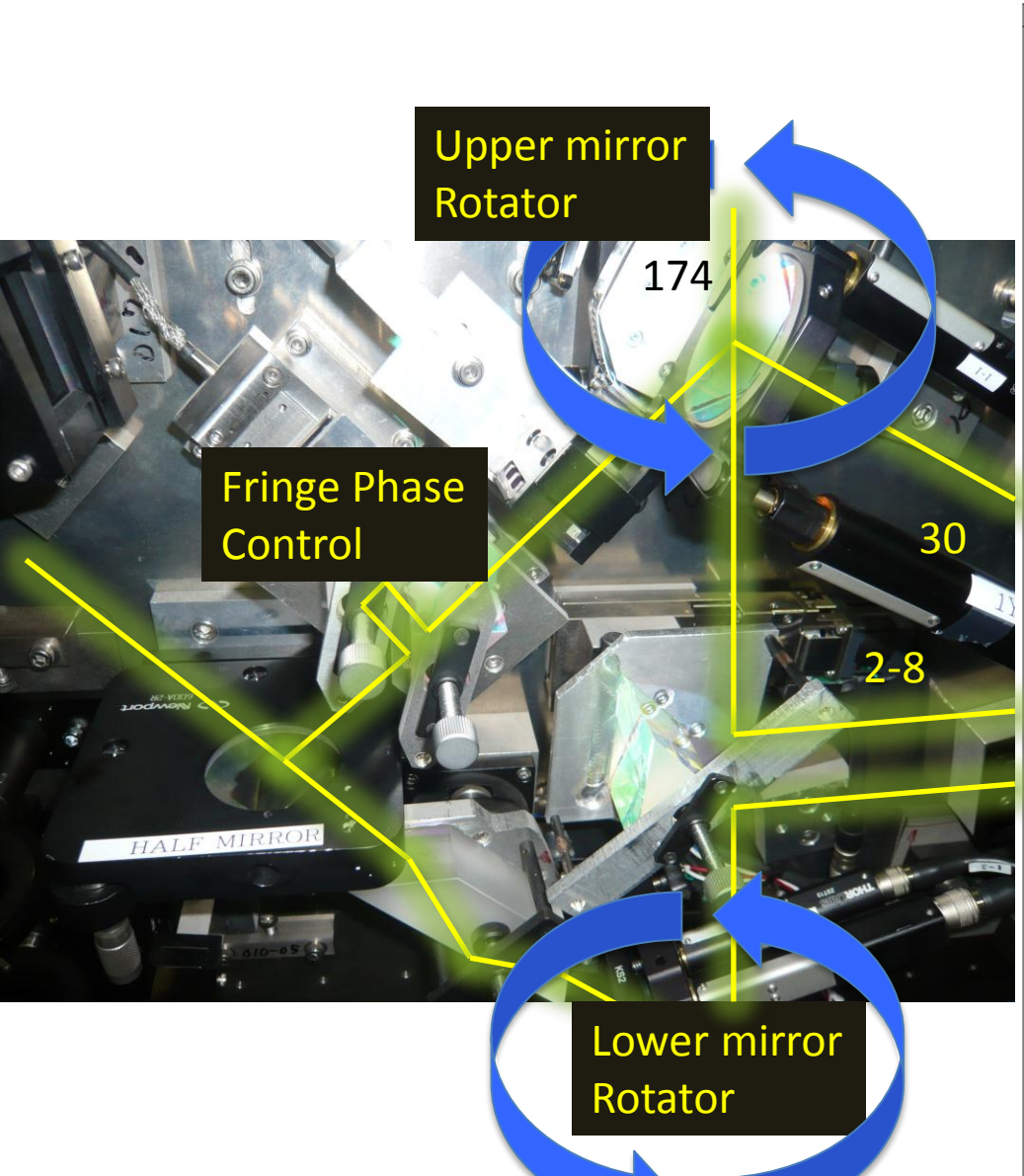
2012/6/26 ATF2 Project Meeting

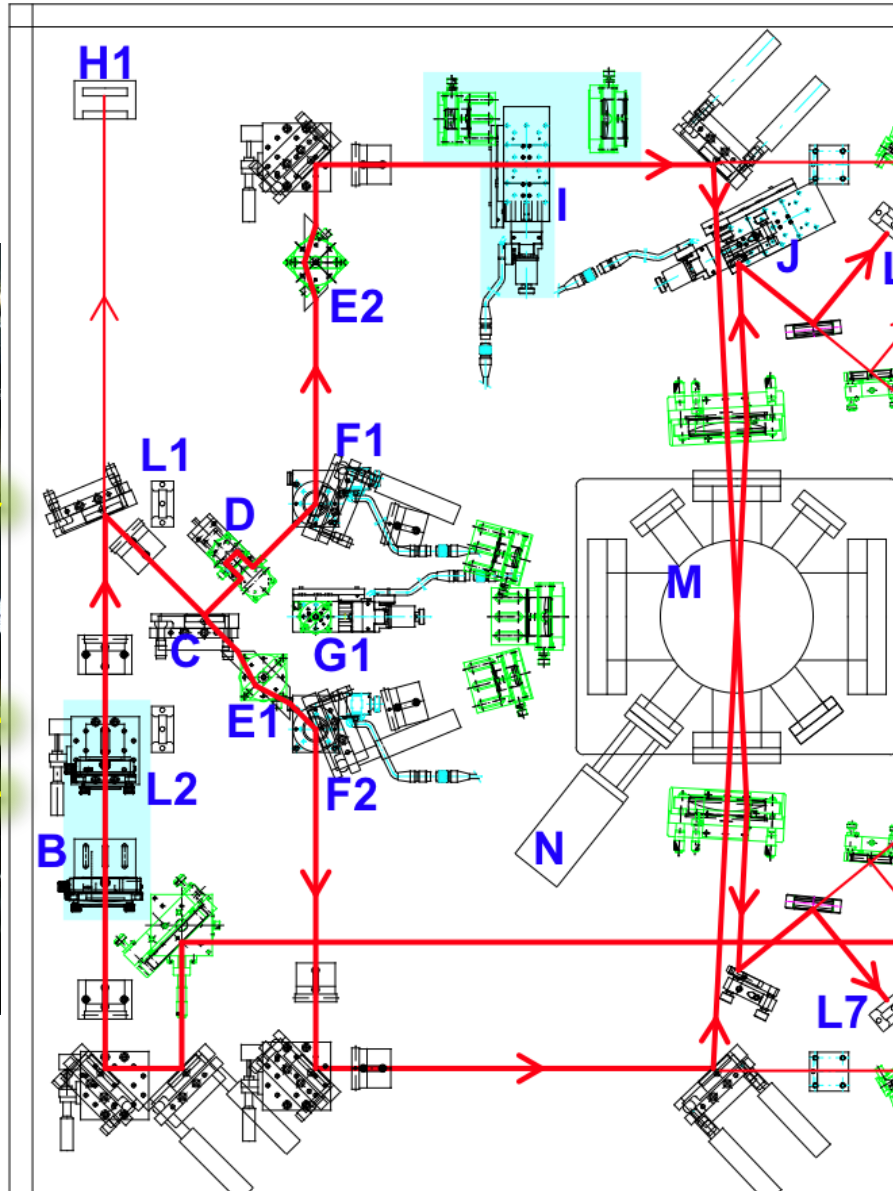
Difficulties	Solutions
Reproducibility of a laser path: A Laser is not well adjusted to the design path because there is no reference to guide it. A laser travels 10cm high from the vertical table. Non-negligible mismatch toward the IP happens very often after the adjustment of the laser orbit.	**Well defined references near the optical elements:** Put reference lines on the base plates, pedestals etc., to enable the alignment of optical element and traveling laser.
Significant spot size difference at IP between upper and lower lasers. Path length is not same because of the chicane for fringe phase control. It introduces the different waist position; i.e., no ideal crossing.	**Match the path length of upper and lower lasers.** It will be done by adding a drift space that created by an image flopping mirrors.
Concern on the small beam tuning: Changing the crossing angle was done by two sets of rotatable stage and mirror on it. Searching a beam (laser wire, z scan) is done by adjusting the angle of this mirror. Sharing this mirror for different crossing mode lead a retuning every time because it was changed during the previous mode.	**Change the crossing-angle handling concept.** • Remove the rotator and introduce a mirror on a linear mover to select the crossing mode. • Independent mirror adjustment for each crossing mode. • Fixed reducer setting. • Introduce focal lens movers.

Improvement must be done as one of keys to realize the ATF2 Dedicate Runs in fall.

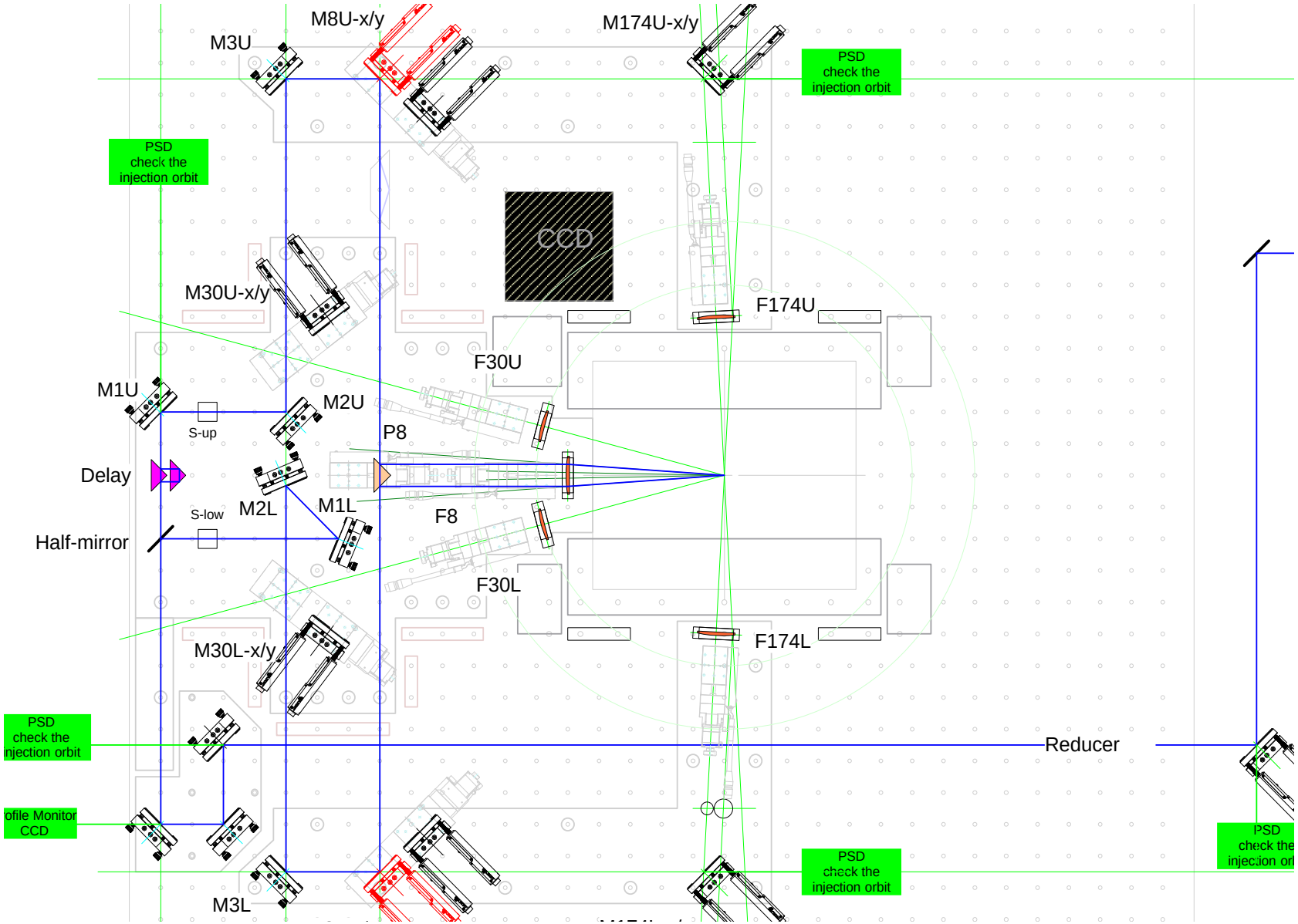
- Design of the new layout on the vertical table is almost done.
- Preparation of the hardware will be done in July/August.
- Assembling will be done quickly until middle of September.
- Off beam checkout will be continue, about a month, until the ATF startup on October 15.

Present Layout

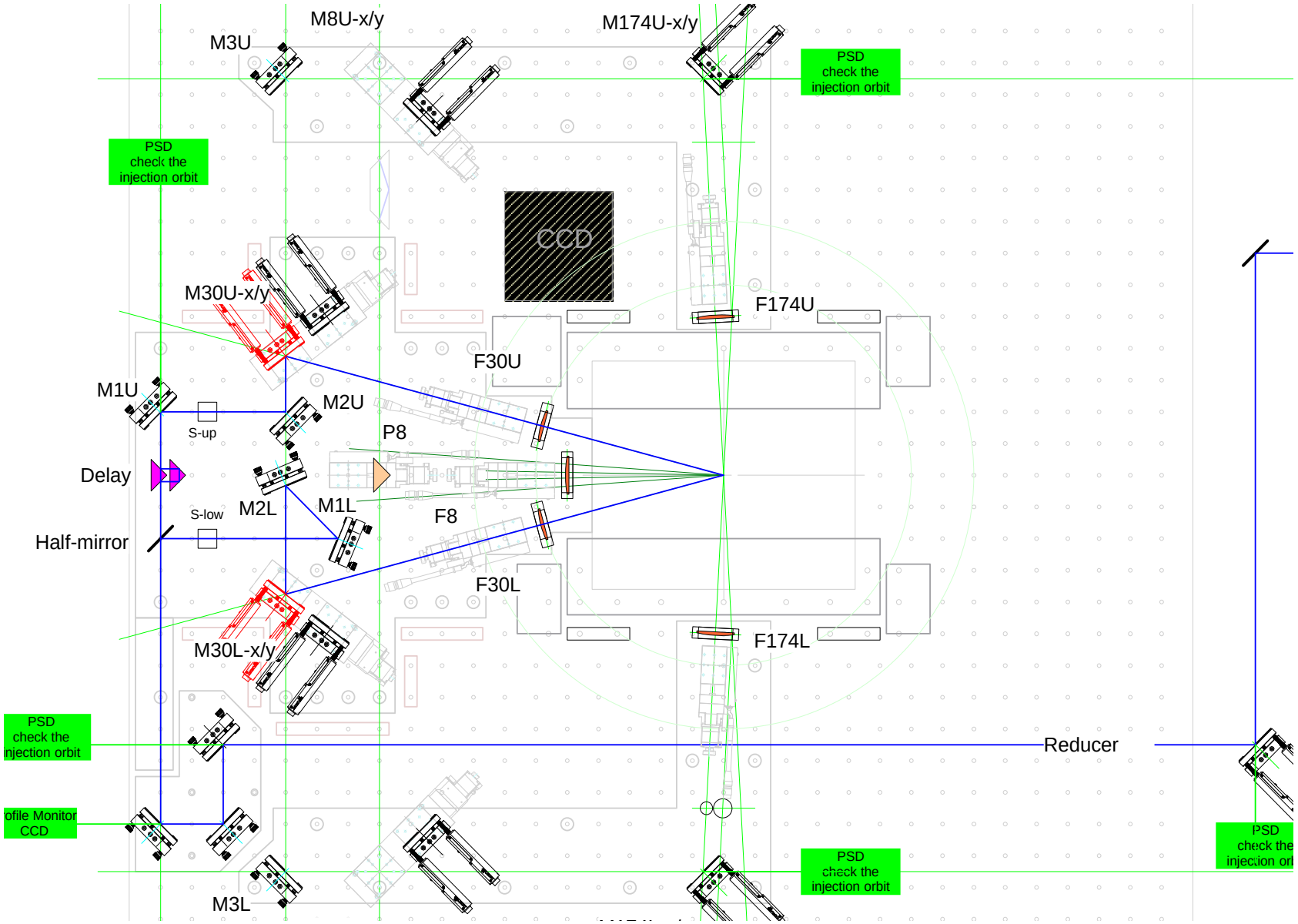




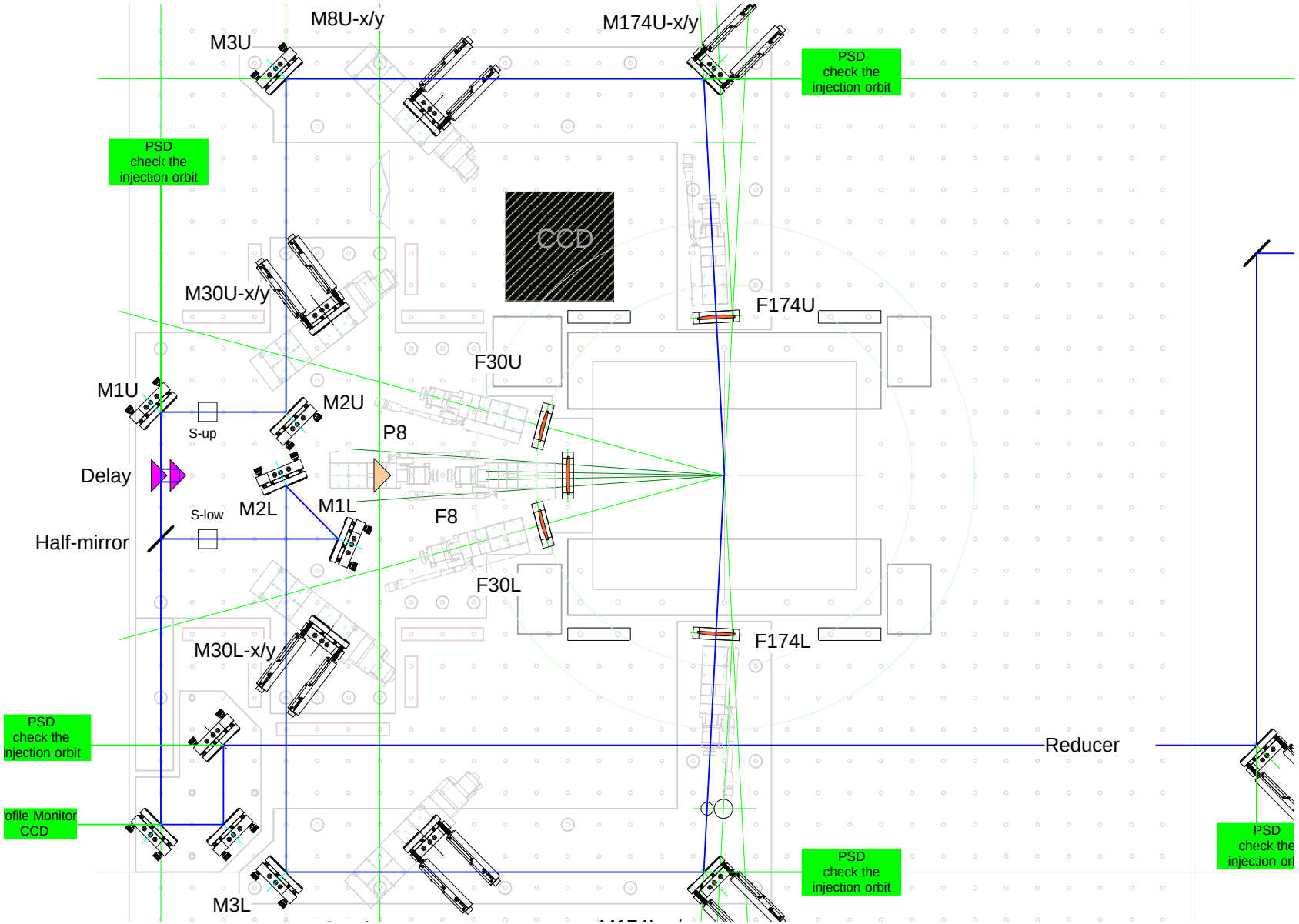
New 2-8 mode


M3U
M8U-x/y
M174U-x/y
PSD
check the
injection orbit
PSD
check the
injection orbit
CCD
M30U-x/y
F174U
F30U
M1U
M2U
S-up
P8
Delay
S-low
M2L
M1L
F8
Half-mirror
F30L
M30L-x/y
F174L
PSD
check the
injection orbit
Reducer
ofile Monitor
CCD
PSD
check the
injection orbit
M3L
PSD
check the
injection orbit

New 30 mode


M8U-x/y
M3U
M174U-x/y
PSD
check the
injection orbit
PSD
check the
injection orbit
CCD
M30U-x/y
F174U
F30U
M1U
M2U
S-up
P8
Delay
S-low
M2L
M1L
F8
Half-mirror
F30L
M30L-x/y
F174L
PSD
check the
njection orbit
Reducer
ofile Monitor
CCD
PSD
check the
injection orbit
M3L
PSD
check the
injection orbit

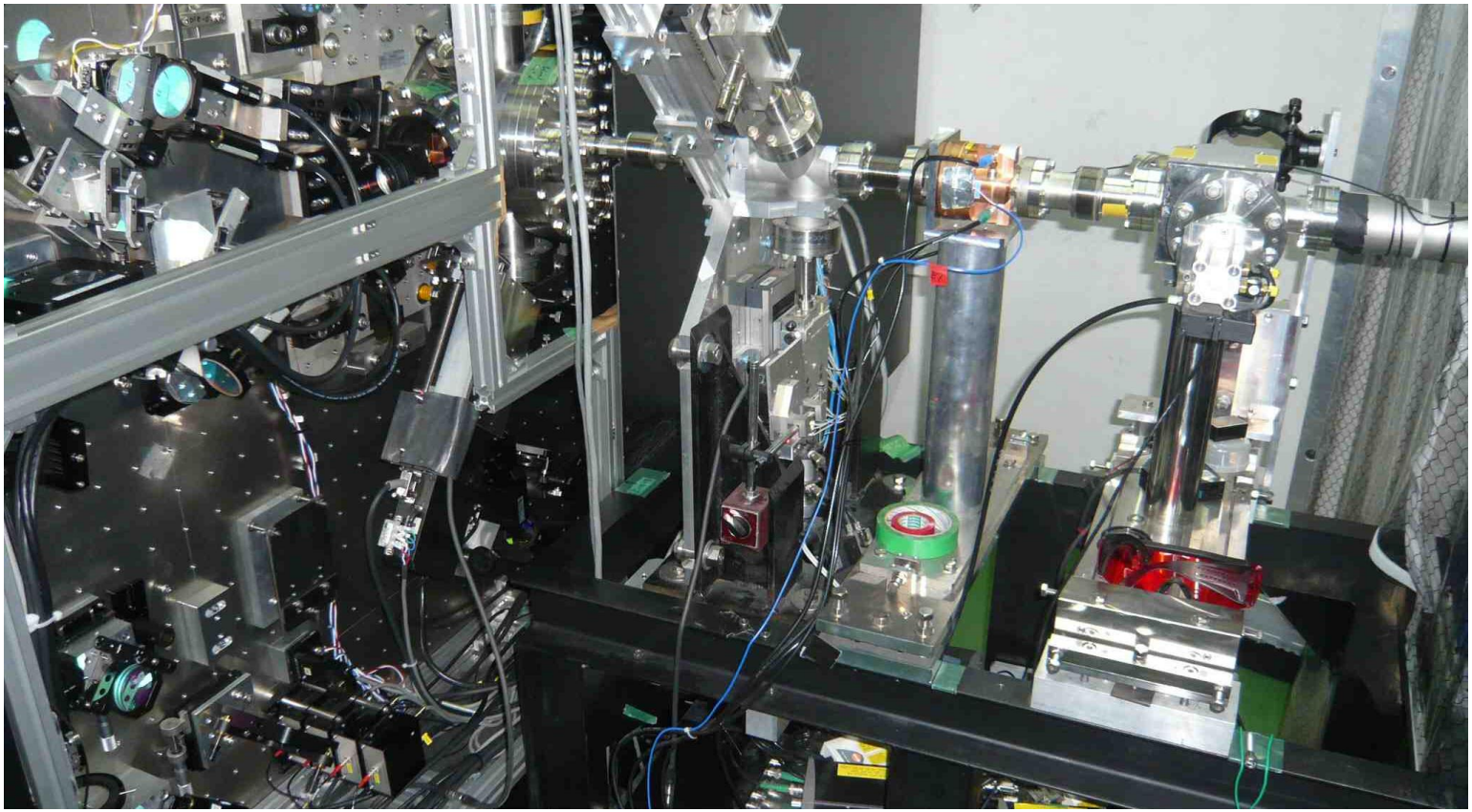
New 174 mode


M8U-x/y
M3U
M174U-x/y
PSD
check the
injection orbit
PSD
check the
injection orbit
CCD
M30U-x/y
F174U
F30U
M1U
M2U
S-up
P8
Delay
S-low
M2L
M1L
F8
Half-mirror
F30L
F174L
M30L-x/y
PSD
check the
injection orbit
Reducer
ofile Monitor
CCD
PSD
check the
injection orbit
M3L
PSD
check the
injection orbit

Post-IP

Need space for BSM maintenance especially for 174 mode.

Do we need a Screen? Cavity BPM? Wire Scanner?



Summary

- We will change the layout of the optical elements on the vertical table. It will bring the higher stability and reproducibility on the operation of IP-BSM.
- This will be a critical improvement for the success of the ATF2 goal 1. The work should be done in this summer shutdown.
- In addition, this new layout will match the upgrade for Goal 2 which is planned in early 2013; i.e., installation of new chamber with three IPBPMs.