General Prepartions

G1600019 **P.1**
Plan for the replacement OFI assembling at LLO

Clean environment: optical table with a HEPA booth
Optical table area: 5~6 ft x 2 ft

Instruments:

- Beam Profiler: Aperture size >10mm desirable

- First Contact kit: First Contact, Peek Tab, Class B Scissors, Class B Tweezers
  Pure N2 cylinder + Ionization blower

- Power meter:

Controller	Thorlabs PM100D	(Does LLO have this?)
Head	Thorlabs S130C	(Does LLO have this?)
Head	Thorlabs S401C	(will be shipped from Caltech)
Controller+Powermeter	OHIR	(will be shipped from Caltech)

- Optical chopper: Thorlabs one (will be shipped from Caltech)
- Glass beam dump: Large aperture, Qty2 (will be shipped from Caltech)
- Rotational stage Qty1 (will be shipped from Caltech)

- Digital Multi-Meter A table-top type one is better, but the handy one is still OK
- Oscilloscope Any
- FFT Analyzer SRS SR785
- IR Sensor card Newport F-IRC4 or similar
- IR Viewer Any

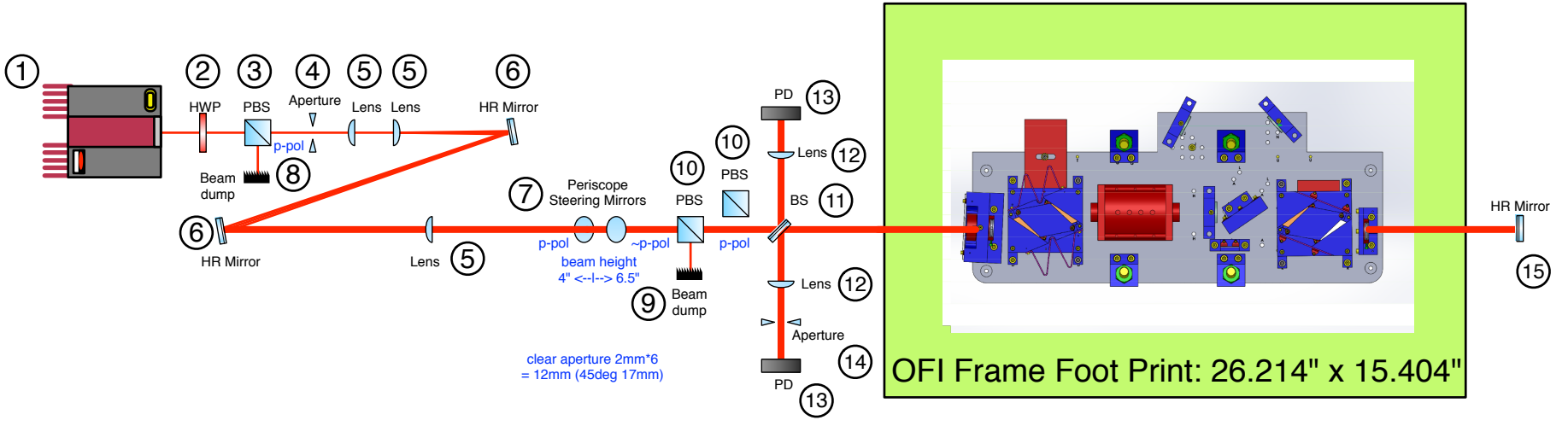
- Hartman sensor: KA will ask Nichole/Gerardo about the detail (see P.3)

Other Class B items:

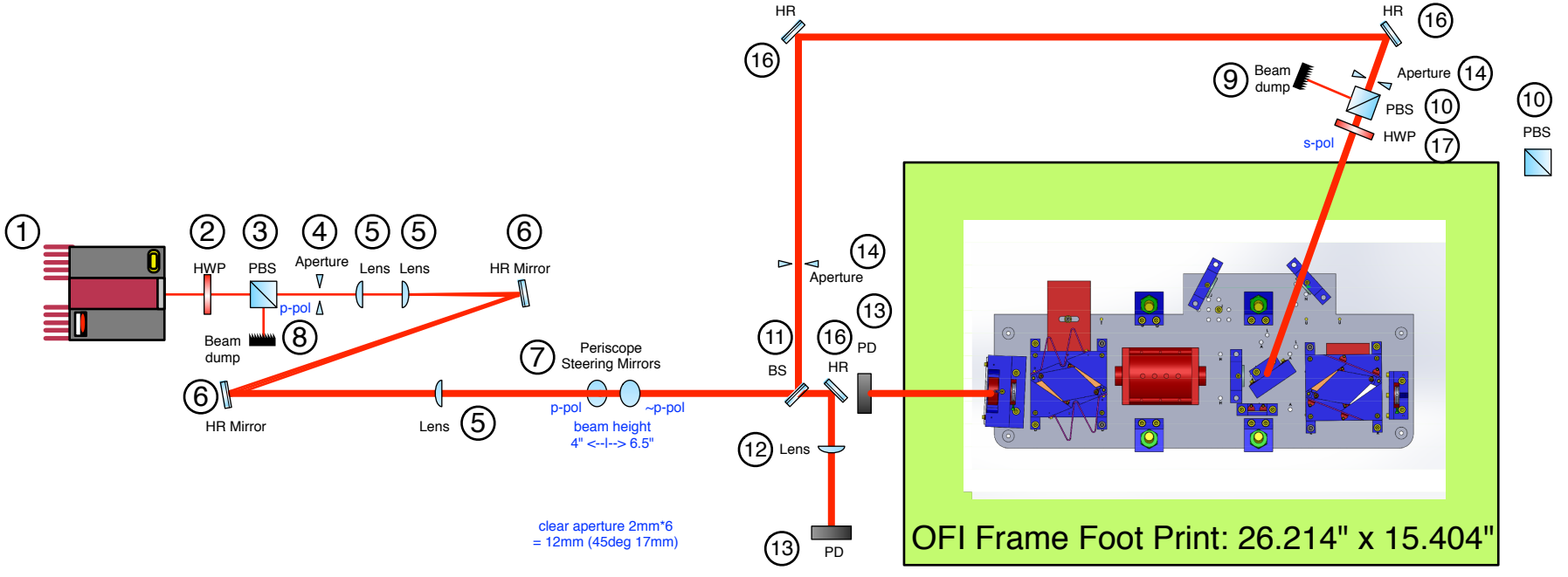
- Allen keys

- 2" pedestal posts Qty. 4
- Thread converter Qty. 4, 8-32 Male to 1/4-20 Male (equivalent to Newport TA-8Q20-10)
  ==> These are used to raise the OFI table when it is not suspended

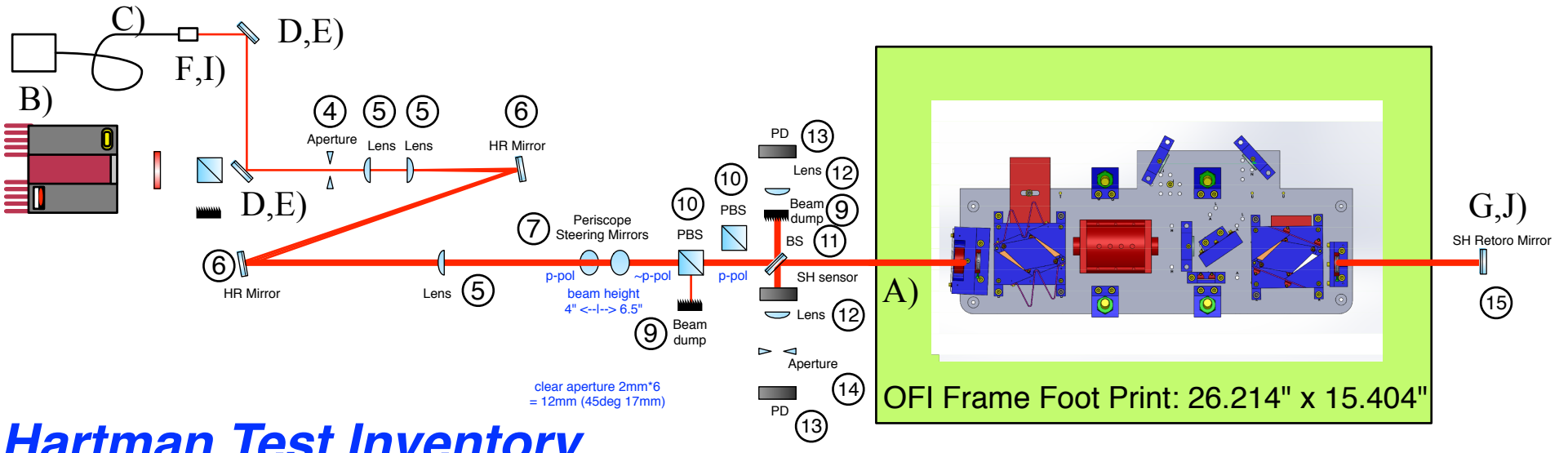
OFI Transmission measurement setup



OFI Squeezer Transmission measurement setup



OFI Hartman wave front distortion measurement setup



Hartman Test Inventory

A) WFS300-14AR	Thorlabs Shack-Hartmann WFS
B) S1FC635	Thorlabs Fabry-Perot Benchtop Laser Source
C) P1-630A-FC-5	Thorlabs Single Mode Fiber Patch Cable
D) Steering Mirrors	Qty2 1" Al coated mirrors
E) Mirror mounts	Qty2 1" mirror / beam height 4"
F) F810FC-635	Thorlabs FC/PC Collimation Package
G)	3" Mirror Mount (beam height 6.5")
H)	XY Stage Assembly (??? Don't know how it is used)
I) K5X1	Thorlabs 5 Axis Mirror Mount Assembly / beam height 4" (for the fiber coupler?)
J) Retro Mirror	3" lambda/10 Mirror (Al coated???)
K) Windows PC	To control Hartman Sensor

Optics / Opto-mechanics list

1	1064nm CW Laser	Qty1	Innolight Mephisto or LWE NPRO with height spacer to raise the beam height to 4"
2	Half Wave Plate	Qty1	Zero-order Quartz Half-Wave Plate Clear aperture size ~1/2" / beam height 4"
3	Fused Silica PBS	Qty1	Fused-Silica Cube PBS (like CVI "PBSO?) Size 1/2" / beam height 4"
4	Variable aperture	Qty1	on a height-adjustable mount (post) / nominal beam height 4"
5	Lens	Qty3	1" lens kit AR coated for 1064nm on a height-adjustable mount (post) / nominal beam height 4"
6	HR Mirror (0deg)	Qty2	1" High Reflectivity Mirror (0deg incidence) beam height 4"
7	Periscope kit		Convert 4" height to 6.5" height
	- Post	Qty1	such as "Newport - Heavy Duty 1.5 inch Optical Support Rods"
	- Mount	Qty2	such as "Newport - model 340-RC" for the above post.
	- HR Mirror (45deg)	Qty2	1" High Reflectivity Mirror (45deg incidence, P-pol) 2"~2.5" beam height from the periscope mount
8	Beam dump	Qty1	Can receive ~1W power beam height 4"
9	Beam dump	Qty2	Black glass beam dump (large aperture), prepare at Caltech beam height 6.5"

Optics / Opto-mechanics list (cont'd)

10	BK7 PBS	Qty2	BK7 Cube PBS Size 1" / beam height 6.5"
11	50% BS	Qty1	50% BS for 45deg P-pol Size 2" 1/4" or 3/8" thickness / beam height 6.5"
12	Lens	Qty2	1" lens f=100mm, AR coated for 1064nm on a height-adjustable mount (post) / nominal beam height 6.5"
13	Thorlabs PD	Qty2	Large aperture, Variable Gain PD like PDA-100A or PDA-10CS. Either Si or InGaAs OK. on a height-adjustable mount (post) / nominal beam height 6.5"
14	Aperture	Qty2	Aperture on a height-adjustable mount (post) / nominal beam height 6.5"
15	HR Mirror (0deg)	Qty1	1" High Reflectivity Mirror (0deg incidence) beam height 6.5"
16	HR Mirror (45deg)	Qty3	1" High Reflectivity Mirror (45deg incidence, P-pol) beam height 6.5"
17	Half Wave Plate	Qty1	Zero-order Quartz Half-Wave Plate Clear aperture size ~20mm / beam height 6.5"
18	HR Mirror (0deg)	Qty1	Super polished (<lambda/10), 3" High Reflectivity Mirror (0deg incidence) beam height 6.5" (for hartman wavefront test)

+ General access to optics, posts, forks, screws

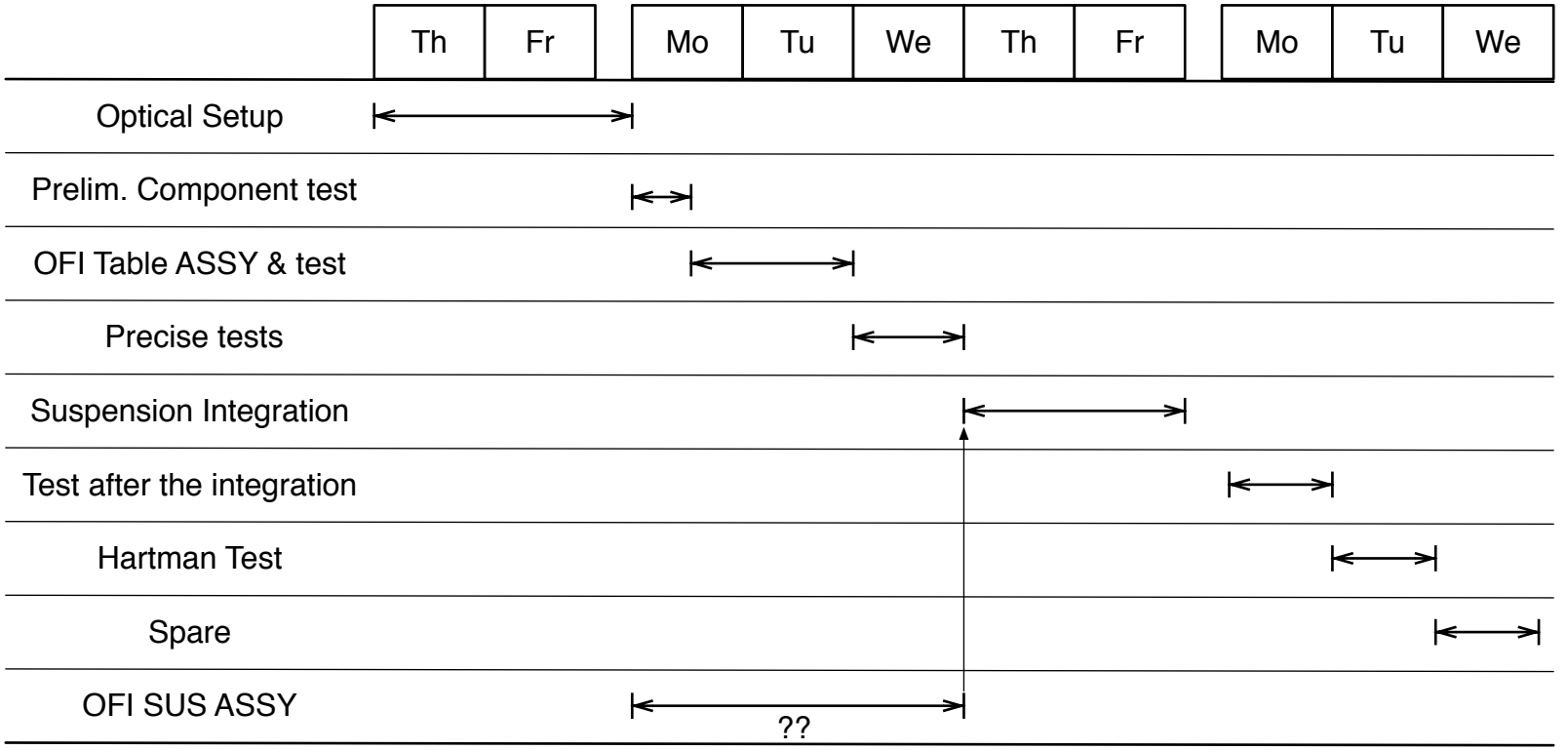
OFI Table assembling steps

- Fix the OFI table on the optical table
- Step 1 Wedge plate installation
- Check A: Transmission measurement
- Step 2 Front Balance Weight installation
- Step 3 Brewster Prism installation
- Check B: Transmission/rejection measurement
- Step 4 Faraday Rotater installation
- Check C: Transmission measurement
- Step 5/6 Wire Suport blocks installation
- Step 7 Half Wave Plate installation
- Check D: Transmission measurement
- Step 8 Thin Film Polarizer installation
- Check E: Transmission/rejection measurement
- Step 9/10/11 Beam dumps/Wire Suport blocks/ Front Balance Weight installation
- Step 12 Brewster Prism installation
- Check F: Transmission/rejection measurement

- Check G: Isolation performance measurement
- Check H: Back scattering measurement
- Check I: Squeezer transmission measurement

- Step 13/14 Output aperture / magnet installation

Schedule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Optical Setup
Prelim. Component test
OFI Table ASSY & test
Precise tests
Suspension Integration
Test after the integration
Hartman Test
Spare
OFI SUS ASSY
??

OFI Optics List & Spares

	Qty	Main	Spare @Location
Wedged Prism	1	From LHO	N/A
Brewster Prism	2 pairs	From LHO	1 pair @CIT - Koji
Faraday Rotator	1	From LHO	1 @CIT - Nichole
Half Wave Plate	1	From LHO	1 @CIT - Koji
Thin Film Polarizer	1	From LHO	1 @CIT - Koji

Spare optics come from eLIGO H1 squeezer. At the time the beam there was horizontal. Therefore the wedged prism was not needed.