Holographic Litho - SOP

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Contents

Important things to know before using the set up:

1. Use laser goggles (OD 5) to protect eyes from stray light reflections. Laser is at ~320nm and so is not visible to naked eye

2. Do not bump into any of the optical components. Set up is very hard to realign.

3. Once the He-Cd laser is turned ON, turn OFF only after a minimum of 30min

3. Once the He-Cd laser is turned OFF, turn ON only after a minimum of 30min

Operation steps

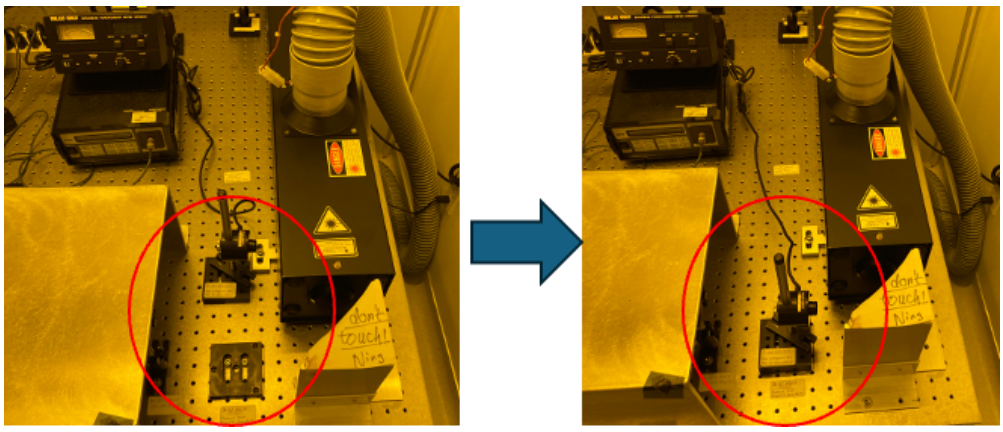
1. Turn Laser on

- Turn on the laser interlock switch located on the wall next to the optical table

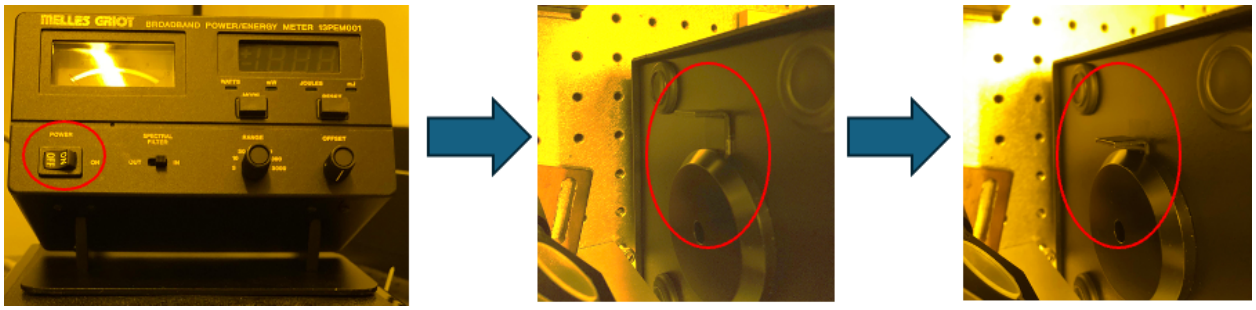
- Turn on the “KIMMON He-Cd LASER POWER SUPPLY” key to on position to turn on the laser.
- In the log book note down when the laser was turned on. Wait for about 30mins for the laser to warm up.

2. Log Laser power

- At the laser head, if a post with a mirror is placed on the magnetic mount, remove it. The mirror is used for directing the laser beam to the “Photo Luminescence” setup.
- Replace it with the detector of the “MELLES GRIOT 13PEM001” power meter. The post with the detector will snap into place when placed on the magnetic mount. Handle the detector using the metal post and do not bump into any of the optics near the mount.

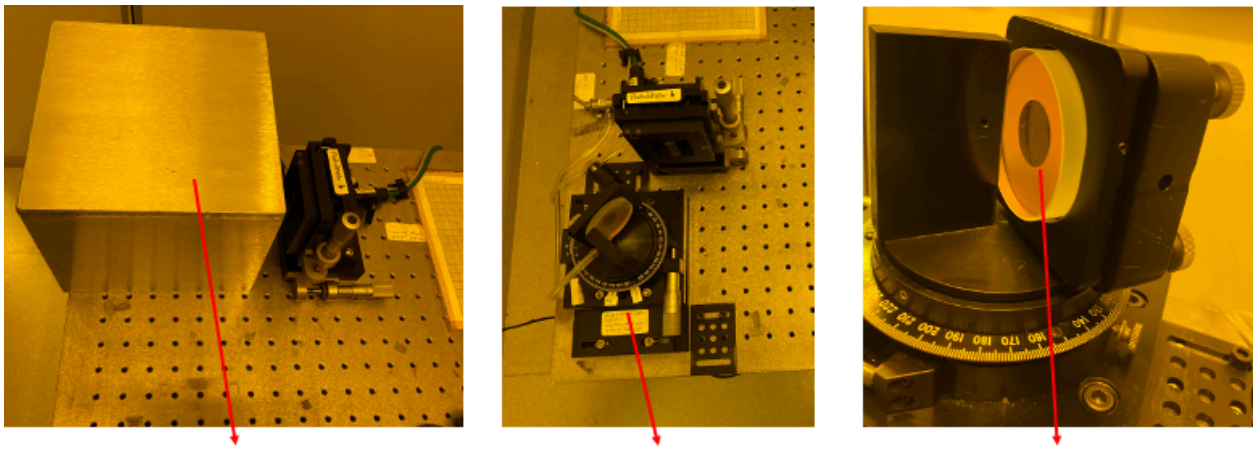


- Turn on the MELLES GRIOT power meter by pressing the Power on/off switch.
- Open the laser shutter at the laser head. Laser beam should come out of the laser head and fall inside the detector. Note, laser light is not visible to naked eye
- Note down the power reading from the MELLES GRIOT power meter in the log book. Then close the laser shutter.
- Remove the detector from the magnetic mount near the laser head.



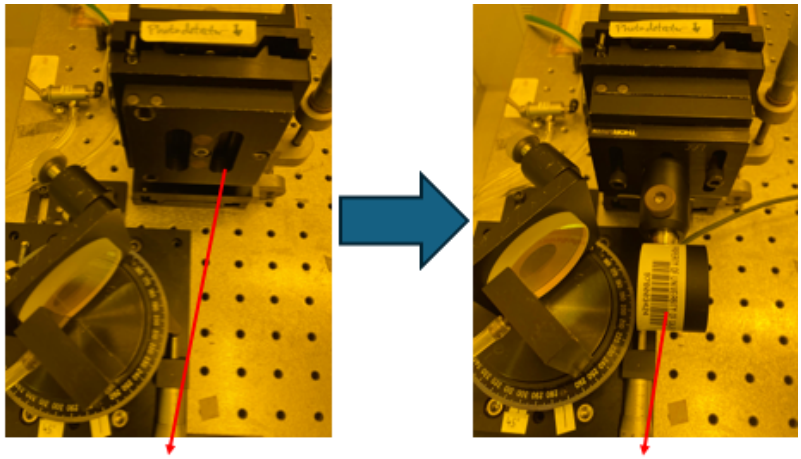
3. Log Laser power at the sample stage

- Remove the metal cover from the sample mounting stage. Do this very carefully by holding both sides of the metal cover. Pay at most attention not to touch or bump the sample mounting stage, especially the high reflectivity mirror.



Metal cover | Sample stage | High reflectivity mirror

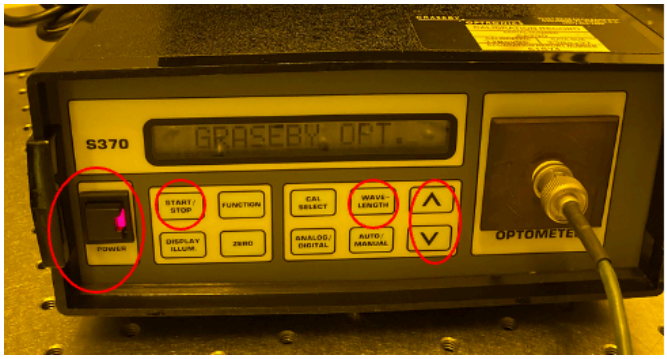
- On the photodetector magnetic mount (near the sample stage), mount the photodetector of the S370 power meter. The photodetector will snap into place on the magnetic mount. Be very careful not to hit the mirror of the stage assembly while mounting the photodetector.

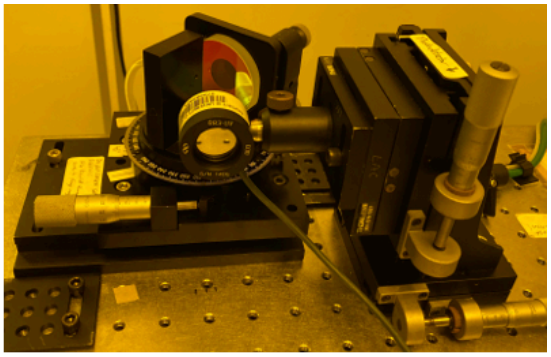


Photodetector magnetic mount stage

S370 photo detector

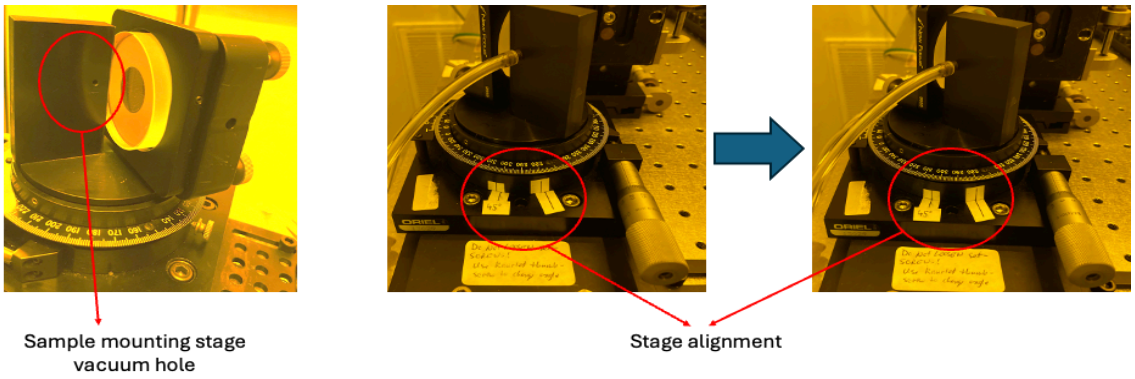
- Turn on the S370 power meter by pressing the power button. The screen will show “GRASEBY OPT”.
- Press the “START/STOP” button. The screen will start to show some optical power reading.
- Next press the “WAVE-LENGTH” button. Use the arrow keys to set the wavelength to 350nm.
- Press “START/STOP” button again.
- Use the screw gauge of the photodetector stage to approximately align the S370 photo detector to the center of the sample mounting stage.
- Open the laser shutter at the laser head. Laser light will go through the optics and fall on the photo detector.
- Note down the optical power reading from the S370 in the log book.
- Turn the shutter off and carefully remove the photodetector from the stage.





4. Sample loading, alignment & exposure

- Turn on the “PneumaDyne” vacuum switch and place the sample on the vacuum hole on the sample mounting stage.
- Using the screw gauge of the sample mounting stage align the stage such that the lines on the “45^0” markers are aligned.



- Turn off the room lights if needed. Start & stop the sample exposure by opening and closing the laser shutter at the laser head manually.
- Use a timer to time the exposure.
- Exposure time is given by the equation: Time(sec) = Dose(mJ) / Power (mW)
- For example, if the power measured from the laser using MELLES GRIOT power meter is 20mW and the dose for the resist is 100mJ. Then the exposure time is: Time = 100mJ/20mW = 5sec

5. Sample unload

- Carefully remove the sample by turning off the vacuum switch.
- Carefully replace the metal cover on the top of the sample mounting stage.
- After making sure the laser has been turned on for at least 30min, turn the laser off by turning the “KIMMON He-Cd LASER POWER SUPPLY” key to off position.
- Turn off the laser interlock switch located on the wall. In the log book note down when the laser was turned off.

Trouble shooting

1. If the MELLES GRIOT power meter is showing considerably lower optical power reading at the laser head, wait for 10-20 mins and check again. If the power is still low report tool issue using sign up monkey.

2. If the S370power meter is showing considerably lower optical power reading report tool issue using sign up monkey. Do not try to align the optical setup, users are not allowed to do this.

3. If unknowingly bumped the optical set up, report tool issue using sign up monkey.