Standard Operating Procedure

Zygo Nexview Optical Profiler

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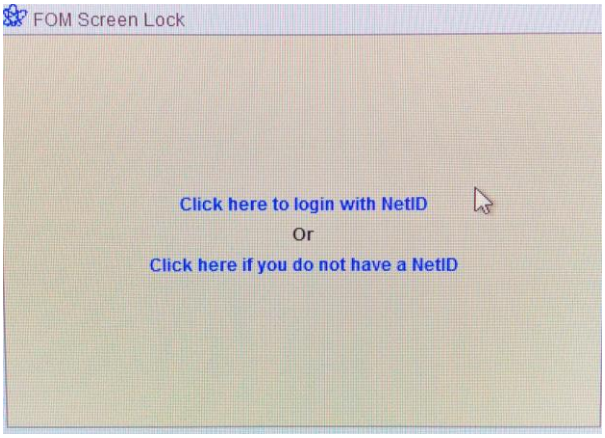
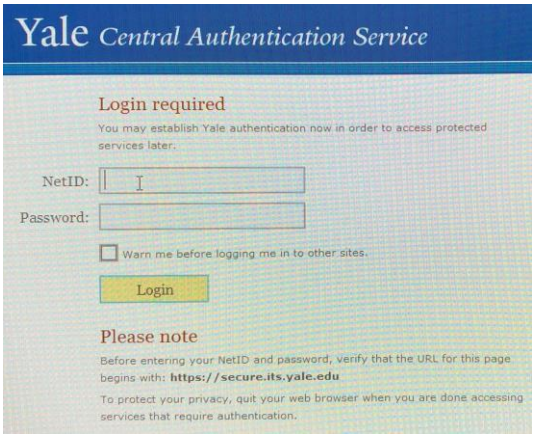
Zygo Nextview Optical Profiler SOP

1. Logbook Sign-In

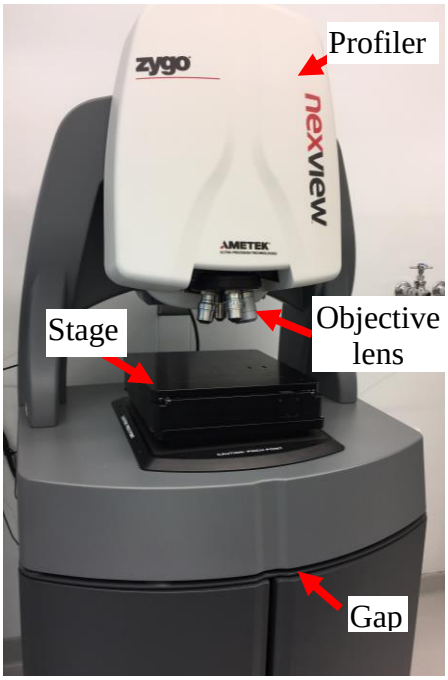
All users are requested sign in the logbook first. Log into your **FOM** account and reserve your time for the profiler.



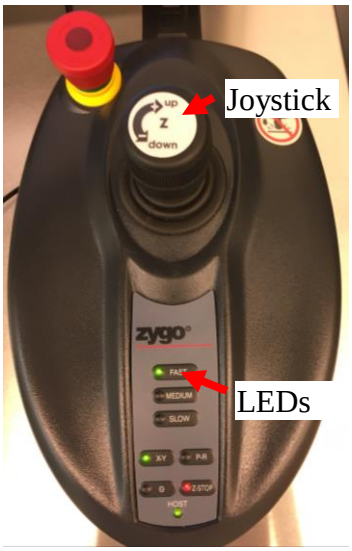


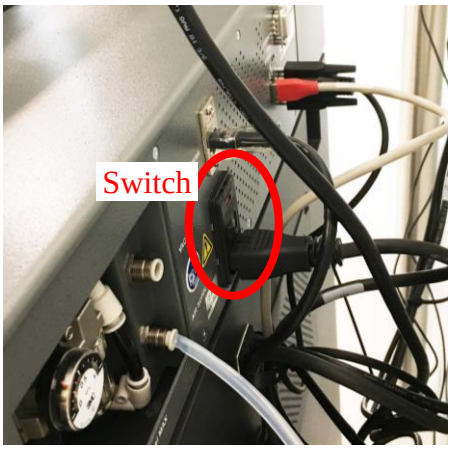
2. System check

1) Check to make sure the pressure of **condensed air** is around **30 psi**. Check the vibration damping table is floating: a gap should be visible between scanning platform and supporting cabinet underneath.



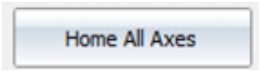
2) Check if the LED lights on the joystick are **ON**; if not, turn on the profiler by pressing the switch on the back of the profiler (see picture below). The lights on the joystick panel should then be turned **ON**.



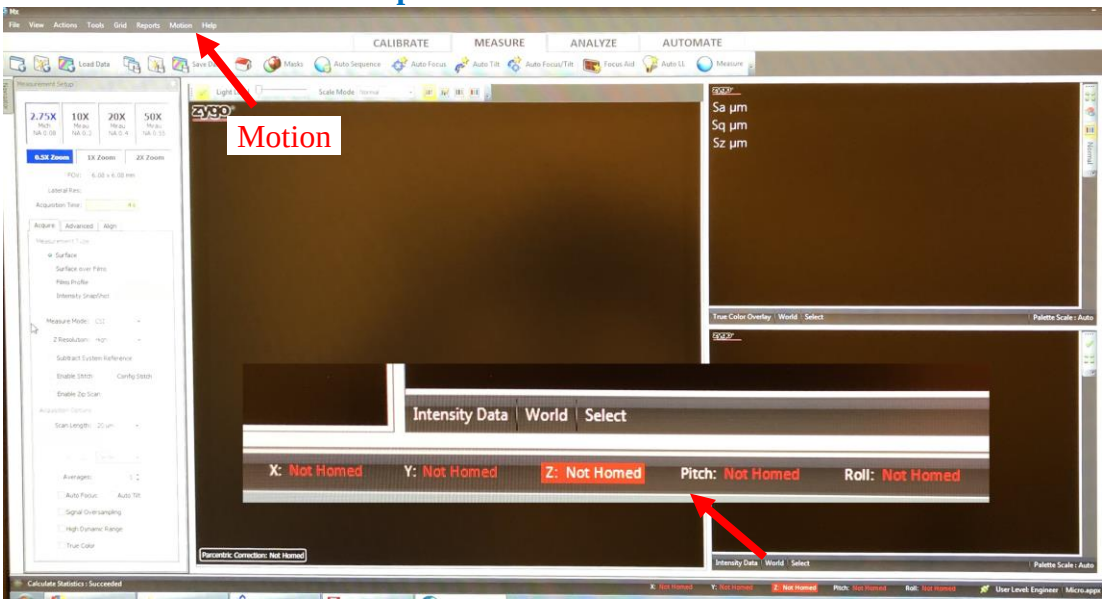


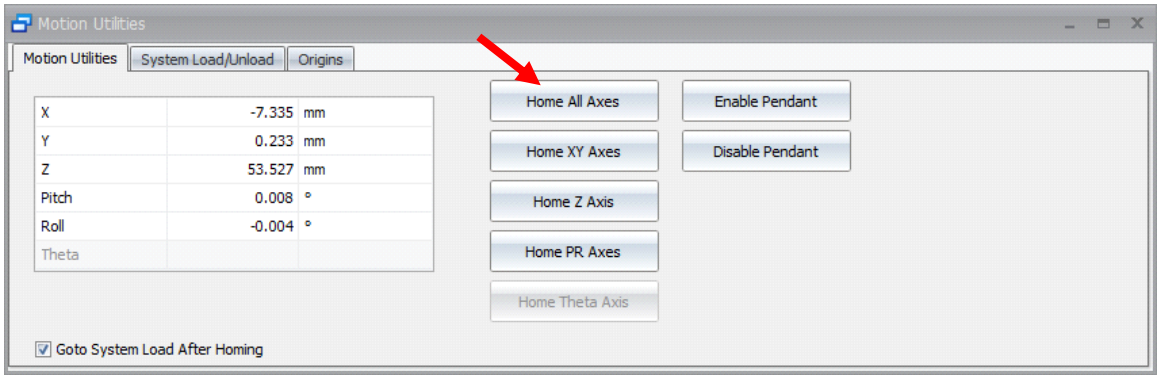
3. Turn on the Mx program

1) If the profiler operating software, **Mx program** is closed, click the **Mx** shortcut on the desktop to open the program. The hardware **initialization** should start. When done, you should see the following picture, but all X, Y, Z, Pitch and Roll are not homed.

2) Then in **Mx program**, click **Motion** → **Utilities** and click 

in the **Motion Utilities** window.
Click **Ok** when **Home all complete**. Then close Motion Utilities window.





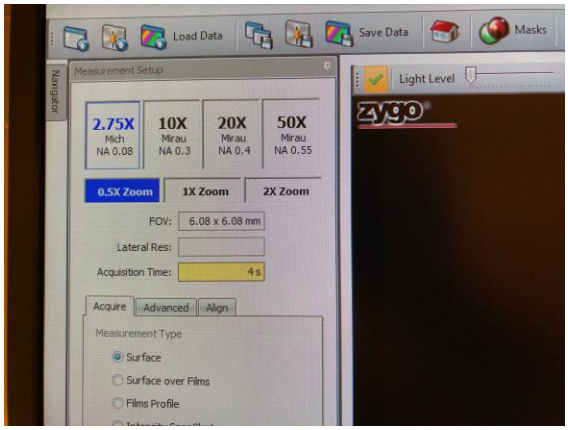
4. Lower the lens and Set up Z-STOP distance

Warnings:

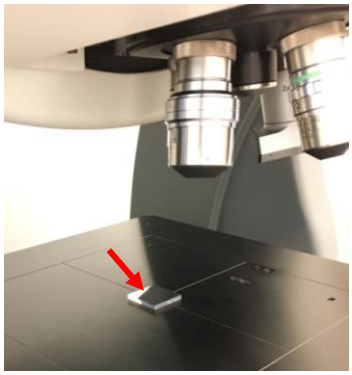
> The **Z-STOP** setup must be performed each time for a new sample.
> The **Z-STOP** setup is **crucial** to prevent lens from crashing into the samples. The repair cost ~**$5k** will be charged **to user PI's account.**

1) Before start, the **Z-STOP** light on the joystick panel should be **flashing in red**. If not, press **Z-STOP** button to release previous setup.

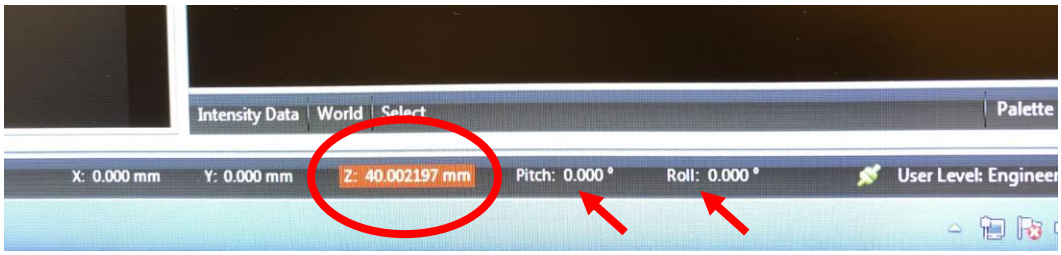
2) Click on **2.75X** lens icon to start **Z-STOP** setup.



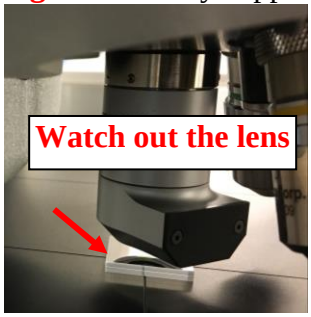
3) **Make sure the lenses are high enough above the stage**. Place the sample near the **cross** in the middle of the sample platform. Then, use the **Joystick** to move the **sample edge** underneath the lens so that the lens reflection can be easily seen when approaching the sample surface.
Warning: **DO NOT touch the lens when placing the sample**! It is **VERY** expensive to repair the lens.



4) **Slowly** turn the **Z-motion** stick **counterclockwise** to lower **down** the lens toward the sample. Watch the **Z value** carefully at right bottom of the window (see picture below).
   a) When Z value is larger than **40 mm**, the **FAST** mode can be chosen by pressing the **FAST** button on the **Joystick** panel. You should hear the beeping sound during lens movement indicating that the **Z-Stop** is not set yet.
   b) When the z value is between **40 mm and 10 mm**, change the **Z** speed to **MEDIUM**.



5) Turning the **Z-motion joystick very carefully when z < 10 mm.** For a standard Silicon wafer **(1 mm thick),** you should see the sample image becomes clear when z < 7 mm. **At z ~3mm, the image becomes very clear.** For thick sample, please use **(thickness +2) mm** as a reference.
Warning: For standard silicon wafer with 1 mm thickness, **never** move the lens too close to the sample **< 2.8 mm**. **Damage** to lens may happen.

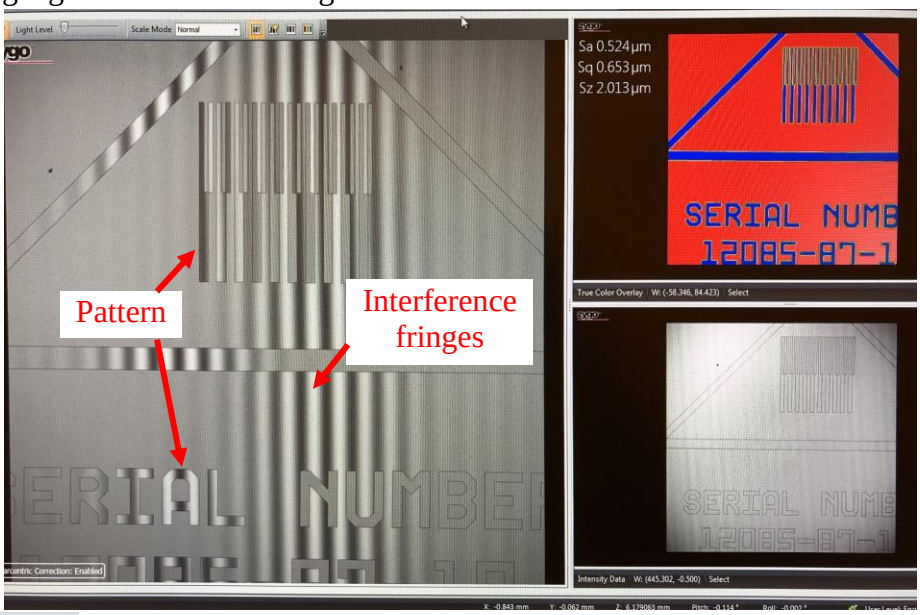


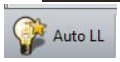
6) Keep lowering the lens carefully using **SLOW** mode. Stop lens movement right after the image passes sharp focus plane and becomes slightly blurring. Press **flashing Z-STOP** button on the panel to set up **Z-STOP**. The **Z-STOP** light should be in **stable red**.

Note: **Z-STOP** light will turn into **green** if the lens is moved away from the sample surface.

5. Focus adjustment

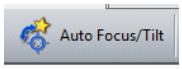
1) Turn the joystick clockwise in **SLOW** mode until the image becomes very clear. Keep adjusting the focus back and forth until you see the **interference fringes** (see below), suggesting a good focus on that region of the surface.



2) Click 

button on the top menu if the image is red, indicating the light intensity is too high.
3) Press **P-R** (Pitch & Roll) button on the joystick panel and move the **Z-stick** around to align the fringes horizontally/vertically in the **middle** of the interested sample area.

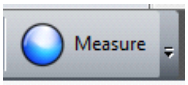
Note: during measurement, user needs to switch between **P-R** and **X-Y** motion to do the tilting adjustment or lateral sample movement.

4) Click 

on the top menu to finish the focusing and tilting on the sample before **measurement**.

Note: if error occurs, repeat fringe alignment and focus adjustment.

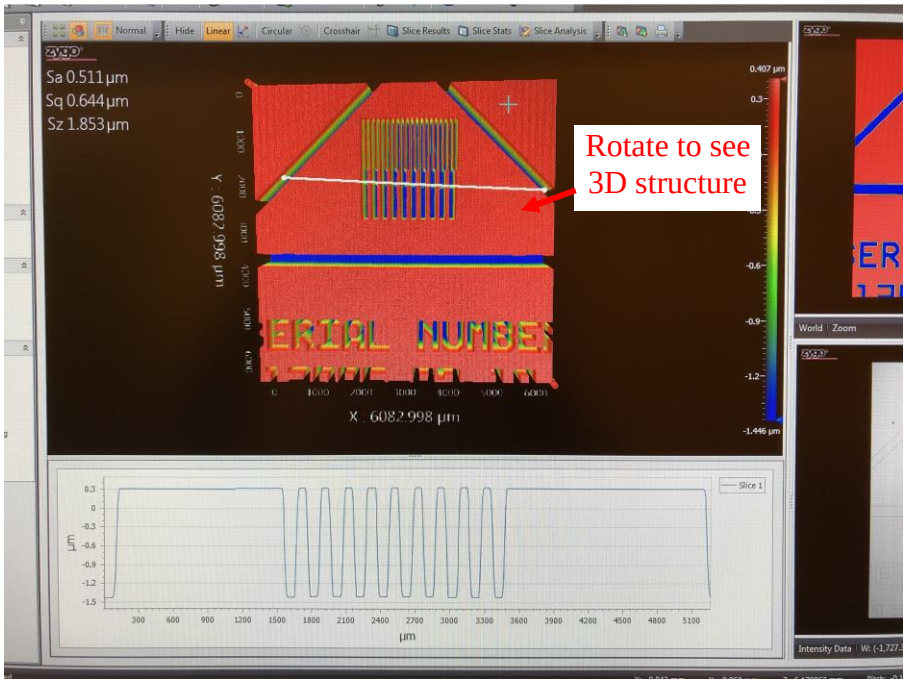
6. Measurement

1) Click on 

button on the top menu to start surface imaging.

Warning: Users should **keep quiet** and **stop walking around** the sample stage during measurement.

2) Click **Analyze** button on the top menu. You can do a variety of analysis including line profile.



3) Save data.

Clicking on **File** menu on the top menu and save Data into the **C:\Cleanroom Users\user name folder**

4) Change the objective lens and field size if needed.

7. Close the measurement

1) Make sure the **Z-Stop** button light should be stable in **green**/**red**.
2) Turn the **Z-joystick clockwise** to move the lens away from the sample to **z ~ 10 mm**.
3) Check and change the lens magnification to **2.75X** and **0.5X Zoom**.
4) Switch to **FAST** button on the joystick panel. Turn the **Z-joystick clockwise** to move the lens away from the sample, until **z ~100mm**; then take the sample away from the stage.

   Warning**: DO NOT touch the lens when removing the sample!**
5) Press **Z-STOP** button on the joystick panel to **release** the Z-STOP for measured sample. The **Z-STOP** light should be flashing in **red**.

Warnings:

This step is **crucial** to prevent lens crashing into new samples.

6) Close the **Mx** software.
7) **Turn off** the sample stage power in the back of the stage. The LED lights on the joystick panel should be **OFF**.

Warnings:

> Users should **Not** reboot the computer;
> **DO NOT** close the compressed air valve or disconnect the air tubing.

8. Logbook Sign-Off

1) Log out the FOM account. Users are requested to sign off the logbook and make comments for any concerns. Please CONTACT cleanroom manager (Lei Wang at 203-745-8460) for emergencies.
8) Clear the computer desk; make sure your samples are not left behind.
9) Put tools (tweezers) back to the tool box.