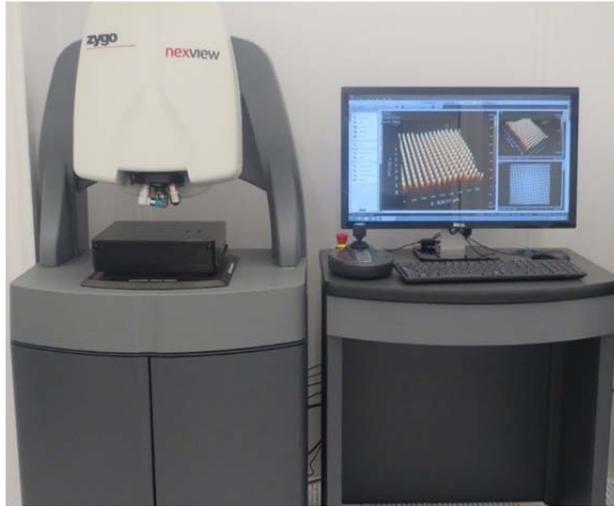


Zygo 3D Optical Profiler



1. Introduction

Nexview 3D optical surface profiler excels at measuring all surfaces – from super-smooth to very rough, with sub-nanometer precision, independent of field of view.

Measurement types include flatness, roughness, large steps and segments, thin films, and steep slopes, with feature heights ranging from < 1 nm up to 20000 μm .

Features and Specifications

- Z precision: less than 1nm
- Objective lens: 5X, 10X, 50X
- Zoom lens: 1X, 1.5X, 2X
- Auto Light, Auto Focus, Focus Aid and Auto Tilt available
- Multi scan length from 5 μm to 145 μm
- Extended scan length available
- Advanced analysis tool
- Motorized turret
- Joystick control of stage: X, Y, Pitch and Roll

2. Safety and Precautions

- a) Always set Z-stop first before focusing on any sample.
- b) Always start with 5X objective lens to focus on your sample.
- c) Always look through eye-pieces while lowering the objective lens.
- d) Lenses are calibrated. Never adjust the lenses or have the lenses contact with samples.

- e) The EMO button is located at the top left side of the joystick. Press the EMO button if there is an immediate danger to the equipment or personnel. This will stop all the movements (objectives, stage, etc.) and can prevent crashes.
- f) Pay attention to safety symbols on the equipment.
- g) Follow the operating procedure described here to use the tool safely.

3. Operating Procedure

Activate this tool in FOM before you start. Deactivate it when finished.

3.1 Start up the software

1. Login in FOM.
2. On the computer desktop, double click the shortcut for Mx to start the software.
3. Click **Load Application** icon (the first icon on the left), select **Micro.appx** from the pop-up dialog window (Figure 1). Then click Open.

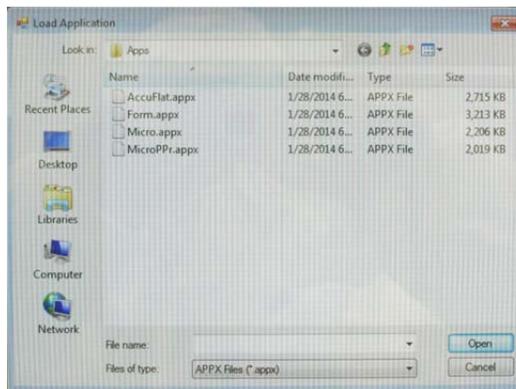


Figure 1

3.2 Load Sample

1. Use the joystick (Figure 2) to raise the microscope by turning its handle clockwise. Raise it high enough to load you sample.
2. Place you sample on the stage. Do not use any tape or glue.
3. Switch the objective lens to 5X by clicking on the 5X box in the left column of the software screen (Figure 3). Note: Always start with the 5X lens for focusing before doing any measurement.
4. Use the joystick to lower the microscope to about 2 cm above the highest surface of your sample. You can choose either Fast or Medium speed by pressing the corresponding button (Figure 2).

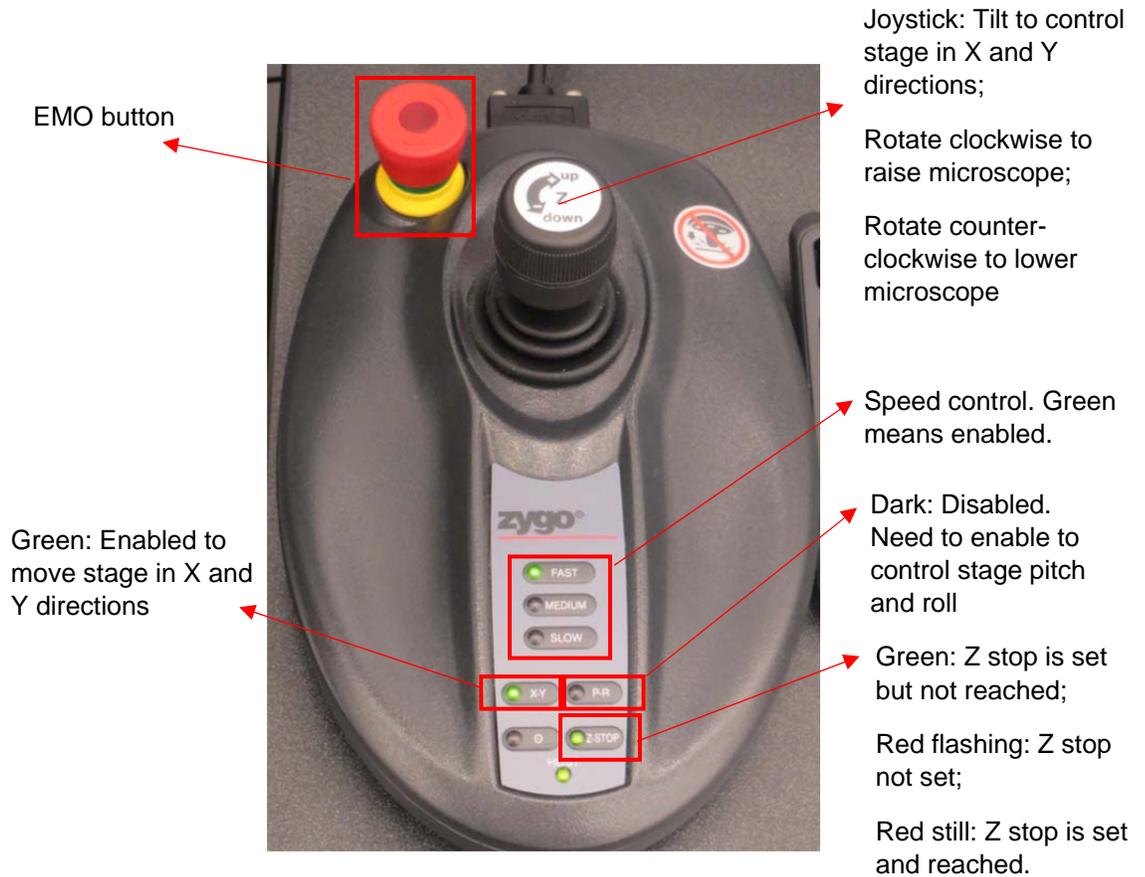


Figure 2

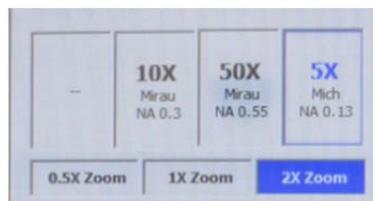


Figure 3

5. Set up the Z-stop. Continue to lower the microscope using Medium speed to a position which is about 5 mm above the highest surface of your sample. Press the Z-stop button twice to set up a new Z-stop position for your sample. When it is set, the LED light on the Z-stop button (Figure 2) should be red and NOT flashing. Raise the microscope little bit, the LED light should turn to green. Note: this step is very important to avoid having the lens to contact your sample, which will damage the lens. Always set a new Z-stop after changing samples.

3.3 Take Measurements

1. Focus on your sample surface by slowly raising the microscope using joystick with medium speed. If the light is too dim or too bright, click the Auto

LL icon (Figure 4), which is at the right side of the icon bar on the software screen, to auto tune the light intensity for focusing.



Figure 4

2. When you get a good focus, use joystick to slowly move lens up and down a little bit until you see some fringes on the screen, as shown in Figure 5. Whenever you see red colors on the fringes, click the Auto LL icon to auto tune the light. Continue to slowly move the lens up and down so that the brightest fringes are seen on the screen.



Figure 5 Fringes on the screen.

3. Click the Auto LL icon if needed when you have the brightest fringes on the screen. Then click the Auto Tilt icon (Figure 4) to auto level the surface of interest.
4. Choose the appropriate Scan Length from the left column of the software screen (Figure 4). The appropriate scan length would be two times the expected thickness of your film or height of your step.

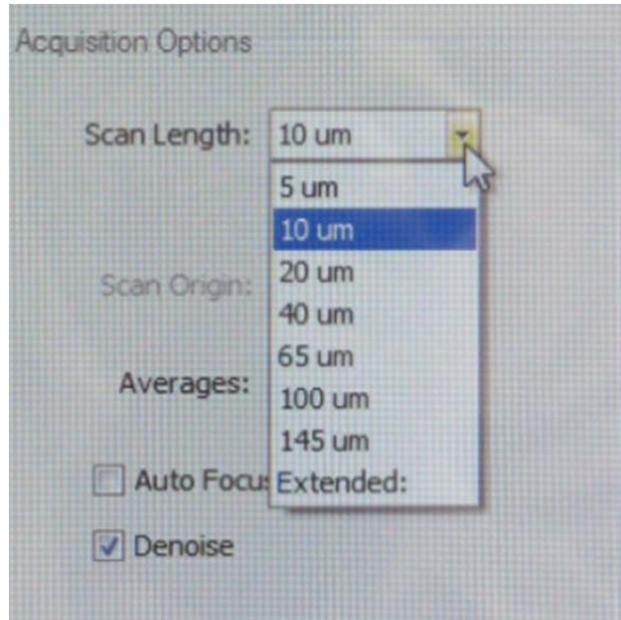


Figure 6 Choose scan length.

5. After that, click the **Measure** icon (Figure 4) to take a measurement. Once it is done, the surface topography will be displayed on the right side of the screen. You can view the 3D topography by clicking the Analyze tab (Figure 4).

3.4 Basic Analysis

Note: The software can do more analyses than what are described here. Due to complexity of the advanced analysis, only basic analysis skills will be described here. More advanced skills will be taught during the training.

1. Click the **Analyze** tab on top of the menu bar to switch it to analysis mode. You will see a bigger topography image of your sample here in the center region of the screen.
2. On the left side of the center image, you can see some function buttons as shown in Figure 7. Use the arrow button to draw a line across the points of interest on your topography. The cross-section profile of your sample at this line will be displayed at the bottom of the screen as shown in Figure 8.

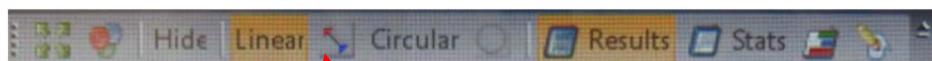


Figure 7

To draw a line across the profile image

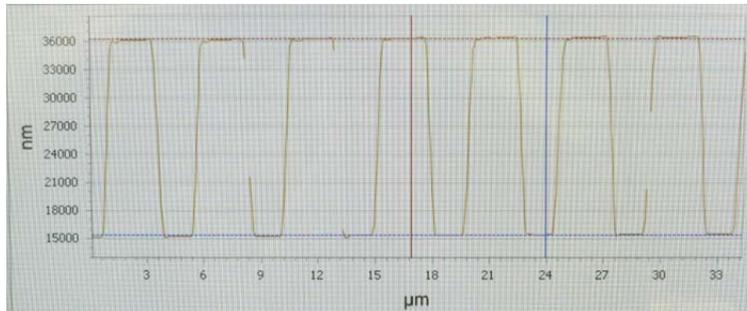


Figure 8

3. Right click on the line profile, select inspector, show inspector 1, and show inspector 2, to bring up a red and a blue vertical line on the line profile.
4. Use the mouse to move the red and blue vertical lines to measure the height difference in between the two horizontal dotted lines. The results are displayed on the right side of this profile as shown in Figure 9.

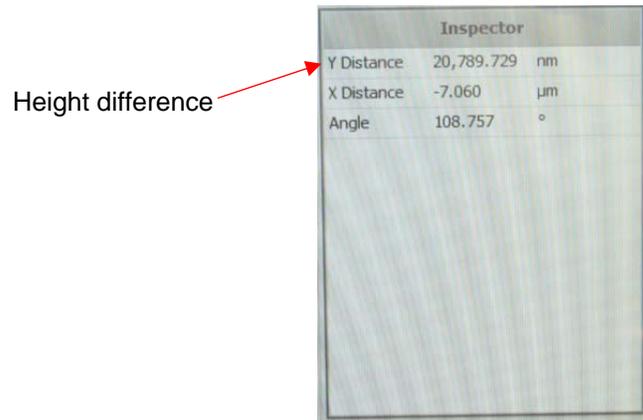


Figure 9

5. To save line profile, right click it and select Export. To save 3D image, click Save Data on the top-right corner.
6. After finishing all measurements, close Mx, without saving the application. Raise the microscope to remove your sample.
7. Logout in FOM.