

Wyko Optical Profiler

Purpose

This machine investigates variations in topography for surfaces ranging from very smooth to 2mm step height. Basic interferometric principles are used with light reflected from a reference mirror combined with light reflected from a sample to produce interference fringes, where the best-contrast fringe occurs at best focus.

Two modes of interferometry are used: PSI (Phase Shifting Interferometry) mode uses variations in phase of a monochromatic (632 nm) reference source to combine with beam reflected from the sample to form interference rings. The variation in intensity of the rings at significant phases is used to calculate small height variations on the sample surface. VSI (Vertical Scanning Interferometry) mode uses short coherence length of white light to measure the resulting degree of fringe modulation (coherence) between the reference and sample beams as the interferometric objective moves vertically through sample focus. The vertical position of the optics at peak fringe contrast is extracted for each point on the sample surface, resulting in a topographical map.

	Range	Vertical Resolution
PSI	up to 150 nm	3 Å
VSI	up to 2mm	3 nm

Operation

1. Power up:

- Log In
- Power on small monitor

2. Setting up Scan

- Open Vision 32 software
- Click Measurement Options toolbar
- Select Options tab
 - Select resolution: Full or Half
 - Select scan mode: under 150 nm use PSI; otherwise, use VSI
 - **Make sure objectives are raised high above the stage**, then select objective and FOV
- Select the PSI or VSI tab, depending on which mode selected for scan
 - Set up scan parameters
- Open Intensity window
 - Adjust intensity to allow maximum amount of light without saturation (red)

3. Mount Specimen

- Ensure the objectives are raised high above the stage
- Move stage out – **but not to the limits**
- Mount specimen
- Apply vacuum to secure sample

4. Focusing

- Using Z-stage control and while carefully observing sample, lower objectives to a position that is approximately 1mm above sample. **Closely watch all objectives and their interaction with the stage and sample to ensure no part of the objectives touch the sample or stage.**
- To focus, observe the monitor closely and slowly **raise** the objectives until the **top** surface of the feature of interest comes into focus. The interference rings will appear at optimum focus.
- Adjust the tip/tilt to orient the optic head until the rings spread into one large ring (nulling). **DO NOT FAST TILT** (pressing the black button on the joystick while tilting).
- Adjust the intensity for maximum light without saturation.

<See reverse side for more instructions>

5. Scanning

- Press the 'new' toolbar (ctrl + n)
- Do not touch or jar the sample while scanning
- View/Modify/Save data as required

6. Shut Down

- Turn off light using the Intensity window
- Close software
- Power off small monitor
- Log Out

Notes: Leveling Data

1. Click 'Mask Editor' on the toolbar
 2. Select geometry – usually rectangle
 3. Highlight the area to be leveled. Make sure all points within the area are at the same elevation.
 4. Select 'outside'
 5. Under the mask editor section:
 - a. Select 'terms' mask
 - b. Click 'on'
 - c. Click 'save', then 'ok'
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