Washington State University Vancouver Cleanroom
Standard Operating Procedure

Equipment Name:	**Optical profiling system (Veeco WYK0 NT 1100)**		
Process:	Inspection with Optical Profiler in the Vertical Shift Interference (VSI) Mode		
Scheduling Name:	Optical Profiler (VEECO)	**Revision Number:**	1.0
Model:	WYK0 NT 1100	**Revised by:**	Sam Judd (360)546-9201
Location:	VECS046, Bay 3	**Date:**	10/23/2024

The NT1100 use white light interferometry for high-resolution 3D surface measurements, from sub - nanometer roughness to millimeter- high steps. We can use Vertical Shift Interferometry for samples up to 1 mm height with 3 nm resolution.
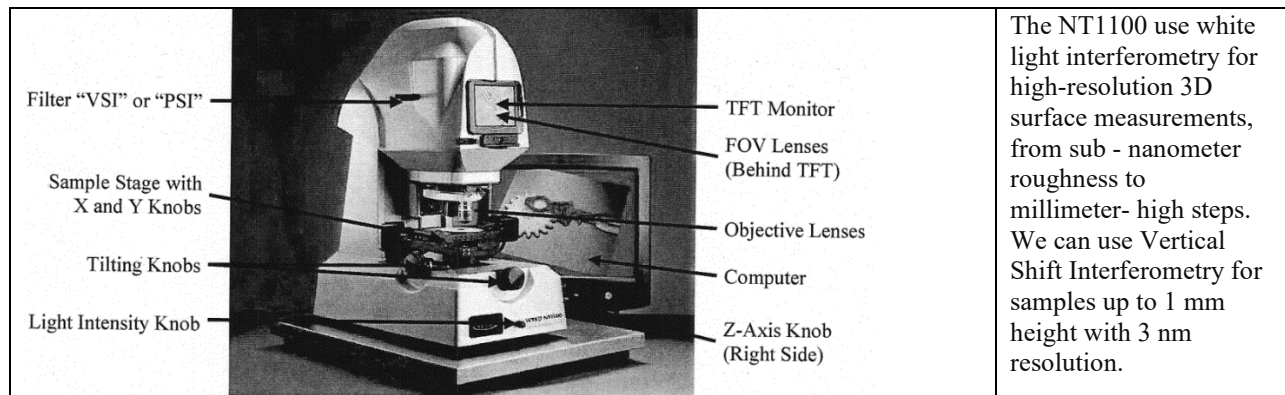
Procedure:
1. Power on the NT 1100 optical profiling system.
2. Power on the computer and start the Vision software.
3. Power on the TFT monitor if desired. This is the small monitor on the NT1100. The "Intensity" button does the same function.
4. Load sample onto the stage.
5. Adjust the Z-axis knob, on the right-hand side of the machine, to find the best focus. At the best focus, you can see the high contrast fringes.
6. From the Vision software, click "Hardware", then click "Measurement Options", choose "VSI" as the Measurement Type and select the correct optics setup.
7. Under tab "VSI Options", adjust "Backscan" and "Length", which determine the vertical scan range of the laser.
8. Click "Set the Intensity" to open "Light Intensity" window. Adjust the light intensity knob, on the front side of the machine, till no red dots are shown on the "Light Intensity" window.
9. Choose "VSI", on the left side of the machine. The vertical range of VSI is 1 mm and the resolution is 3 nm.
10. Make sure the sample is in focus with the highest contrast fringes again. Null the fringes by adjusting two tilting knobs, one on the left side and one on the front side of the stage. Make sure only 3-4 fringes on a flat surface. The fewer number of fringes gives a better image. Finally, focus on a high point of image for scan starting point. The system will Backscan distance noted above and scan down the Length past your lowest point of interest.
11. Start the measurement from the Vision software by clicking "New". Add title and notes as desired at this point.
12. Data analysis and image processing.
    a. [2D Analysis] shows the surface profile in 2D.
    b. [3D Interactive Plot] shows the surface topography in 3D.
13. Save data and images.
    a. The Vision software does not provide image export functions. You can save Database file to use later.
    b. Push "Print Screen" key on the keyboard of the computer.
    c. Paste the captured screen image in Windows Paint and save the image for later editing.
14. Decrease the light intensity to minimum (fully counterclockwise).
15. Power off the TFT monitor if used.
16. Turn off the Vision software.
17. Power off the computer.
18. Power off the system.

Useful Information:

	Vertical Range	Resolution
Vertical Shift Interference (VSI)	1 mm	3 nm
Phase Shift Interference (PSI)	160 nm	3 Å

Filter	VSI	PSI Low Mag	PSI High Mag
Total Magnification	N/A	<10	≥10

Field Size (mm x mm) FOV: field of view	5x	20x	50x (not available at WSU)
FOV 0.5x	2.47x1.88	0.62x0.47	0.25x0.19
FOV 1x	1.24x0.94	0.31 x0.24	0.12x0.09
FOV 2x	0.62x0.47	0.15x0.12	0.06x0.04

Lamp rated for 100 hours. **Remember to turn it off after use.**

> International Light Technologies
> Tel: 978-818-6180
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> Part# L7388
> 6 volts, 20 watts, G4 base type, C-6 Filament type, 420 lumens
> Also available as:
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>> Osram ESB FHE 64250 HLX lamp 20w 6v G4 Halogen Light Bulb

Definitions:
1) **Primary Scan** is the scan taken in a measurement.
2) **Backscan** is the distance back (up) from the starting point that the translator moves before starting the measurement. Adjust backscan to measure all points of interest above your point of focus.
3) **Length** is the distance the translator scans forward (down) from the original starting position.

Software

> Freeware analysis suite, Gwyddion, can use 3D image data files from NT1100, the NanoSurf AFM and other 3D image formats.

> http://gwyddion.net/download.php