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BRUKER Contour X-200 3D Optical Profilometer User Manual

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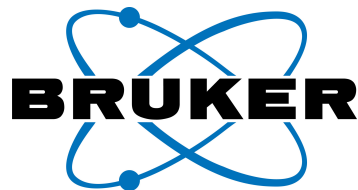
BRUKER Contour X-200 3D Optical Profilometer

Bruker Contour X-200 user Manual

Phase shifting interferometry (PSI) for roughness and small steps (< 135 nm)

- Vertical scanning interferometry (VSI) for rough surface and steps up to 10 mm high
- PSI vertical resolution: <0.01 nm
- VSI Step Height Accuracy: <0.75 %
- Lateral resolution: 0.38 µm
- Location: Zone 15

Equipment Description
The Bruker Contour X-200 is an optical profiler providing three-dimensional surface profile measurements without contact. Two working modes are available: VSI (Vertical Shift Interference) and PSI (Phase Shift Interference). The VSI mode, based on white light vertical scanning interferometry, is dedicated to device measurement. The maximum measurable topography is 10mm and there are some limitations to measure slopes depending on the optics numerical aperture and surface roughness (see table 1). The PSI mode, based on optical phase-shifting, is dedicated to roughness measurements with adjacent pixel-height differences smaller than 135nm. The system is able to run automatic stitching to grab larger fields.

Principle

Bruker Contour X surface profiler systems are non-contact optical profilers that use two technologies to measure a wide range of surface heights.

- Phase shifting interferometry (PSI) mode allows to measure
 - Smooth surfaces

- Small steps
- Vertical scanning interferometry (VSI) mode allows to measure
  - Rough surfaces
  - Steps up to 10 millimeter high

User Guide

1. Login on the Bruker Contour X-200 using the zone 15 main PC.
2. DO NOT PLACE ANY SAMPLE ON THE STAGE !! RISK OF COLLISION WITH OBJECTIVES
3. Open Vision 64 Software on the X-200 PC. The tool will initialize.
4. Move the stage using the joystick until it is far away from the objectives. Keep the button on the joystick pressed for high speed movement. Load the sample and activate the vacuum switch. Adjust the light intensity.


5. In "Measurement Setup", choose :
   - a. The mode : VSI/USI for steps up to 10 mm, and PSI for roughness measurement and steps up to 135 nm.
   - b. The lens.
   - c. The multiplier/FOV.
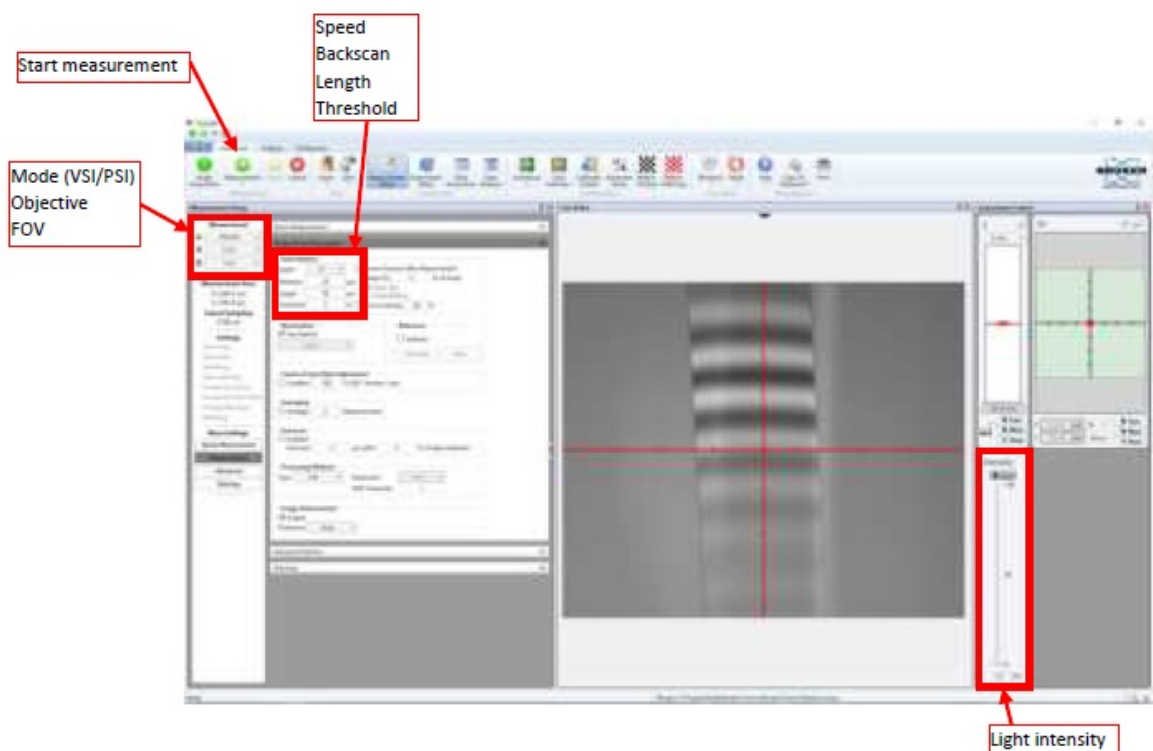
6. Focus on the sample surface using the rotating knob. Keep the "FAST" button pressed if needed and find the interference fringes.

   N.B. : There is an autofocus option available. To use it, the first step is to approach the objective reasonably close to the sample, while looking at the objective and sample to stop before crashing the objective on the sample. Then, press on "Autofocus". The objective will only move upwards, so there is no collision risk during the process.

7. Reduce the number of fringes (=reduce the sample tilt) by turning the corresponding knobs on the front and on the left of the stage holder. VSI = <15 fringes, PSI= 1 fringe. If measuring a step, it is recommended to have the fringes perpendicular to the step.
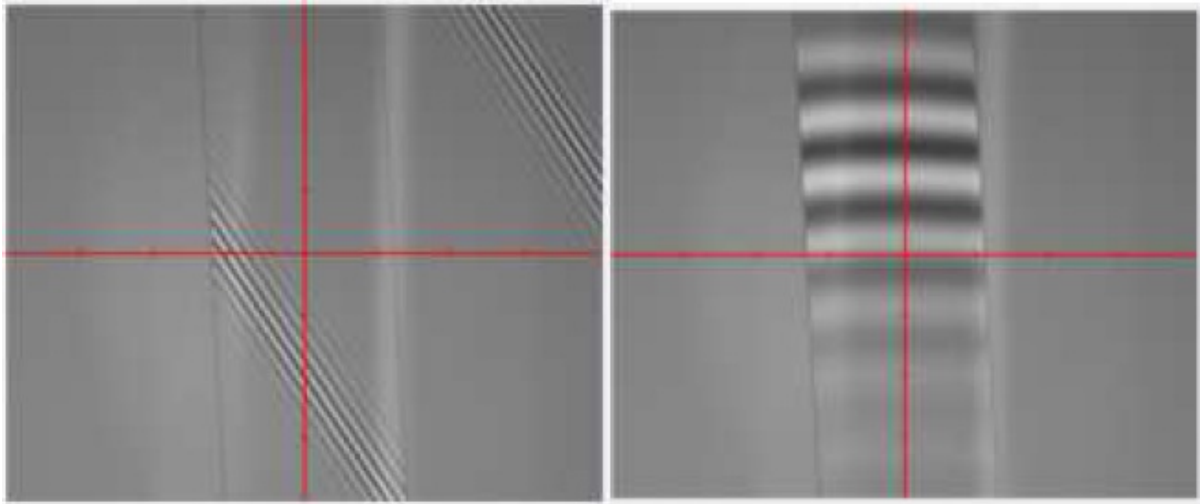

8. In "Measurement Parameters", select :
   - a. The speed of acquisition
   - b. The backscan (= distance traveled upwards by the objective, from the starting position, before starting the acquisition)
   - c. The length of the measurement
   - d. Leave other parameters unchanged to begin.
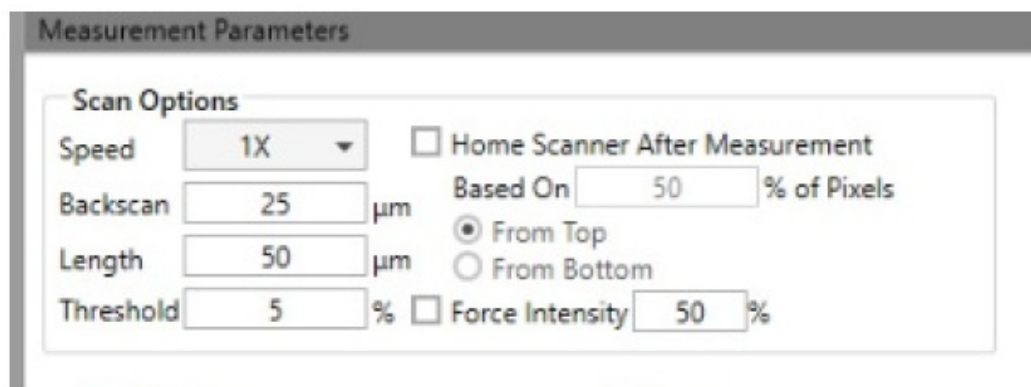
9. Click on "Single Acquistion"
10. A live view of the acquisition can be obtained by selecting "Height Map" during the measurement.

Switch to live view during measurement
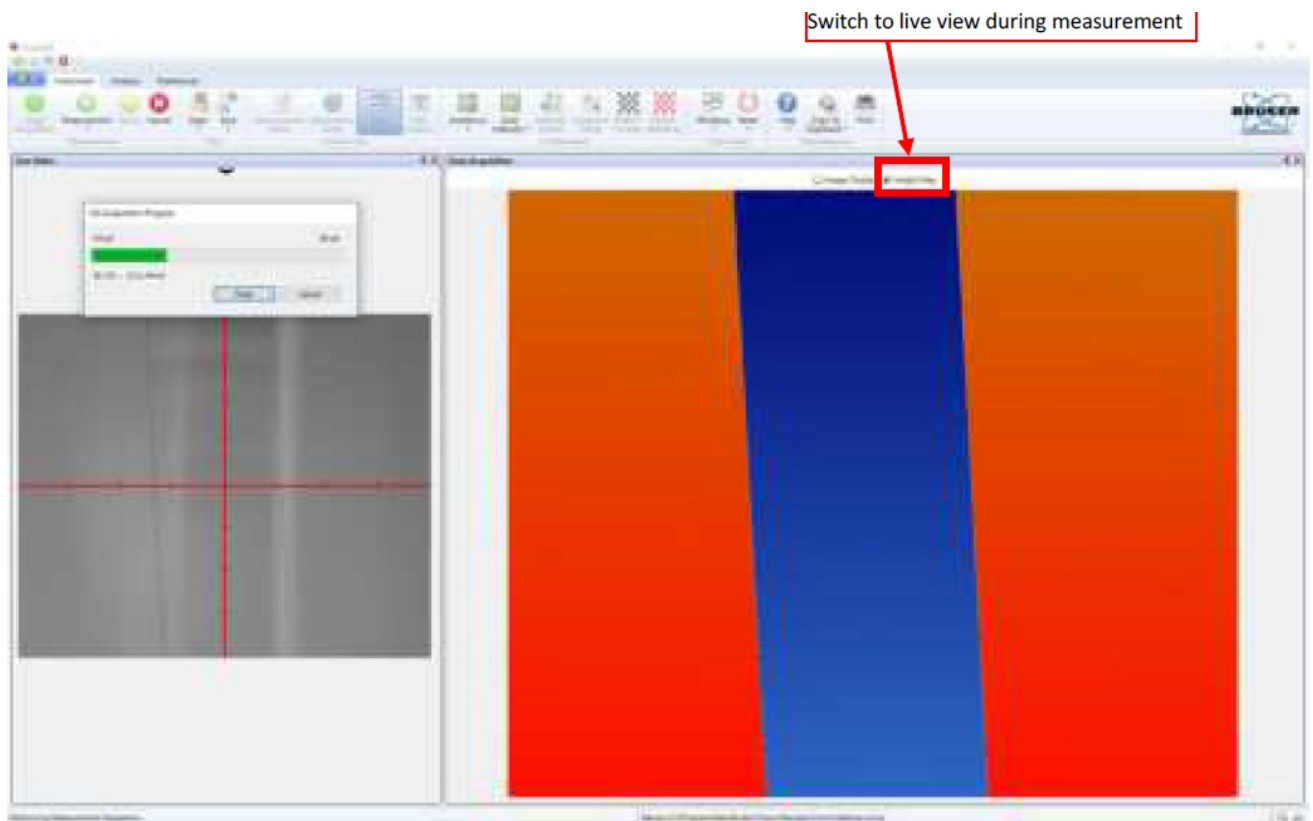
11. The data has to be leveled (i.e. the sample tilt and/or curvature has to be removed). To do this, right click on "Terms Removal (F-Operator)" under the "Data Analyzer" tab. Select the type of leveling and specify the regions to use by checking the "Use terms mask" option, and define the mask by clicking on "Edit Mask".
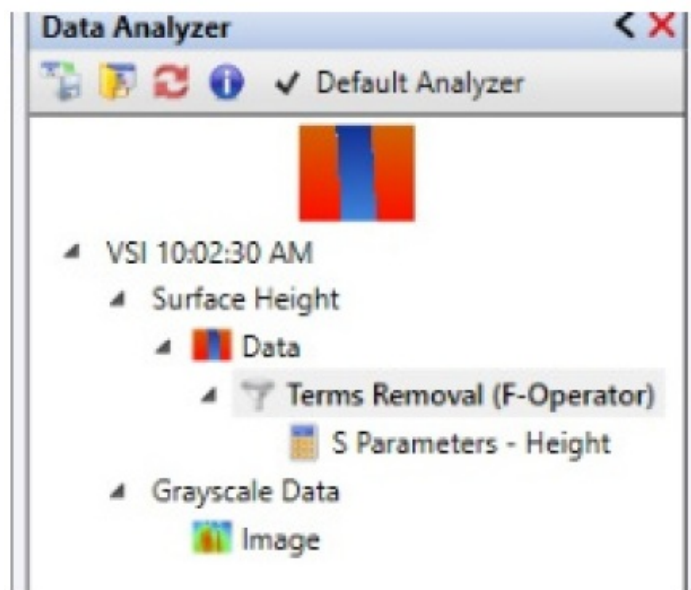
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Contour X-200, 3D Optical Profilometer, Contour X-200 3D Optical Profilometer, Optical Profilometer, Profilometer