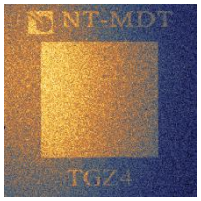
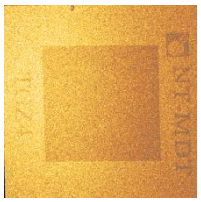
SHeM Angular Detection Manuscript - Experimental

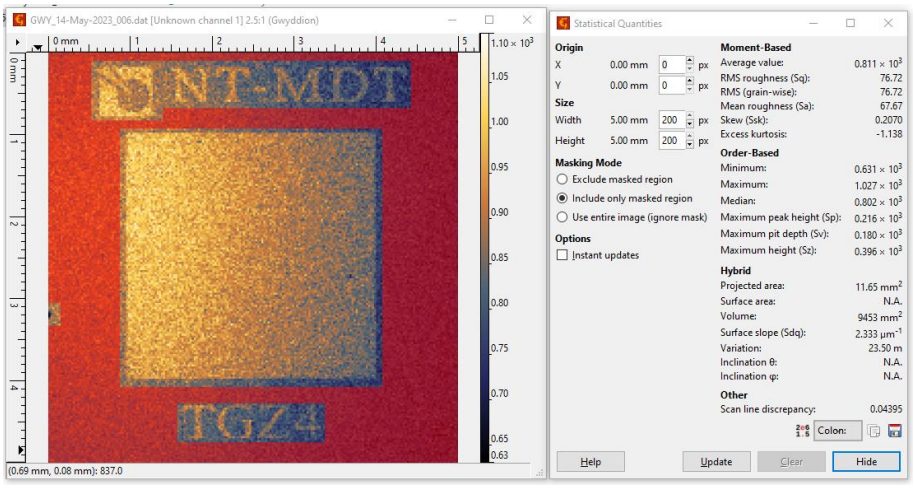
Grating Micrograph Analysis:

1. Scan files used for the subsequent analysis are detailed in the table below (sourced from folder data\Inverted Contrast Micrographs). All scans used a 1750 / 1500 msec read/wait, 25 micron step between pixels, and were 200x200pixels in size (total scan area of 5x5 mm).

Orientation	SHeM Data File	Raw Micrograph
Parallel	14-May-2023_006	
Perpendicular	16-May-2023_002	

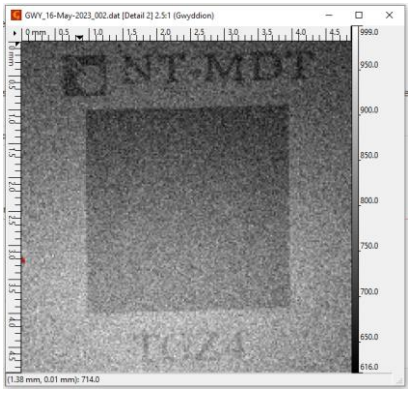
2. Rotated *16-May-2023_002* anticlockwise by 90 degrees to match the first image.

3. Masked appropriate region of the frame background for each micrograph within Gwyddion and checked the counts for this region (see screenshots below). Critically the frame median values are almost identical, well within the expected noise for the technique

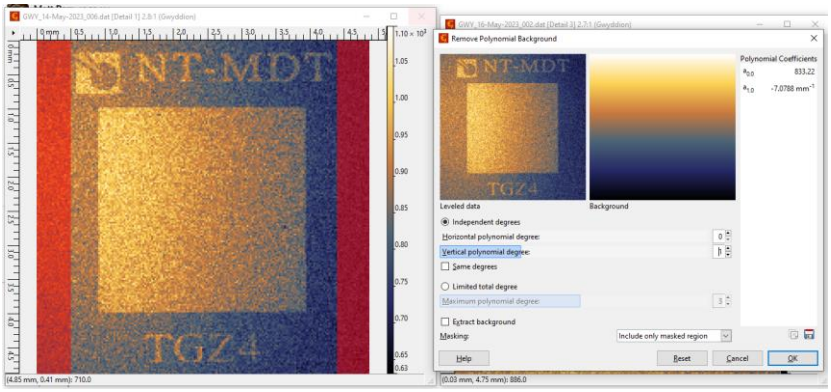


4. Cropping: Using the 'Crop' tool in Gwyddion, cut each micrograph down from 200x200 pixels to 195x195 pixels. Main goals were to remove the topographic feature present along the left edge as much as possible, and remove the scan areas off the substrate in the *16-May-2023_002* scan, while matching the approximate scan area between each image as best as possible.

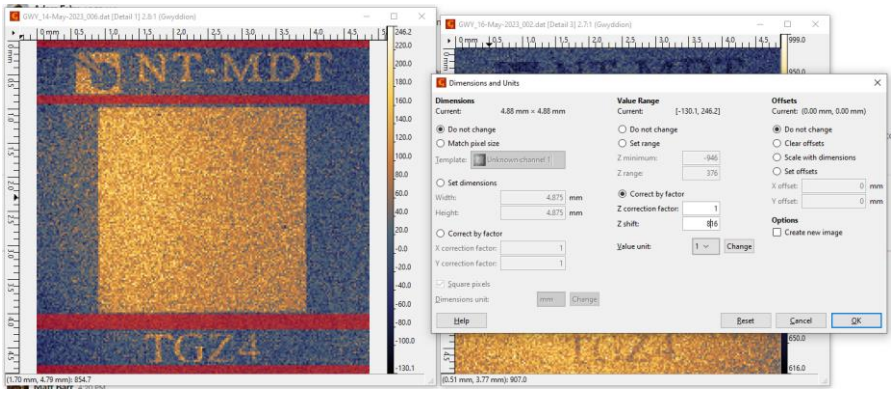
5. Scar removal: For the *16-May-2023_002* scan was not able to remove entirely of feature along left edge via cropping. Masked the remaining 6 pixels in Gwyddion, before using 'Data Process' → 'Correct Data' → 'Interpolate Data Under Mask'.



6. Vertical flattening: For both micrographs, masked vertical strips along both edges of the scan along featureless areas of the substrate. Noted the count rate for this region (median ± RMS), went into 'Remove Polynomial Background' and selected a vertical polynomial of degree 1. Horizontal and vertical axes independent, and the former was set to zero. Background was based on the masked region only. Once the background was removed, went to 'Data Process' → 'Basic Operations' → 'Dimensions and Units', and under the 'Value Range' menu selected 'Correct by factor', using a 'z correction factor' of 1 and a 'Z-Shift' of the previously noted median value to return the scan to the correct intensities. Count rates for the altered scan compared to the initial values to ensure no change.



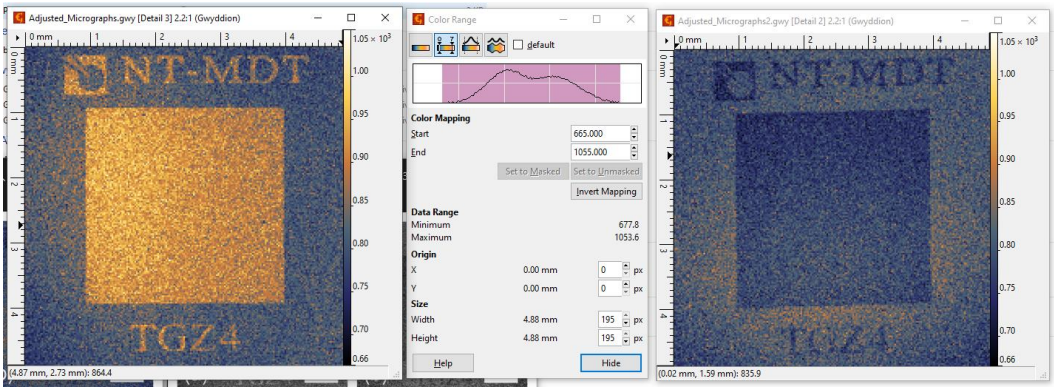
7. Horizontal flattening: For both micrographs, masked horizontal stripes across along featureless areas of the substrate in multiple locations. Noted the count rate (median ± RMS) before going into 'Remove Polynomial Background' and selecting a horizontal polynomial of degree 1. Horizontal and vertical axes independent, and the latter was set to zero. Once the background was removed, went to 'Data Process' and corrected the data as for the vertical flattening using the previously noted intensities. Count rates for the altered scan compared to the initial values to ensure no change.



8. Post the flattening across both micrographs, had the following (to nearest whole number):

	14-May-2023_006	16-May-2023_002
Masked Frame – Median Value	810	809
Entire Image – Minimum Value	678	668
Entire Image – Maximum Value	1054	950

9. For each micrograph, went into the 'Colour Range' within Gwyddion and set a fixed range spanning the total intensity spread across the two images – in this instance, 665 - 1055.



10. Exported various PNG versions of the micrographs with and without scale bars.