Karlsruhe Institute of Technology

Institute of Microstructure Technology

Correlative Characterization: Enhancing the capability of the region of interest transfer

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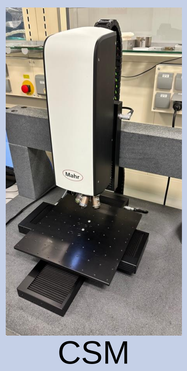
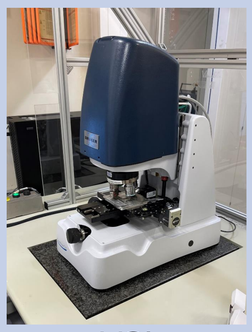
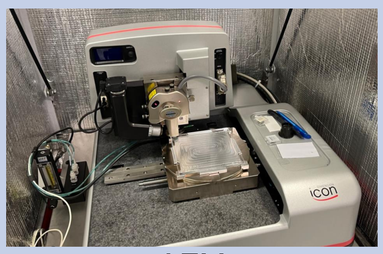
Introduction

Correlation of measurement results of different measurement methods may gain more information about one specific spot at the surface of a sample. This can be challenging if therefore different measurement devices have to be used


CSM

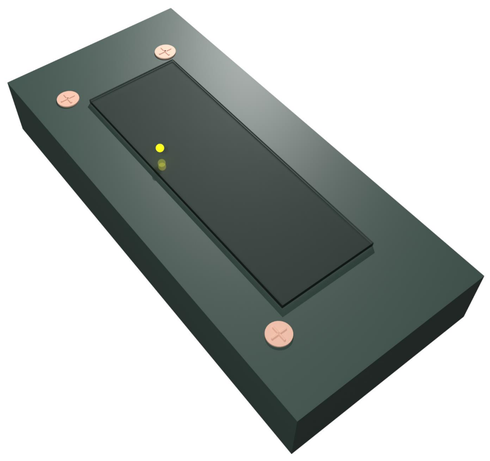

VSI



AFM

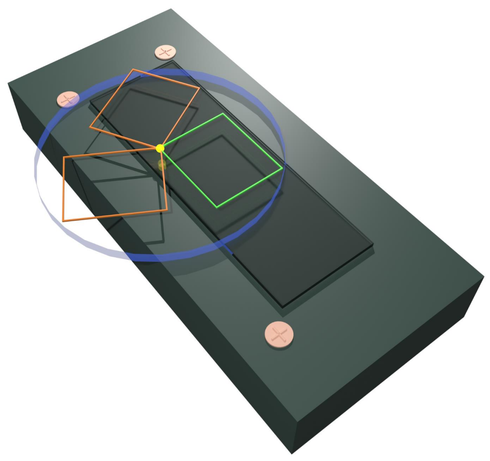
The challenge by using different measurement devices is the switching of the sample between the different measurement devices.
This switching can be a source of uncertainties and time loss. The region of interest must be found in all measurement devices very precisely, especially in this micro- and nano order of magnitude.

Current Version – Single Point



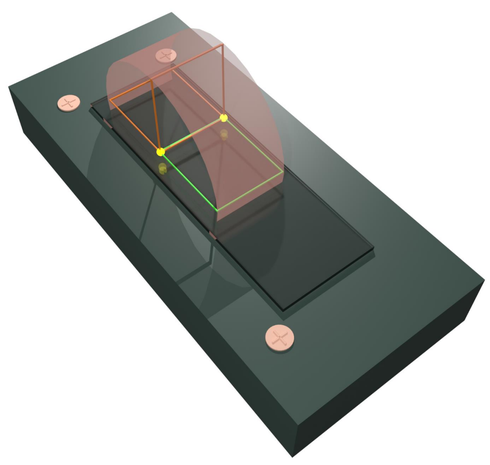
In the current version is just a single Spot transferred between the different devices

Definition with one point



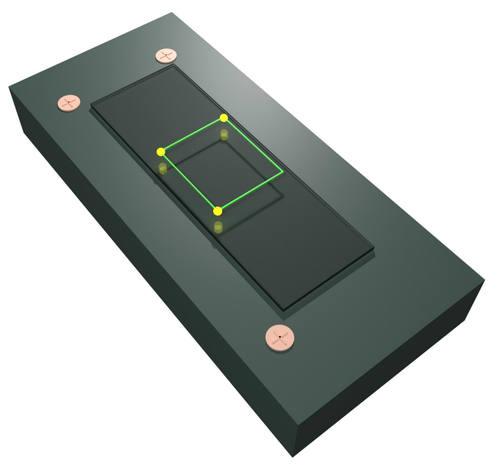
With only one point to define a Region of interest as an area the filed can freely rotate about the one point that is transferred between the devices.

Definition with two points



Two points reduce the degrees of freedom to one. The ROI can only rotate about the axis between the two points.

Definition with three Points



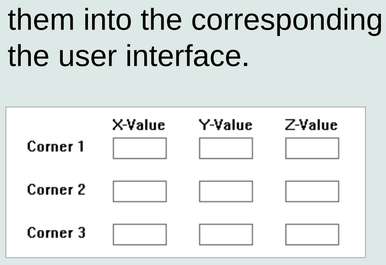
With three points there is no degree of freedom left. The ROI position is completely defined.

Region of interest as an area

The ROI needs to be defined as an area to clearly define the position of interesting structures. Here as a rectangular one using three points to be defined. This can be done in two ways.

Manual definition:

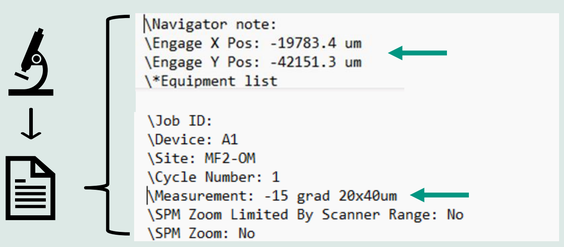
Defining the region of interest in a manual way needs the operator to find out the corner Points of the ROI and fill them into the corresponding boxes of the user interface.



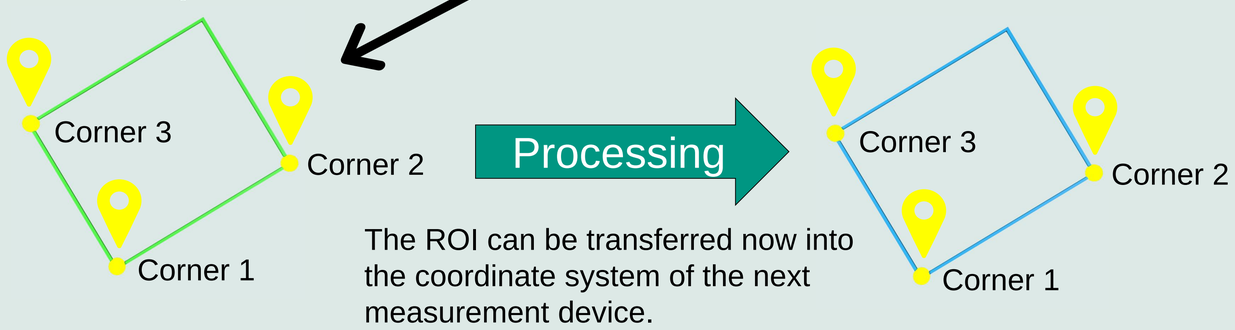
Automated import:

Measurement result files contain:

- Start Position
- Direction of the measured area
- Dimensions of the measured area

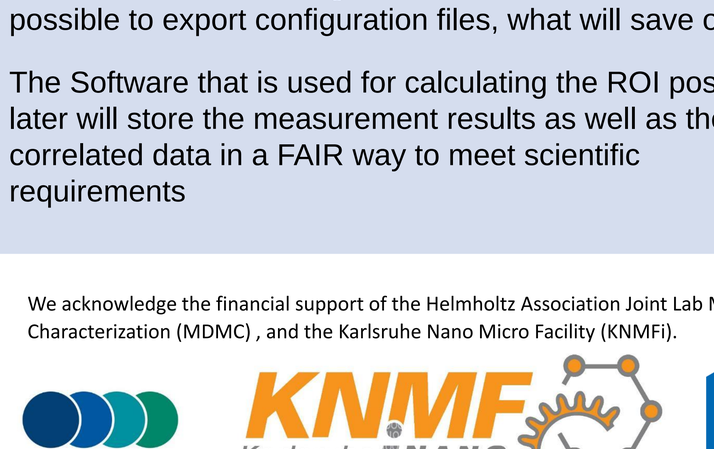


Using the content in the file the three positions can be calculated.



The ROI can be transferred now into the coordinate system of the next measurement device.

Complete representation of the region of interest



The complete vector representation of the ROI consists of three paths. Each of them is leading to one corner point of the Region of interest. The vectors are related to the fiducial markers, so the position is independent of the coordinate system of the measurement device.

Benefit:

Defining an area instead of a single point is more precise than giving just one point as a hint where to find the interesting area. This enhancement can provide a higher precision in the field of correlative surface characterisation.

Outlook:

Depending on the used measurement device, the operator can receive information how to configure the measurement device. Later it might be possible to export configuration files, what will save operation time.

The Software that is used for calculating the ROI position later will store the measurement results as well as the correlated data in a FAIR way to meet scientific requirements

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