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TM017 – Image domain analysis   WiRE™ 5

This document aims to show the WiRE™ 5 user how to use the particle analysis software. It assumes the appropriate password has been purchased and entered.

Generating images suitable for use with particle analysis software

In order to derive particle statistical information from an image, a suitable image needs to be provided.

To do this:

1. Run a map measurement over the appropriate area.
2. Generate a Raman image from the map data (i.e. intensity at a point, component analysis, etc) and then review it in WiRE.
3. Use the look up table (LUT) control to maximise the contrast in the image such that it is predominantly only 2 colours, one for the particles (typically white, or brightest colour) and the other as the background (everything else – typically black or most dark colour). See module TM18 - Viewing and saving image data – page 6.

Note that the image contrast can be inverted using the look up table control.

Loading images into the particle statistics software

1. Export the image by selecting the appropriate thumbnail (highlighting the thumbnail such that it is coloured blue) and choosing the 'ExportToParticleDistAnalysis' procedure. This will automatically load the image into the particle analysis software.

   Only one image can be loaded at a time.

Generating particle analysis metrics

Generating average and distribution values from the entire image

On loading the Raman image the statistics are automatically generated.

Figure 1 shows the particle statistic window. The image domains (particles) are coloured to indicate that they are considered separate where they have close neighbours. There is **no** colour correlation with particle size.

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Initially the component property parameters (highlighted in Figure 1) can be selected to show the average value for the entire image. The distribution of this average with particle frequency is shown in the graph below the average value.
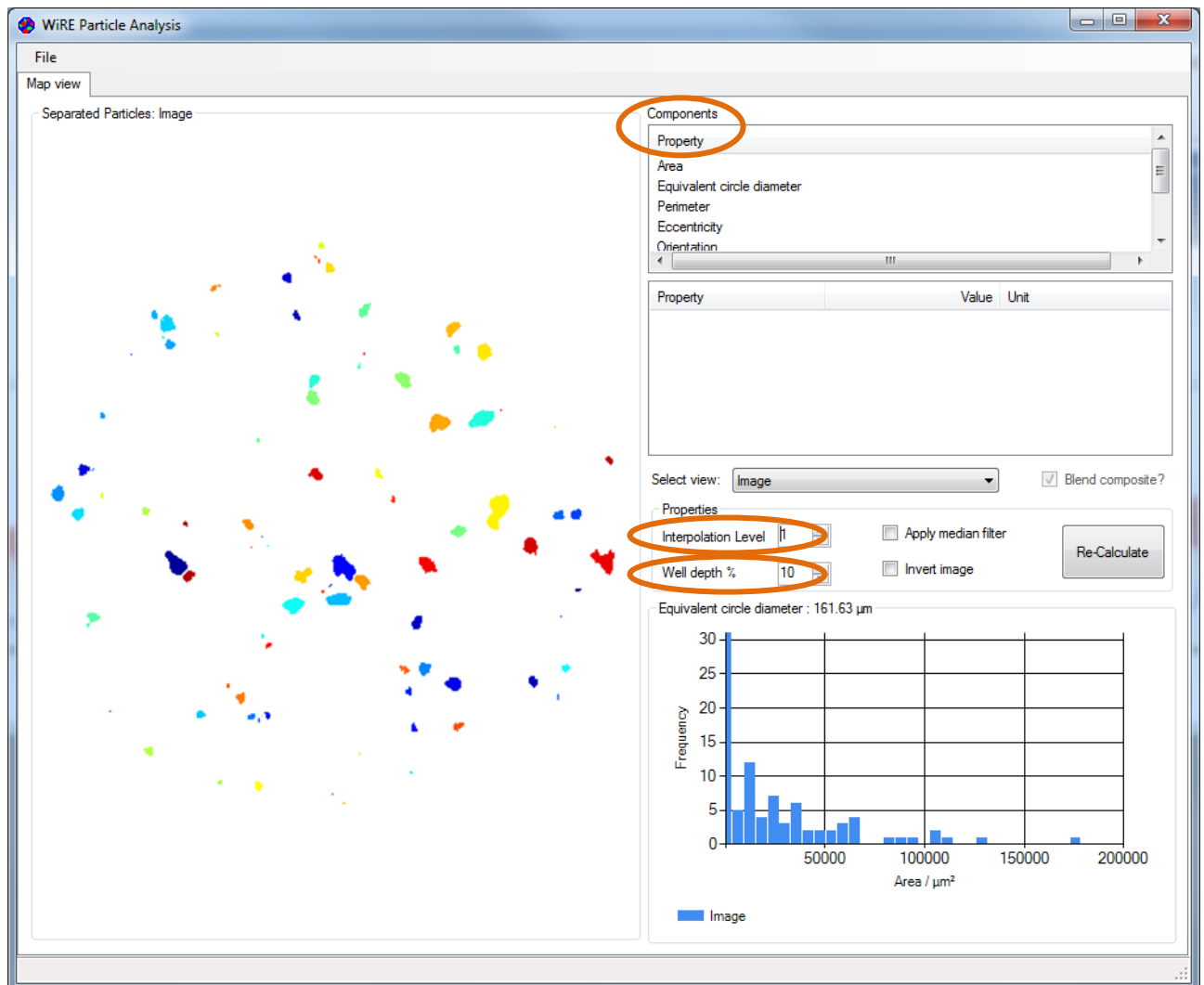

Figure 1. Example particle statistic interface screen showing average domain values and distribution

Ensure the 'Apply median filter' option is **un-ticked**. If this option is ticked, single pixels will not be analysed from the original image.

Well depth - The well depth enables the user to control the segmentation of the image domains. Increasing the well depth decreases the sensitivity of the domains to be treated separately (decreases sensitivity of segmentation). Change the value and select 'Recalculate'.

Note: the interpolation level does not significantly influence the reported values and is not a parameter which should be adjusted.

Generating values from individual domains

Individual domains can be selected by clicking directly onto the image.

Now, in addition to the average information, the values specific to the individual domain are reported (Figure 2). Here, the position of the centre of the domain (centre of mass) relative to the entire image is additionally reported. The selected particle is coloured black to highlight which has been selected.
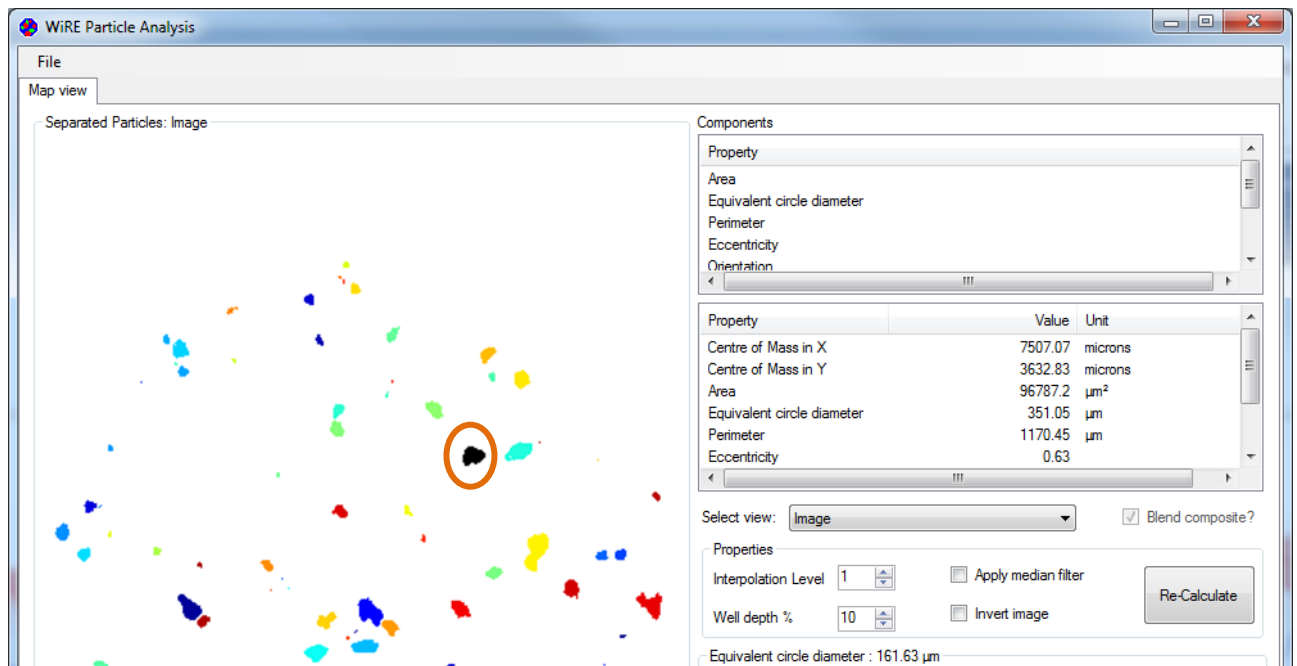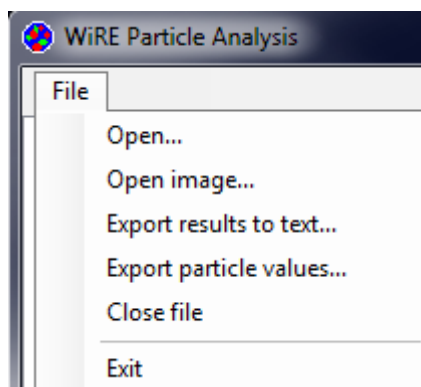

Figure 2. Example particle statistic interface screen showing average and individual domain values

Exporting image and domain values

These values can both be exported as text files from the main File menu:

Export results to text: - This option exports all average parameter values. It also outputs the total number of particles.

Export particle values: - This option exports all individual domain parameter values.

Seeding map measurements from image domains

White light images can be exported into the particle analysis software from static video images or montages. The white light image is automatically contrast optimised based on the red, green, and blue colour channel intensities.

The domains highlighted in the particle analysis software can then be re-imported into WiRE using the 'ImportToParticleDistAnalysis' procedure, where a map measurement will be automatically generated to collect a single spectrum from each domain centre (using the same analysis parameters).

This provides a solution where a single spectrum from each optically visible domain is desired.