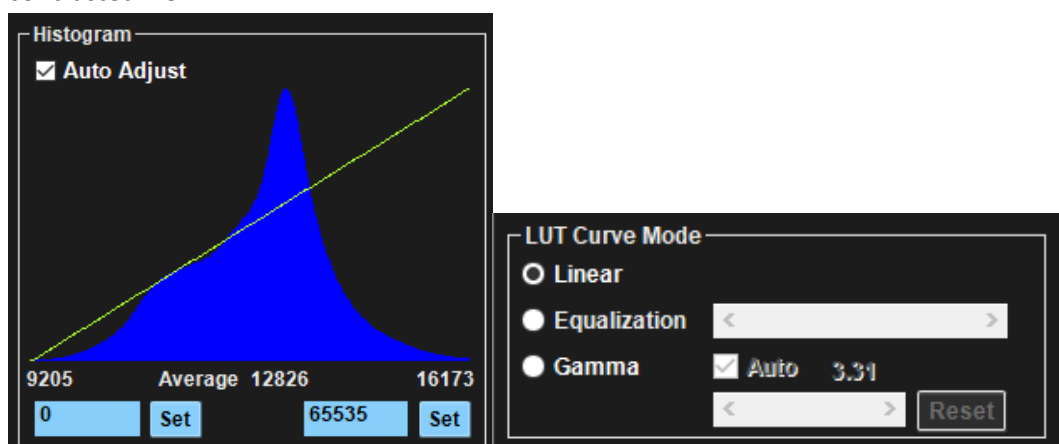


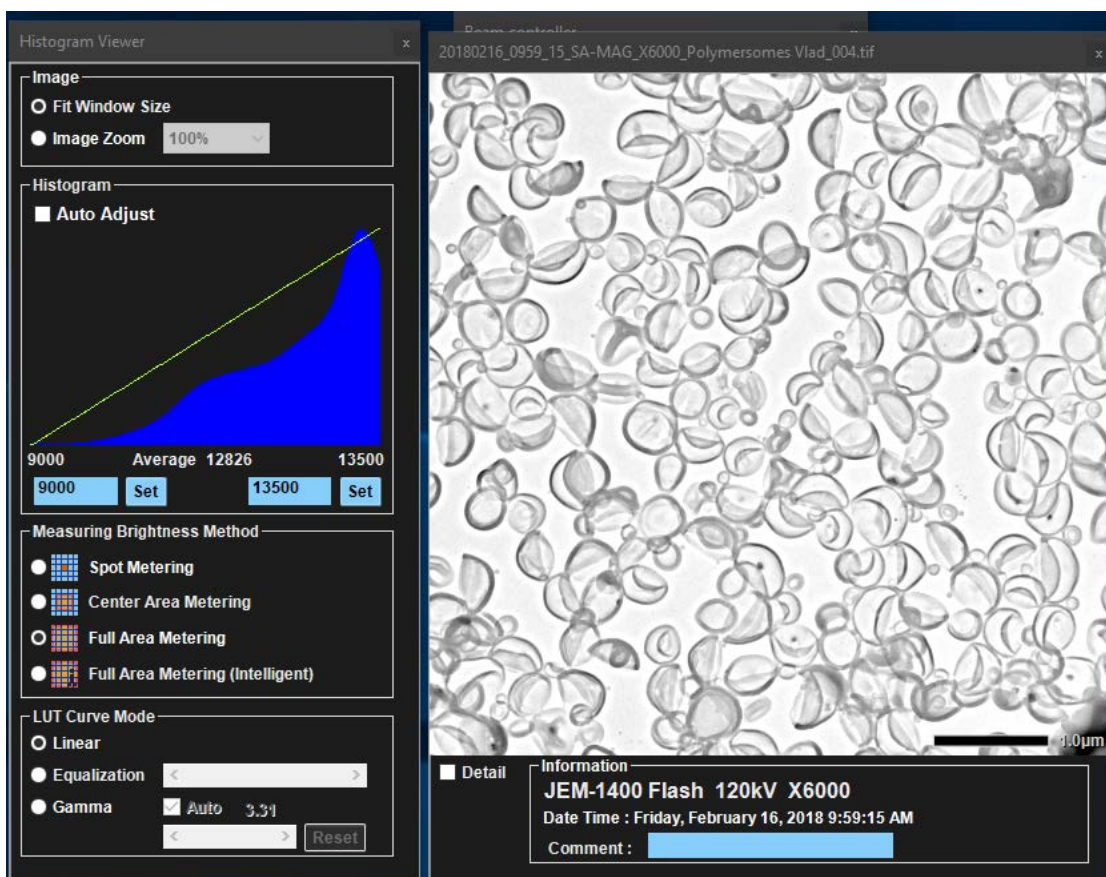
Difference between acquired full scale tiff and display

- **In short:**

Always **save images as 16 bits tiff** in order to retain the full information for post-processing or image analysis. To optimize the contrast of the display of an image, at the beginning of a project, **Set the minimum to 0 and Set the maximum to 65535 inside the histogram window, then select the check box Auto Adjust**. Further options: Measuring brightness Method (Spot, Center, Full area, Full area intelligent) and the LUT Curve mode (Linear, Gamma, Equalize). See explanations below. Recommendation: besides the full 16 bits image, save also an 8 bits bmp (256 gray-gradations from the darkest to the lightest pixel) contrasted view.

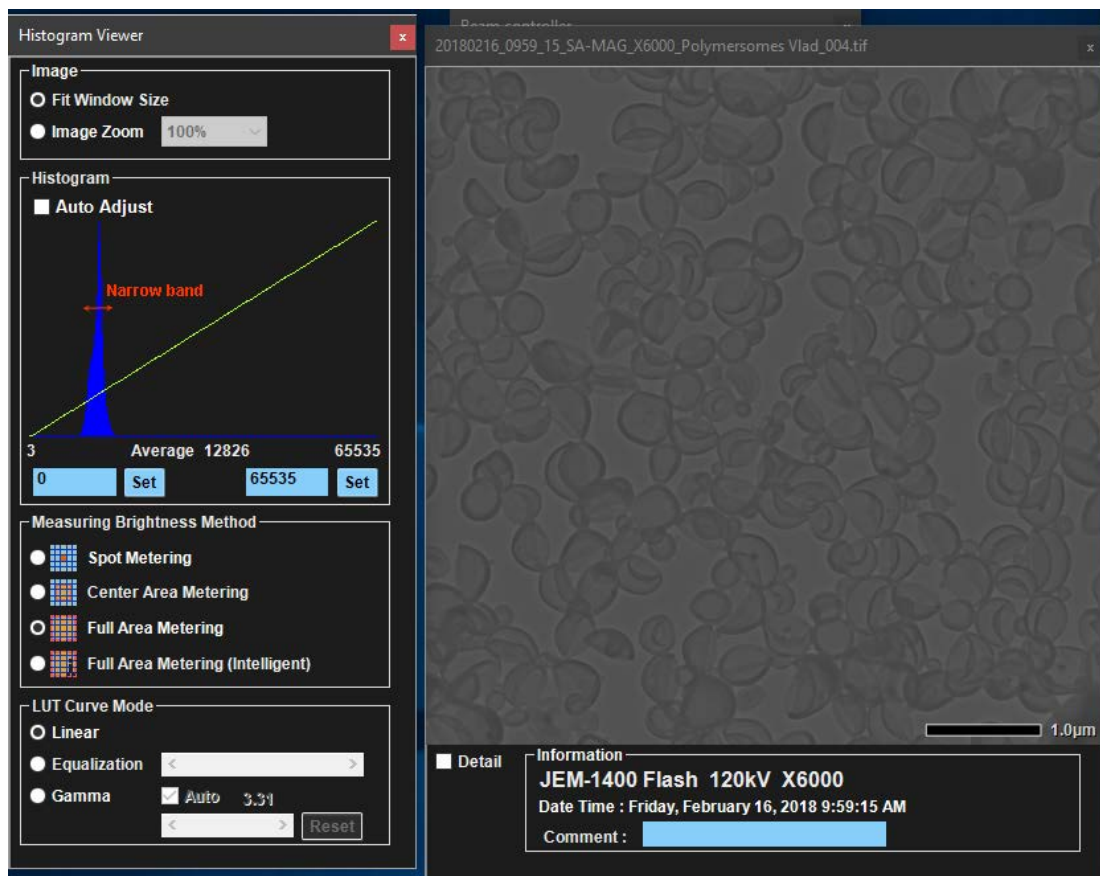


- Images acquired as tiff with the camera in TEM Center retain the full 16 bits information on gray levels. This is valid even if the display (in 8 bits on a normal monitor) would not show the full range of pixel values, depending on the settings. This means that after reopening a tiff image, one can go back to the original full-shades image and readapt the display in this later session.
- How to readapt the display for a better contrast? Reopen the tiff image in TEM center. The example below shows a tiff image that has been stored with a truncated suboptimal display (abrupt cut in the histogram on the right side), as can be seen from the histogram. In this view pixels with a value 9000 are shown as black, and all pixels above 13500 are shown as white, although 13500 is very likely not the true maximum value in the full-scale image as acquired by the camera. As a result, the image looks as if it were saturated, with a lot of white in the display, but in fact this is just a display mistake.

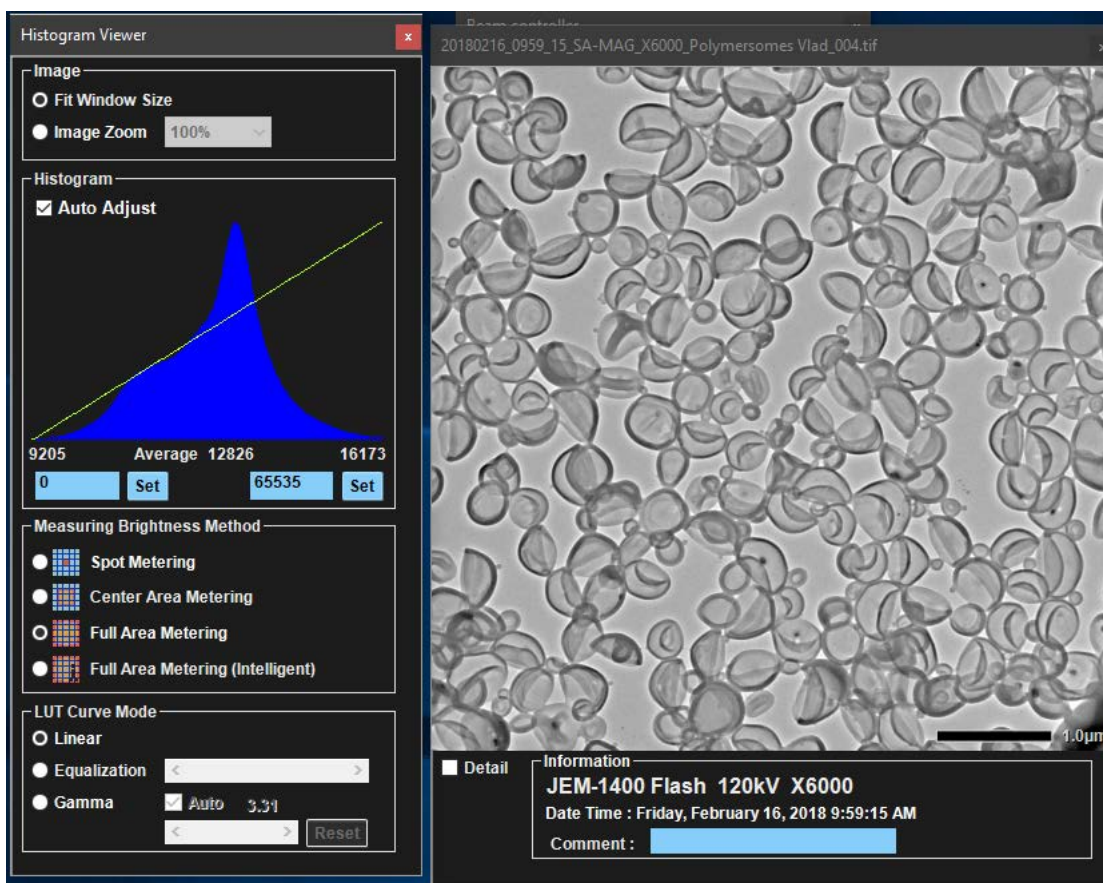


- Double-click on the histogram: the original full scale is restored, that means that values from 0 to 65535 are displayed. (And because the pixel values in which the image is comprised are only constrained to a narrow band of gray values within the whole range, the view looks

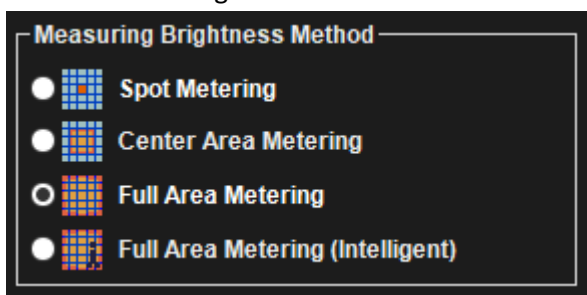
rather dull.



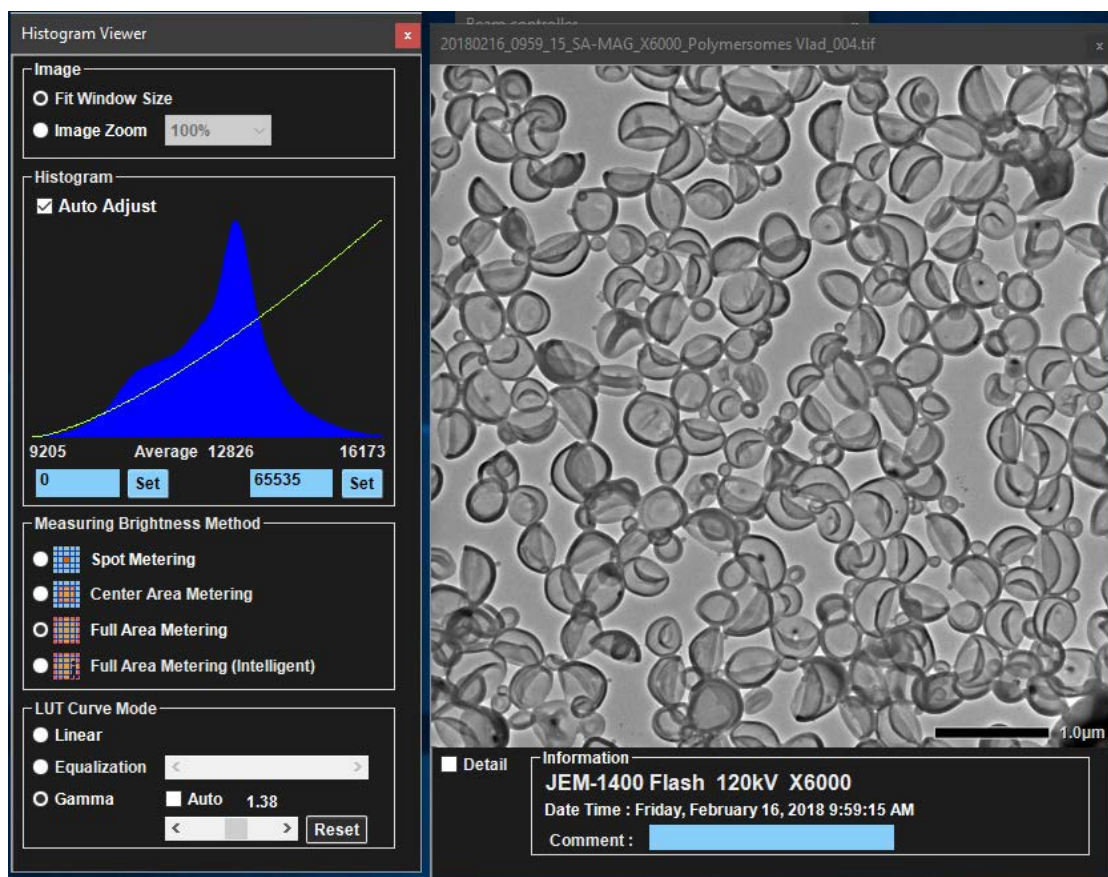
- To visualize the lowest pixel value of the image as black, and the pixels with the highest value displayed as white, and all intermediated values interpolated linearly over the 256 gray values of a monitor, so that the contrast is improved, select Auto Adjust. In this example the darkest pixel in the full area metering has a value of 9205 and it is shown as black, and the brightest pixel has a value of 16173 and it is shown as white. All intermediate values are linearly spread (LUT Curve mode here Linear)



- The Auto Adjust function is performed on account of the pixel information on various areas, as defined by **Measuring Brightness Method**: Spot measurement takes only the central part of the image (in a pattern divided in 5 x 5 sections), Center Area metering is ignoring the peripheral information, Full Area Metering is considering the pixels of the full image, and Full Area Metering is xxx

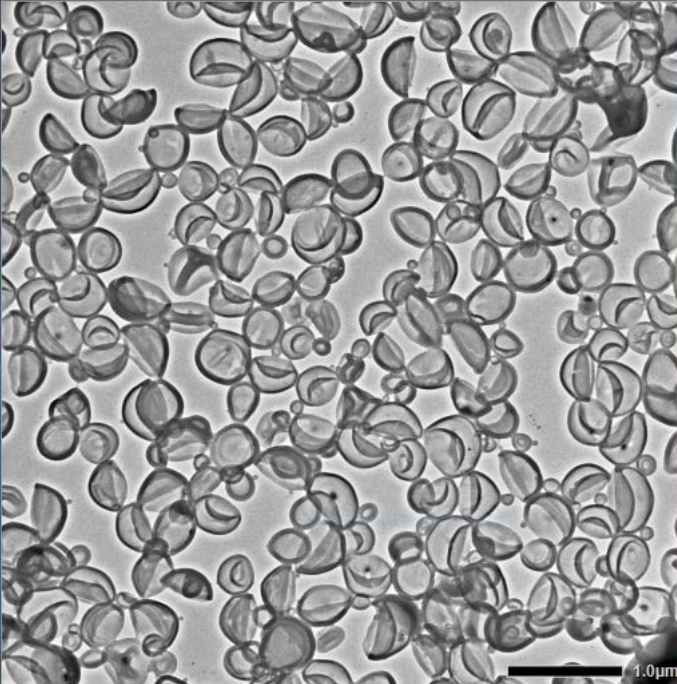


- If it is interesting to accentuate the darker areas, one can adapt the gamma, e.g. using a LUT curve Gamma > 1, here 1.38. This means that the darker regions are displayed relatively darker than in a linear display (non linear conversion).



- Another option is to utilize the Equalization mode, that will spread the intensity values over the whole range from the darkest to the lighter pixel. In this case equalization makes the darker area look darker, and the brighter pixels look lighter, compared to a linear display. This mode increases the contrast. Note that this is a non-linear conversion

20180216_0959_15_SA-MAG_X6000_Polymersomes Vlad_004.tif



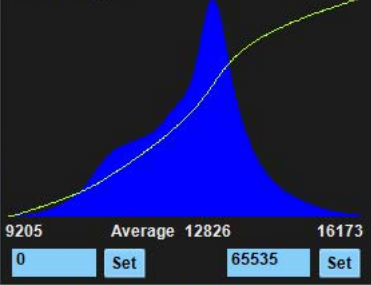
1.0 μm

■ Detail Information
JEM-1400 Flash 120kV X6000
Date Time : Friday, February 16, 2018 9:59:15 AM
Comment :

Histogram Viewer

Image
 Fit Window Size
 Image Zoom 100%

Histogram
 Auto Adjust



9205 Average 12826 16173
0 Set 65535 Set

Measuring Brightness Method

- Spot Metering
- Center Area Metering
- Full Area Metering
- Full Area Metering (Intelligent)

LUT Curve Mode

- Linear
- Equalization
- Gamma

Auto 1.05
Reset