

63X_1_4_610

Microscope info:

Image		Image3_bead0						
image's	date	2024-10-17 10:22:36						
creation method used from file creation date								
Actual ima	16							
Microscope type		WideField						
	NA	1.4						
Objective	im. refractive index	1.518						
Channel(s)		Wavel	engths		sampling (X,Y,Z)			
		Ex. (nm)	Em. (nm)	Saturation	Nyquist (µm)	Found (µm)	Nyquist/found ratio	
Channel 0			610.0	none	0.109x0.109x0. 328	0.063x0.063x0. 06	0.6, 0.6, 0.2	
Bead original coordinates(in pixels)			72.0					

Warnings:

(No saturated pixels detected). (All channels sampled following Shannon-Nyquist criterion). (A subresolution bead is used for all channels).

Resolution table:

Channel	Sig/Backgn d ratio	Dimension	Measured FWHM (µm)	theory (µm)	Fit Goodness	Mes./theory ratio
		Х	0.275	0.222	1.0	1.24
Channel 0 (em.	hannel 0 (em. 610.0nm) 13.4	Υ	0.278	0.222	1.0	1.25
010.01111)		Z	0.757	0.836	0.98	0.91

Green: within specifications, red: outside specifications (ie. XY ratios above 1.5 or Z ratio above 2.0)

Lateral asymmetry ratios:

Channel	Ratio
Channel 0 (em. 610.0nm)	0.99

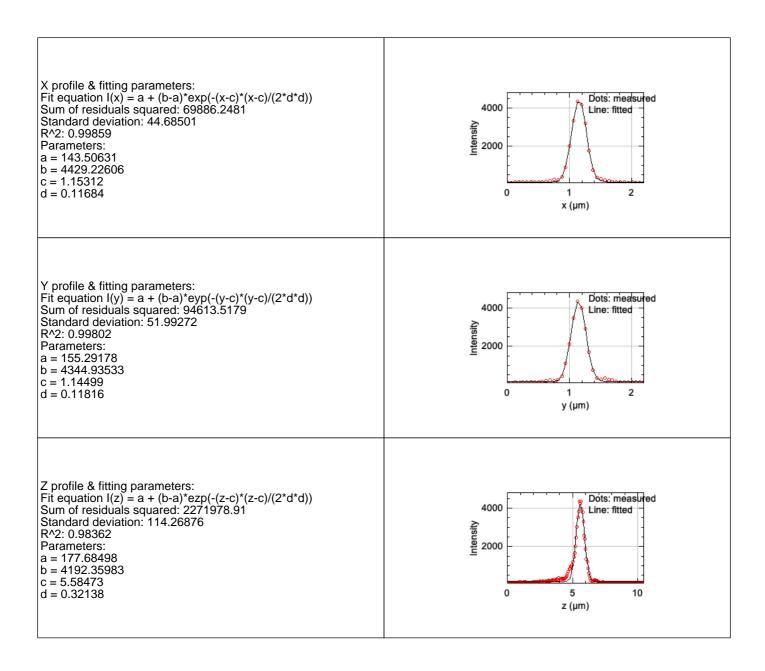
Detailed channel detection info:

Channel #0





Channel 0 (em. 610.0nm)					
Sig./Backgnd ratio	Sig./Backgnd LAR Dimension			Fit goodness	
		X	0.275	1.0	
13.4	0.99	Υ	0.278	1.0	
		Z	0.757	0.98	



Analysis parameters

	Tool	PSF Profiler (batch)			
Tool & Operator	Versions	MetroloJ_QC v1.3.1.1, ImageJ v2.14.0/1.54f, Java v1.8.0_322, OS Mac OS X			
	Operator & date	SO, October 25, 2024 2:38 PM			
data	result folder	/Users/oggsc/Documents/OM/ImageAnalysis/QC/Elyra/PSFs/20241014/63X_1_4/610//Processed/63X_1_4_610/Image3/bead0/			
data	Type of saved data	.pdf, .jpg, .xls			
	Input data bit depth	16			
Dim	ension order	XY-(C)Z			
Discard s	aturated samples	false			
	Bead detection threshold	Legacy			
	Center detection method	Legacy Maximum Intensity			
	Discard bead if more than one particle are thresholded	true			
	Background annulus thickness in µm	0.5			
Beads	Background annulus distance to bead edges in µm	0.5			
Deads	Multiple beads in image	true			
	Bead identification method	Using Find Maxima (prominence of 1000.0)			
	Bead size (µm)	0.1			
	Bead crop Factor	5.0			
	Cropped ROI size in µm	2.31x2.31 (using bead size & background annulus parameters)			
	Bead rejection distance to top/bottom	2.0 μm			
Square Root PSF Image displayed		true			
	Applied in this report	true			
Tolerance	X & Y FWHM ratios valid if below	1.5			
	Z FWHM ratio valid if below	2.0			

Analysis log

image name	creation date	saturation	sampling density	status
Image 3_bead0	2024-10-17 10:22:36	none	correct	analysed

Formulas used:

Lateral $(res_{x,y}^o)$ and axial (res_z^o) theoretical resolution values used for widefield microscopes are calculated as defined in Wilhelm, S. Confocal Laser Scanning Microscopy, 2011:

$$res_{x,y}^o = \frac{0.51*\lambda_{em}}{NA}$$
 $res_z^o = \frac{1,77n*\lambda_{em}}{NA^2}$

NA: numerical aperture, λ_{em} : emission wavelength, n: refractive index of the lens immersion & mounting media.

Axis profiles are fitted using ImageJ Gaussian Curve Fitter and the following formula $y = a + (b - a) * e^{\frac{-(x-c)^2}{2d^2}}$ (Gaussian fitting).

Measured lateral and axial resolution (Full Width at Half Maximum, FWHM) values are derived using FWHM = $2d\sqrt{2ln(2)}$

Compliance with the Shannon-Nyquist criterion uses the following formulas for Shannon-Nyquist distances calculation:

$$\alpha = \arcsin(\frac{NA}{n})$$

$$\Delta_{x,y} = \frac{\lambda_{em}}{4.NA} \qquad \Delta_z = \frac{\lambda_{em}}{2.n. (1-\cos{(\alpha)})}$$