

GreenBeadsIMG4R (SHORT)

Microscope info:

Image		Image2_bead0						
image's	date	2024-10-17 10:22:16						
creation method used from file creation date								
Actual image depth		16						
Microscope type		WideField						
	NA	1.4						
Objective	im. refractive index	1.518						
		Wavel	engths		sampling (X,Y,Z)			
Chan	nel(s)	Ex. (nm)	Em. (nm)	Saturation	Nyquist (µm)	Found (µm)	Nyquist/found ratio	
Channel 0			440.0	none	0.079x0.079x0. 236	0.063x0.063x0. 06	0.8, 0.8, 0.3	
Bead original coordinates(in pixels) 760.0, 968.0								

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	0.251	0.16	1.0	1.56
Channel 0 (em. 440.0nm)		Υ	0.235	0.16	1.0	1.47
		Z	0.506	0.603	0.99	0.84

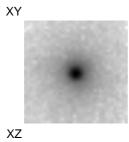
Green: within specifications, red: outside specifications (ie. XY ratios above 1.5 or Z ratio above 2.0)

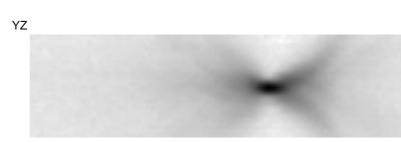
Lateral asymmetry ratios:

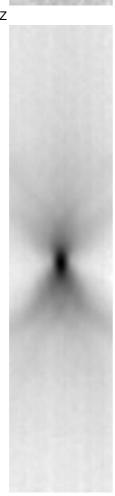
Channel	Ratio	
Channel 0 (em. 440.0nm)	0.94	

Detailed channel detection info:

Channel #0







Channel 0 (em. 440.0nm)					
Sig./Backgnd LAR Dime		FWHM	Fit goodness		
	X	0.251	1.0		
0.94	Υ	0.235	1.0		
	Z	0.506	0.99		
	LAR	LAR Dimension	LAR Dimension FWHM X 0.251 0.94 Y 0.235		

Analysis parameters

	Tool	PSF Profiler (batch)
Tool & Operator	Versions	MetroloJ_QC v1.3.0, ImageJ v2.14.0/1.54f, Java v1.8.0_322, OS Mac OS X
	Operator & date	aaa, October 20, 2024 9:10 AM
data	result folder	/Users/bumozaza/Desktop/Zeiss WFM/green/Processed/GreenBeadsIMG4R/Image 2/bead0/
data	Type of saved data	.pdf, .jpg, .xls
	Input data bit depth	16
Dim	ension order	XY-(C)Z
Discard s	aturated samples	true
	Bead detection threshold	Legacy
	Center detection method	Centroid
	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	10.0
	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 2_bead0	2024-10-17 10:22:16	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:

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

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