

Formulas used:

Axial (res_z^o) theoretical resolution value used for Spinning Disk microscopes is calculated as defined in Toomre and Pawley, Disk-Scanning Confocal Microscopy in Handbook Of Biological Confocal Microscopy 221–238 (Springer US, 2006):

$$res_z^o = \frac{\lambda_{em}}{n - \sqrt{n^2 - NA^2}}$$

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

Z-axis profiles is fitted using ImageJ Gaussian Curve Fitter and the following formula $y = a +$

$(b - a) * e^{\frac{-(x-c)^2}{2d^2}}$ (Gaussian fitting).

Measured axial resolution (Full Width at Half Maximum, FWHM) value is derived using

$$FWHM = 2d\sqrt{2\ln(2)}$$

Compliance with the Shannon-Nyquist criterion uses the formula for widefield Shannon-Nyquist distance calculation:

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

$$\Delta_z = \frac{\lambda_{em}}{2 \cdot n \cdot (1 - \cos(\alpha))}$$