

Leica objectives

Objective	N.A.	Max. W.D. (mm)	Brightness (rel to 40x, 1.25 NA)	XY resolution (μm) ($\lambda_{\text{exc}} = 488 \text{ nm}$)	Z resolution (μm) ($\lambda_{\text{em}} = 515 \text{ nm}$ PH = 1 A.U.)	Optimal pixel size (μm) ($\lambda_{\text{exc}} = 488 \text{ nm}$)	Optimal slice spacing (μm) ($\lambda_{\text{em}} = 515 \text{ nm}$ PH = 1 A.U.)
10x air	0.30	11.0	5	0.992	10.30	0.496x0.496	5.15
25x oil	0.75	0.18	33	0.397	2.502	0.198x0.198	1.251
40x air	0.75	0.56	13	0.397	1.648	0.198x0.198	0.824
40x oil	1.25	0.10	100	0.238	0.901	0.119x0.119	0.450
63x air	0.70	2.60	4	0.425	1.892	0.213x0.213	0.946
63x oil	1.40	0.20	63	0.213	0.718	0.106x0.106	0.359

Brightness $\propto \text{NA}^4 / \text{M}^2$

Z res. $\approx 1.76 \cdot \lambda_{\text{em}} \cdot n \cdot \text{PH} / \text{NA}^2$

Pixel size = XY res./2 (Nyquist criterion)

XY res. $\approx 0.61 \cdot \lambda_{\text{exc}} / \text{NA}$

For widefield PH ≥ 5 A.U.

Slice spacing = Z res./2 (Nyquist criterion)

(Where M = magnification, PH = pinhole dia. [Airy Units], and n = ref. index = 1.000 [air] and 1.518 [oil].)