

Objectives (dry)

Objective	N.A.	Max. W.D. (mm)	Brightness (rel to 20x, 1.0 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.)
2.5x air	0.075	9.3	0.2	3.969	161.1	1.985	82.55
5x air	0.16	12.2	1	1.861	35.41	0.930	17.71
10x air	0.30	5.6	3	0.992	10.07	0.496	5.350
	0.45	2.8	16	0.662	4.476	0.331	2.238
20x air	0.50	2.0	6	0.595	3.626	0.298	1.813
20x air	0.75	0.61	32	0.397	1.611	0.198	0.805
20x air	0.80	0.55	41	0.372	1.416	0.186	0.708
40x air	0.60	3.3	3	0.496	2.518	0.248	1.259

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 $\geq 5 \text{ A.U.}$

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

(Where M = magnification, PH = pinhole dia. [Airy Units], and n = ref. index = 1.000 [air], 1.337 [H₂O] and 1.518 [oil].)

Objectives (immersion)

Objective	N.A.	Max. W.D. (mm)	Brightness (rel to 20x, 1.0 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.)
20x H ₂ O	1.00	1.80	100	0.298	1.212	0.149	0.606
40x H ₂ O	1.00	2.50	25	0.298	1.212	0.149	0.606
40x H ₂ O	1.10	0.62	37	0.271	1.002	0.136	0.501
40x H ₂ O	1.20	0.28	52	0.248	0.861	0.124	0.431
40x oil	1.30	0.21	71	0.229	0.814	0.114	0.416
40x oil	1.40	0.13	96	0.213	0.702	0.106	0.351
63x H ₂ O	0.90	2.40	7	0.331	1.496	0.166	0.748
63x H ₂ O	1.20	0.28	21	0.248	0.861	0.124	0.431
63x oil	1.40	0.19	39	0.213	0.702	0.106	0.351
63x oil	1.46	0.10	46	0.204	0.645	0.102	0.323
100x oil	1.40	0.17	15	0.213	0.702	0.106	0.351

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], 1.337 [H₂O] and 1.518 [oil].)