Magnification/spatial calibration

Comparison: actual data vs extrapolated values

magnification as displayed on the TEM and entered into iTEM, most in the LM range are omitted	linear calibration obtained using standard preparations[2] (nm/pixel)	extrapolated calibration[4] (nm/pixel)		width of image (μm)
		at bin 1×[1]	at bin 2×[1]	
450 000	--	0.08	0.16	0.208
340 000	--	0.10	0.21	0.275
245 000	--	0.14	0.29	0.382
180 000	0.19 [3]	0.19	0.39	0.520
130 000	0.28 [3]	0.27	0.54	0.720
92 000	0.39 [3]	0.38	0.76	1.017
64 000	0.56 [3]	0.55	1.09	1.462
46 000	0.78 [3]	0.76	1.52	2.035
34 000	0.93	1.03	2.06	2.753
25 000	1.37	1.40	2.80	3.744
19 000	1.85	1.84	3.69	4.926
13 500	2.43	2.59	5.19	6.933
10 500	3.24	3.34	6.67	8.913
7900	4.21	4.43	8.87	11.847
5800	5.64	6.04	12.08	16.136
4600	7.17	7.62	15.23	20.345
3400	9.76	10.30	20.60	27.526
2600	12.90	13.47	26.94	35.996
1950	16.90	17.96	35.92	47.994
1450	22.27	24.16	48.31	64.544
1100	30.41	31.84	63.68	85.081
800	40.43	43.78	87.56	116.986
620	51.70	56.49	112.99	150.950
530	64.44	66.09	132.17	176.583
380	91.09	92.17	184.35	246.287

[1] e.g., 2672×4008 pixels, or 2672×3615 pixel when cropped; for bin 2× multiply the calibration by 2
[2] grating replica except where noted
[3] catalase crystal
[4] "linear calibration" = (s × "display magnification")$^{-1}$; where s=2.855×10^{-5}, the slope in pixel/nm calculated from a regression analysis of values measured using standard preparations at various magnification

Example: calculate a scale bar in pixel using the extrapolated calibration

image taken at a display magnification of 130 000×	**scale bar**	
	nm	**pixel**
at bin 1× e.g., 2672×3615 pixel (0.27 nm/pixel)	50	50 ÷ 0.27 = 185
at bin 2× e.g., 1336×1809 pixel (0.54 nm/pixel)	50	50 ÷ (0.54) = 93