

Supplementary

Detector	Manufacturer	Sensor size	Pixel size (um)	Frame rate Hz	DQE Peak (300 kV)
Falcon 1	TFS	4,096 x 4,096	14x14	18	0.35
Falcon 2	TFS	4,096 x 4,096	14x14	18	0.4
Falcon 3	TFS	4,096 x 4,096	14x14	40	0.7
Falcon 4	TFS	4,096 x 4,096	14x14	250	0.9
Falcon 4i	TFS	4,096 x 4,096	14x14	320	0.92
K2	Gatan	3,840 x 3,712	5x5	400	0.85
K3	Gatan	5,760 x 4,092	5x5	1500	0.87
DE-12	Direct Electron	4,096 x 3,072	6x6	40	0.35
DE-16	Direct Electron	4,096 x 4,096	6.5x6.5	92	0.9
DE-20	Direct Electron	5,120 x 3,840	6.4x6.4	32	0.8
DE-64	Direct Electron	8,192 x 8,192	6.5x6.5	42	0.9

	Probability of failure	Probability of occurrence	Normalised probability	For every 10 projects, fails at screening	% projects	Revised number of failed projects (in 100)	Failure microscope (hours/100 attempts)	Failed 'working' (hours/100 attempts)	Failed 'out of hours' (hours/100 attempts)	Successful (hours/100 attempts)	Successful 'working' (hours/100 attempts)	Successful 'out of hours' (hours/100 attempts)	Failed hours normalised to % of projects	Successful hours to % of projects	Failed 'working' hours normalised to % of projects	Failed 'out of hours' normalised to % of projects	Successful 'working' hours normalised to % of projects	Successful 'out of hours' normalised to % of projects	Total working hour/100 projects	Total out of hour/100 projects	Total hour/100 projects
Low	0.2	0.15	0.03	2	15	20	480	160	320	1920	640	1280	72	288	24	48	96	192			
Medium	0.5	0.6	0.3	5	60	50	200	200	0	1400	400	1000	120	840	30	0	60	150			
High	0.8	0.15	0.12	8	15	80	640	640	0	640	320	320	80	96	96	0	48	48			
Variable	0.6	0.1	0.06	6	10	60	2880	480	2400	2880	960	1920	288	288	72	360	144	288			
Sum			0.61						2720	6840	2320	4520	576	1512	222	408	348	678	676	1086	1656
Fixed (manual screening)	0.5			5	100	50	1000	600	400	1000	600	400	1000	1000	600	400	600	400	1200	800	2000

Table S1- Properties of direct electron detector technology [31-40]

Table S2- Scheduling based on probability of project success results in less 'failed' microscope time compared with a fixed scheduling of projects.