

K3 Direct Detection Cameras

Models 1025 and 1024

K3[®] is the new imaging performance benchmark for direct detection cameras. Redesigned from the ground up, this true best-in-class camera is optimized for the most demanding low-dose electron microscopy (EM) applications in both life science and materials science research. The K3 camera series is the result of Gatan's deep experience in developing cameras to capture and save all individual electron events with the highest data quality.

Benefits

- Powerful inline signal processing raises the DQE beyond that of the K2[®] camera; addition of CDS mode pushes this even higher
- Real-time electron counting immediately lets you know if your samples are good
- Native *.dm4 file format provides lossless data compression of all counted electron events with a compression ratio of at least 20:1
- Optional inline, GPU-based motion correction avoids the need to save terabytes of raw frames
- 1,500 full frames per second – 3.75 times the speed of the K2 camera
- Match the field of view with your application needs
 - 24 megapixels – Maximize throughput for your highest performance microscopes
 - 14 megapixels – Turn screening microscopes into data collection microscopes

As researchers collect larger datasets, the speed that a camera counts is becoming increasingly important. The K3 is a unique direct detection camera that uses a high-speed, real-time electron counting with super-resolution technology to produce better images than its predecessor – the K2 (Figure 1).

Using a maximum frame rate of 1500 full frames per second (fps), this technology recognizes and counts individual image electrons in real-time. Unlike conventional direct detection capture speeds (e.g., 40 fps), the K3's high-speed capture rate counts electrons quickly, avoiding coincidence loss, and delivering the highest resolution, single-electron counted images available.

The K3's sensitivity is reflected in its detective quantum efficiency (DQE), with performance that is unparalleled at 200 and 300 kV. The addition of correlated double sampling mode (CDS) now boosts the DQE even higher to provide the ultimate in data quality.

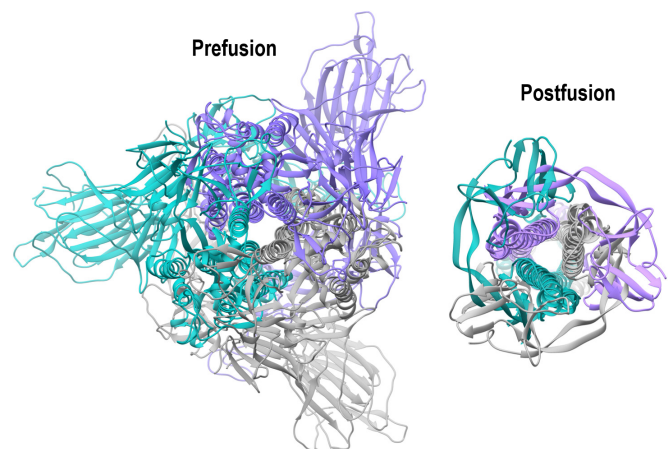


Figure 1. Distinct conformational states of SARS-CoV-2 spike protein. When throughput matters, more than a dozen research labs worldwide have relied on Gatan cameras to solve structures of the coronavirus.

To add, the K3's high frame rate is ideal for capturing high-resolution information before a specimen is damaged due to electron beam irradiation. While exposing a specimen to a typical dose of 10 – 30 $e^-/\text{Å}^2$, the significantly shorter exposure time allows you to collect the same number of images 3.75 times faster than K2. When used with dose fractionation, K3 data can easily be drift corrected in your workflow to compensate for specimen motion and drift. Moreover, the optional GPU can implement MotionCor2 inline with data collection.

Two models, the K3 and K3 Base, are available to support a larger and more diverse set of cryo-EM applications in your laboratory. At 24 megapixels (5,760 x 4,092 pixels), K3 provides the largest

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field of view to resolve high-resolution structures at 1.65 times the K2 camera (pixels/frame). The K3 Base utilizes the same image quality in a 14 megapixel-format (3456 x 4092 pixels) to accommodate cryo-EM on even more TEMs.

Powered by Latitude® S single-particle software, the user-friendly wizard simplifies setup and automation of multi-region acquisition to improve throughput for cryo-EM. By combining a large field of view, high frame rate, and beam shift/tilt control, microscope throughput is six times higher than any other combination of software and hardware. This best-in-class throughput enables you to maximize your data collection sessions and get the most value out of your TEM.

¹ <https://www.gatan.com/improving-dqe-counting-and-super-resolution>

Applications

- Cryo-electron microscopy
- Single-particle cryo-EM
- Cryo-tomography
- Energy materials
- Polymers
- Catalysts

Ordering

Model	Description
1025	K3 Direct Detection Camera
1024	K3 Base Direct Detection Camera
1025.GPU	GPU Upgrade for K3 Camera

Other products to consider

- BioContinuum™ K3 imaging filter
- Elsa cryo-transfer holder
- Latitude S single-particle software
- Solarus® II plasma cleaner
- K3 IS direct detection camera

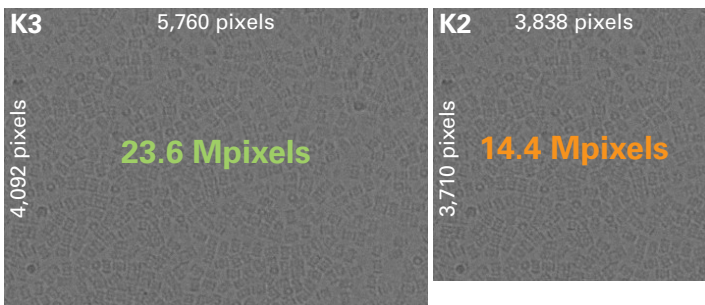


Figure 2. At 23.6 megapixels (Mpixels), the K3 provides 1.65 times the throughput of the K2 (pixels/frame).

Specifications

	K3	K3 Base
TEM operating voltage (kV)	300	
Sensor size (pixels)	5,760 x 4,092	3,456 x 4,092
Readout modes	Counting Super-resolution	Counting
Max. image size (pixels)	11,520 x 8,184 Super-resolution	3,456 x 4,092
Performance relative to physical Nyquist (DQE)		
Peak	>0.90	>0.85
0.5	>0.71	>0.50
Nyquist	>0.40	>0.35
Sensor read-out (full fps)	>1500	
File formats	*.dm4, *.mrc, *.tiff All electron events are counted, accessible, and stored to disk	
Data compression	20:1	60:1
Transfer speed to computer (full fps)	>75	>25
Motion correction	Inline	
Gatan Microscopy Suite® software	Included	
Automation support	Latitude and other third-party software	

Specifications are subject to change without notice.

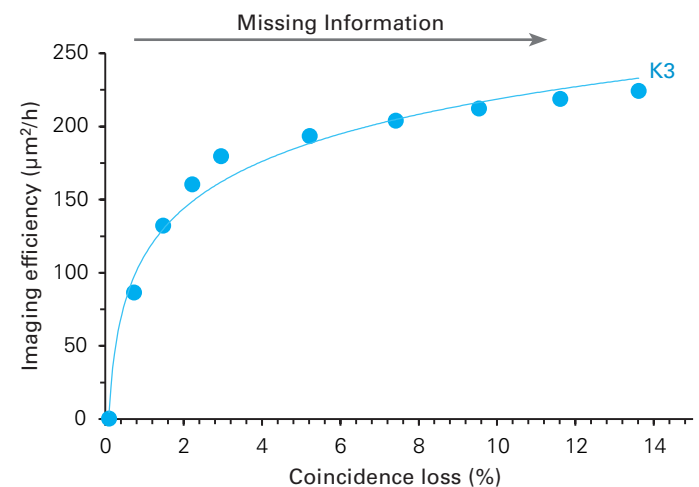


Figure 3. K3 imaging efficiency: When combined with Latitude software the K3 can deliver the highest imaging throughput without compromising performance due to coincidence loss.

