

Alpine Direct Detection Camera

Model 1124

Introducing Alpine®, the world's first direct detection camera to democratize cryo-electron microscopy (cryo-EM) imaging. By enabling the acquisition of high-resolution structures on 100 – 200 keV microscopes, Alpine allows routine cryo-EM research on more affordable, workhorse instruments and expands its usefulness to the larger research community.

Benefits

- Delivers a detective quantum efficiency (DQE) up to 2.4-times the performance of scintillator-based cameras
- Routinely collects high-resolution data from 100 – 200 keV to convert screening microscopes into data collection microscopes
- Makes the 2D classification of small molecules possible while improving macromolecule reconstructions
- Streamlines your workflow and detects failures early to produce better structures, faster
- Real-time counting ensures there is no compromise between data collection speed and quality

Built upon the K3® camera's pioneering single-electron counting capabilities, Alpine delivers high-resolution data on your conventional 100 – 200 keV TEMs. Alpine's proprietary sensor is uniquely optimized to detect individual electron events from 100 –

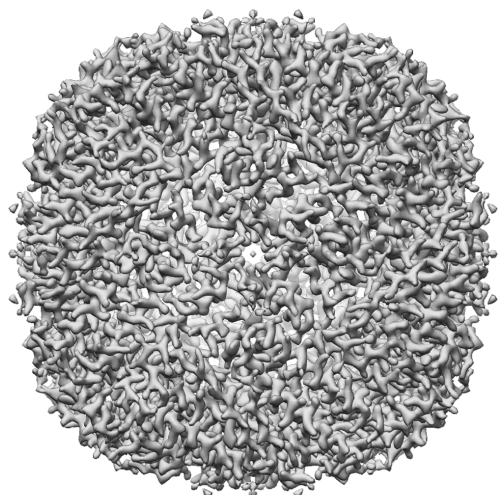


Figure 1. Apoferritin resolved to 2.7 Å at 100 keV acquired on a Talos F200C (equipped with an SFEG) at 45kx (0.851 Å/pixel) using CDS at ~5.2 e⁻/pixel/s, 100 ms frames, 10 frames/s. Samples were prepared by manual plunging samples onto glow discharged Quantifoil UltrAuFoil grids with 1.2 µm holes spaced 1.3 µm apart. The study used a Gatan model 626 side-entry holder for all samples and Leginon for data acquisition.



200 keV. This optimization dramatically improves the DQE across all spatial frequencies, generating 0.5 Nyquist DQE up to 2.4-times the performance of scintillator-based cameras at 100 keV.

When it replaces a scintillator-based camera on a 100 – 200 keV TEM, Alpine makes the 2D classification of small molecules and their macromolecular complexes possible during early screening. By attaining better 2D classes early in the data collection process, you can quickly and confidently decide when sample optimization is sufficiently optimized to transfer studies to a 300 keV microscope. As a result, making better decisions earlier in the workflow enables you to free up valuable 300 keV TEM time (days – weeks) for the most demanding high-resolution reconstructions.

Furthermore, Alpine delivers unparalleled resolution and speed that are ideal for low-dose screening conditions. Compared to other low-keV detectors, Alpine is the only camera that provides a 2.3k x 3.2k pixel field-of-view (bin x1), counts 1,500 full frames/s, transfers 75 full frames/s to disk, AND achieves a DQE of ≥0.6 at half-Nyquist. This one-of-a-kind combination enables you to realize high-quality results at the pace you need to rapidly advance your research.

Alpine integrates into multiple software packages for automated data collection, including Latitude® S, Leginon, and SerialEM. By combining an automated, multi-region data acquisition workflow with Alpine's large field-of-view, high frame rate, and image shift/beam tilt control, microscope throughput is six times higher than a similar configuration with a scintillator camera. This best-in-class throughput enables you to maximize your data collection sessions and get the most value out of your TEM.

Specifications

TEM operating voltage	100 – 200 keV
Sensor size	2,304 x 3,240 pixels
Readout modes	Counting Super-resolution
Max. image size	4,608 x 6,480 pixels Super-resolution
Performance relative to physical Nyquist (DQE)	
Peak	>0.90
0.5	>0.60
Nyquist	>0.40
Sensor read-out	>1500 full fps
File formats	*.dm3, *.dm4, *.dm5 (HDF5), *.mrc, *.tiff All electron events are counted, accessible, and stored to disk
Data compression	≥10:1
Transfer speed to computer (bin x1)	75 full fps
Motion correction	Inline
DigitalMicrograph® software	Included
Automation support	Latitude, Serial EM, Leginon

Specifications are subject to change without notice.

Other products to consider

- K3 Direct Detection Camera
- BioContinuum® System
- Elsa™ Cryo-Transfer Holder
- Latitude S and T Software
- Solarus® II Plasma Cleaner

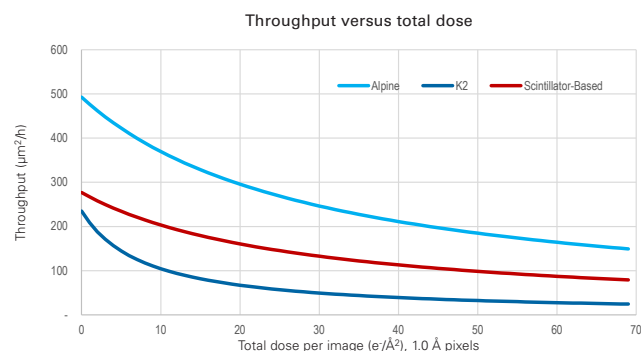


Figure 2. When combined with Latitude software, Alpine delivers high-quality data at the highest imaging throughputs from 100 – 200 keV.

Ordering

Model	Description
1124	Alpine Direct Detection Camera
1025.U2	Camera Housing and Flange
1025.GPU	GPU Upgrade for Inline Motion Correction
700.LS.731.10.64.1	Latitude Software Suite

Applications

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

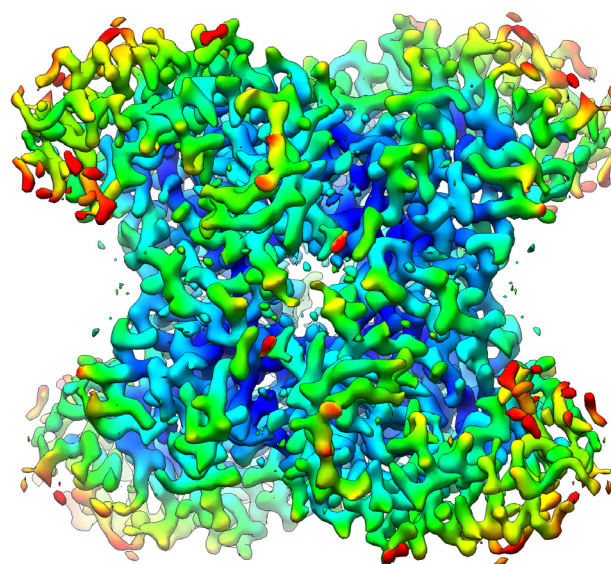


Figure 3. Aldolase resolved to 3.07 Å at 100 keV acquired on a Talos F200C (equipped with an SFEG) at 45kx (0.851 Å/pixel) using CDS at ~5.2 e-/pixel/s, 100 ms frames, 10 frames/s. Samples were prepared by manual plunging samples onto glow discharged Quantifoil UltrAuFoil grids with 1.2 μm holes spaced 1.3 μm apart. The study used a Gatan model 626 side-entry holder for all samples and Leginon for data acquisition.

