



DE-DirectView Camera

versatile & economical direct detection

delivering | bigger | better | faster | cameras for electron microscopy

Direct Detection for Transmission Electron Microscopy

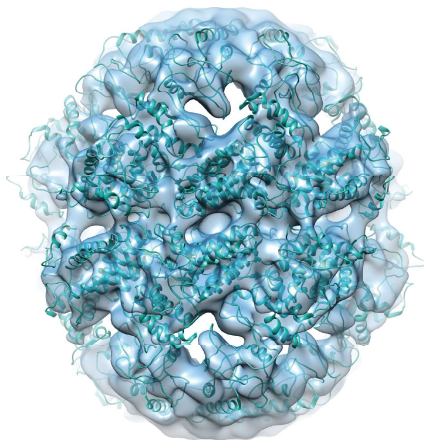
- Direct detection device (DDD[®]) delivers **ultra-high speed**, **extraordinary resolution**, and **ultra-low noise**.
- 4k × 3k (12.6 million) pixels.
- Ideal for a **broad range of applications** for both materials science (including in situ TEM, 4D-STEM, low-dose, etc.) and biological cryo-EM.
- Reach sub-nanometer resolution with cryo-EM on 120 kV LaB6 TEMs.
- **High-speed continuous streaming** for in situ TEM movies and motion-corrected imaging.
- **Integrated Faraday plate**.
- Based on our DE-12 which has a long track record of **proven performance**.
- Low total cost-of-ownership and exceptional support.
- The **most impactful and cost-effective** upgrade to a TEM's capabilities.

Microscopy
TODAY
INNOVATION AWARDS

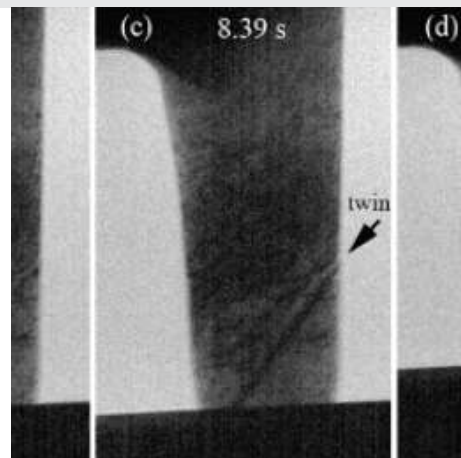


Direct Electron[®]
INNOVATION PROPELLING DISCOVERY

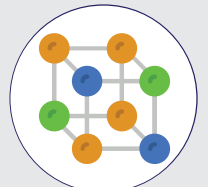
Cryo-EM of Mm-Cpn on a 120 kV LaB6 TEM, yielding ~10 Å resolution with about 1-hour data collection.



Frame from an in situ TEM movie at 57 fps. Courtesy of Zhiwei Shan (Xi'an Jiaotong University, China).



Applications



MATERIALS

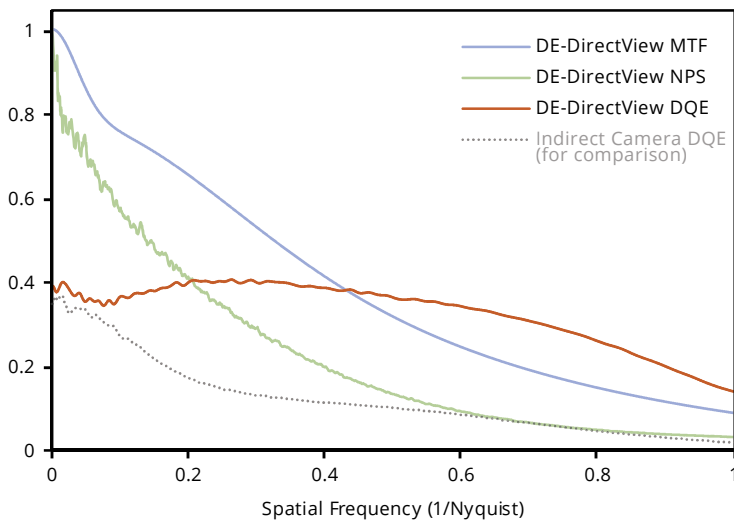


BIOLOGY

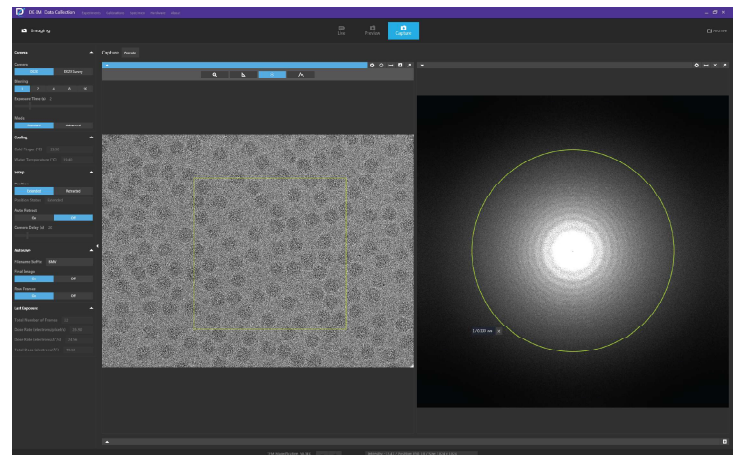
TEM electron energy	sensitive to 80 keV – 1.25 MeV optimized for 120 - 300 keV
pixel array specification	4096 × 3072 (12.6 million pixels) 6.0 μm pixel pitch
single electron SNR	~20:1 (300 kV)
sensor design	>3T pixel design with on-chip correlated double sampling (CDS) backthinned radiation hardened
acquisition frame rate	40 fps max, unbinned full-frame 75 fps max, binned-2× full-frame subarray readout up to 960 fps (4096 × 128) user-selectable hardware frame rate
acquisition modes	integrating mode
exposure rate	large dynamic range with consistent performance (e.g., >500 e ⁻ /pixel/s)
mounting position	fully retractable mounted on-axis TEM bottom port or in JEOL film drawer
exposure measurement	integrated Faraday plate for exposure measurement with each acquisition
sensor protection	integrated sensor protection shutter TEM blanking/shuttering failsafe software
computer system	high-performance computer Windows 10 NVidia GPU(s) up to 48 TB storage
image format	non-proprietary to ensure broad compatibility TIFF, MRC, AVI, MP4, etc.
acquisition software	image acquisition: DE-IM (full-featured, modern GUI) ImageJ / μManager streaming acquisition: DE-StreamPix (realtime, continuous display and recording)
automation	compatibility: SerialEM Legion EMTools (TVIPS) JADAS (JEOL) others customization: software development kit (SDK) for integration with custom software

Integrating (Linear) Mode

used for all TEM applications



DE-IM Acquisition Software



DQE curves are shown for 300 kV electrons | Specifications and performance are subject to change.
Example images of various camera applications were collected by researchers using one of Direct Electron's cameras (not necessarily the DE-DirectView).