DE-20 Camera System

high-performance direct detection for low dose TEM

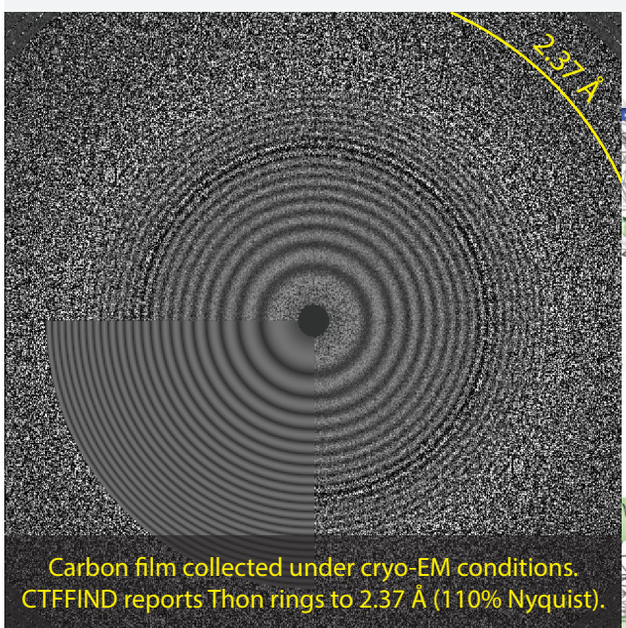
Direct Electron delivers | bigger | better | faster | cameras for electron microscopy

Direct Electron®
INNOVATION PROPELLING DISCOVERY

Better Science, Faster – Brilliant Results in Less Time

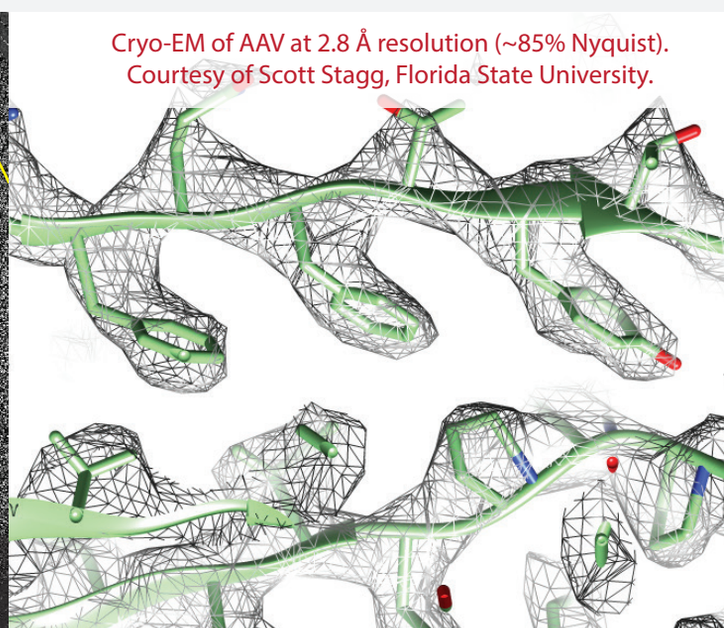
- Direct detection device (DDD®) delivers ***high resolution and excellent sensitivity***.
- ***5k × 4k*** (19.7 million) pixels.
- Capture more area in each image.
- ***High-speed*** continuous streaming for "movie-mode" processing (e.g., motion correction) and continuous-tilt tomography.
- ***Unrivaled features***: integrated survey sensor & Faraday plate.
- ***Electron counting*** to maximize signal-to-noise ratio, when needed.
- High performance for demanding applications, while maintaining ease-of-use and flexibility to maximize data collection efficiency.
- Low total cost-of-ownership and exceptional support.

Microscopy TODAY INNOVATION AWARDS



Carbon film collected under cryo-EM conditions.
CTFFIND reports Thon rings to 2.37 Å (110% Nyquist).

Cryo-EM of AAV at 2.8 Å resolution (~85% Nyquist).
Courtesy of Scott Stagg, Florida State University.



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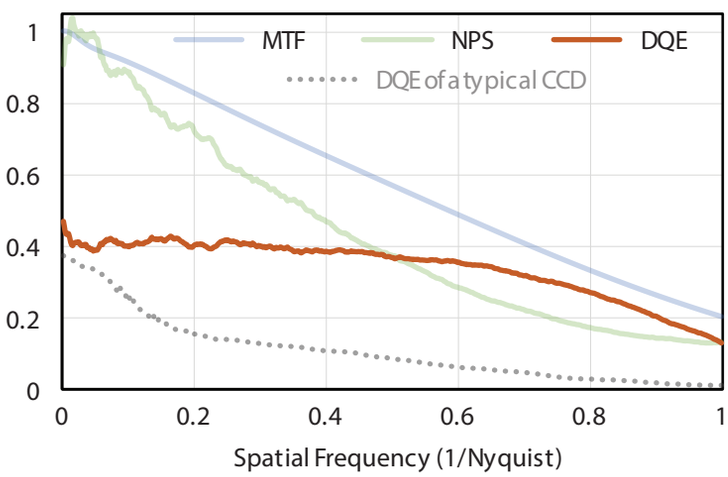
detection electron energy	optimized for 80 keV – 1.25 MeV
pixel array specification	5120 × 3840 (19.7 million pixels) | 6.4 µm pixel pitch
single electron SNR	~50:1 (300 kV)
sensor design	>3T pixel design with correlated double sampling (CDS) | backthinned | radiation hardened
acquisition frame rate	32 fps max, unbinned full-frame subarray readout up to 960 fps max
acquisition modes	integrating mode | counting mode (with optional counting system)
exposure rate	large dynamic range with consistent performance in integrating mode (e.g., 4 – 400 e-/pixel/s)
mounting position	fully retractable | mounted on-axis TEM bottom port or in JEOL film drawer
"buddy" camera	integrated near-axis 2048 × 2048 scintillator-coupled survey sensor
exposure measurement	integrated Faraday plate for exposure measurement with each acquisition
sensor protection	integrated physical protection shutter | microscope blanking/shuttering | failsafe software
computer system	certified high-performance computer system with large >12 TB RAID array for data streaming
image format	image data stored in non-proprietary format to ensure broad compatibility
acquisition & processing software	*conventional acquisition*: DE-IM (full-featured, user-friendly) | µManager (free, open-source) *automated acquisition*: Leginon | SerialEM | EMTools (TVIPS) | others using the DE SDK *"movie" processing*: DE image processing software (free, open-source, Python-based) | others *customization*: software development kit (SDK) for integration with custom software

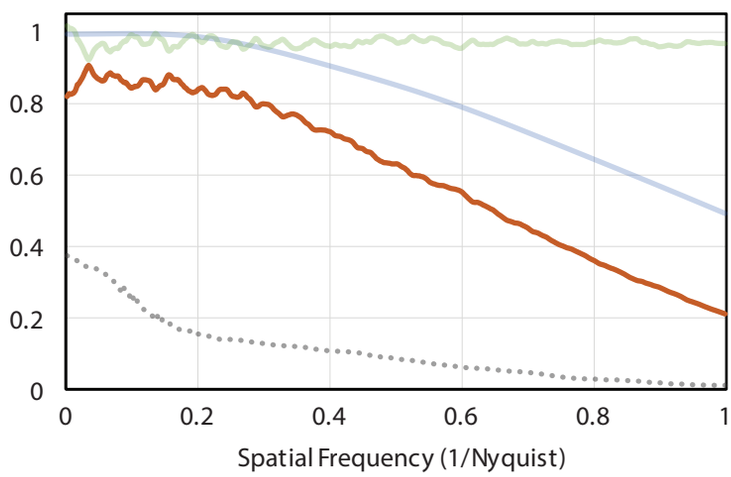
Integrating Mode

best for maximizing overall productivity



Electron Counting Mode

best for maximizing signal-to-noise ratio



* Note: Specifications and performance are subject to change.

there is much more...

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