



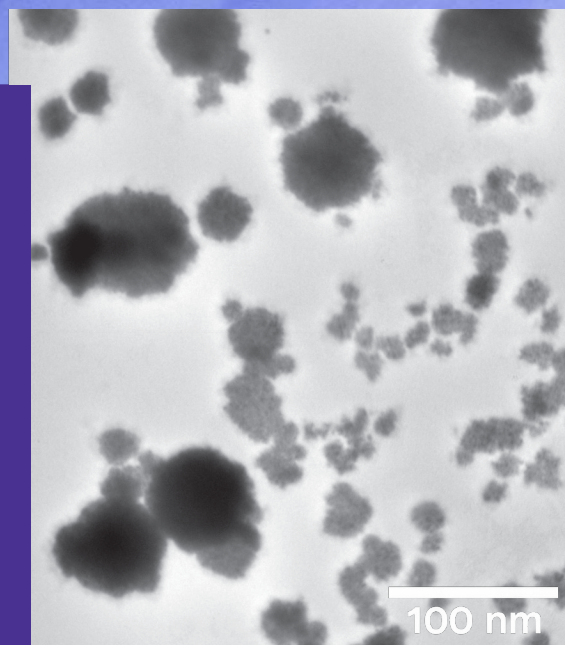
ARTEMIS CAMERA

Low-Dose TEM with ultimate contrast

Delivering Bigger | Better | Faster | Cameras For Electron Microscopy

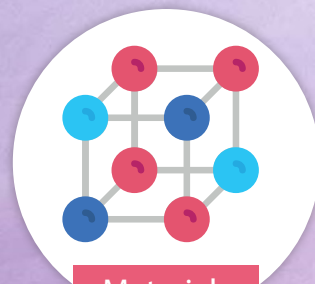
COUNTING-ONLY DIRECT DETECTOR FOR MATERIALS SCIENCE

- Our novel direct detection device (DDD®) delivers ultra-low noise for beam-sensitive materials science applications.
- Electron counting *in hardware* is elegant, fast, easy-to-use, and enables low-dose in-situ movies.
- Change the paradigm for liquid-cell TEM by reducing total dose and quantifying the exposure rate.
- Event streaming .CEF data format enables precise dose weighting.
- On-chip CDS and digital output of detected events minimizes noise without a reduced framerate.
- 4k × 4k (16.8 million) physical pixels with larger 8 μm pixel size to maximize resolution.
- Smaller ROIs allow faster readout speeds for 4D-STEM
- Counted movies saved to the computer, live drift correction applied to single images.
- Integrated with Protochips and DENS Solutions for holder metadata.
- Generate better results than you've ever achieved before.

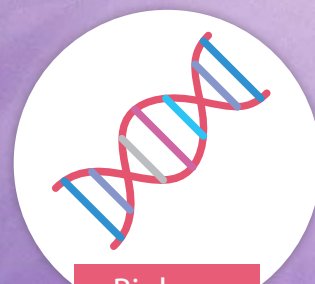


Liquid-phase in-situ TEM imaging of platinum nanoparticle formation
Courtesy of Dr. Maria de Marco, IPCMS Stras.bourg.

DETECTOR APPLICATIONS:



Materials

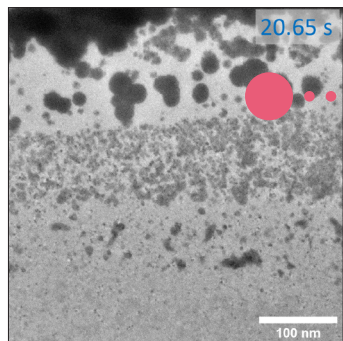


Biology

Direct Electron
INNOVATION PROPELLING DISCOVERY®

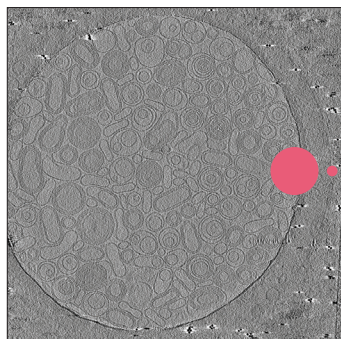
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OPTIMIZED FOR BEAM SENSITIVE TEM APPLICATIONS



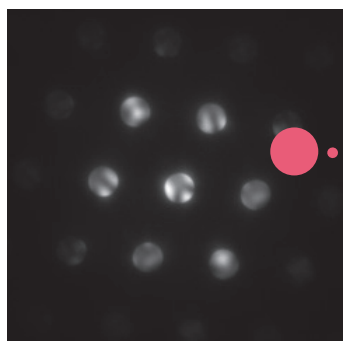
Low-Dose In-Situ TEM Movies

Ultra-fast electron counting enables live imaging



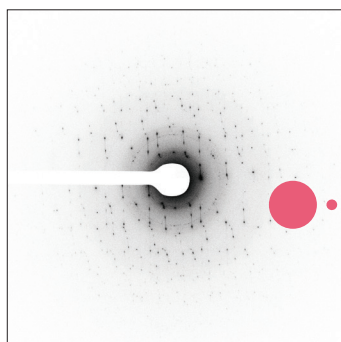
Cryo-Tomography

Large field-of-view and high contrast



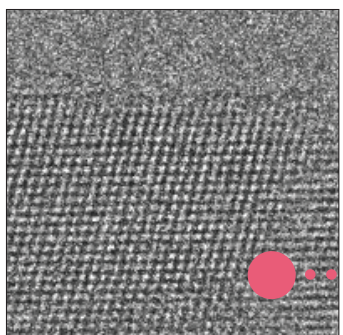
4D-STEM Compatible

Capture crystallographic information from nanodomains



MicroED (Diffraction)

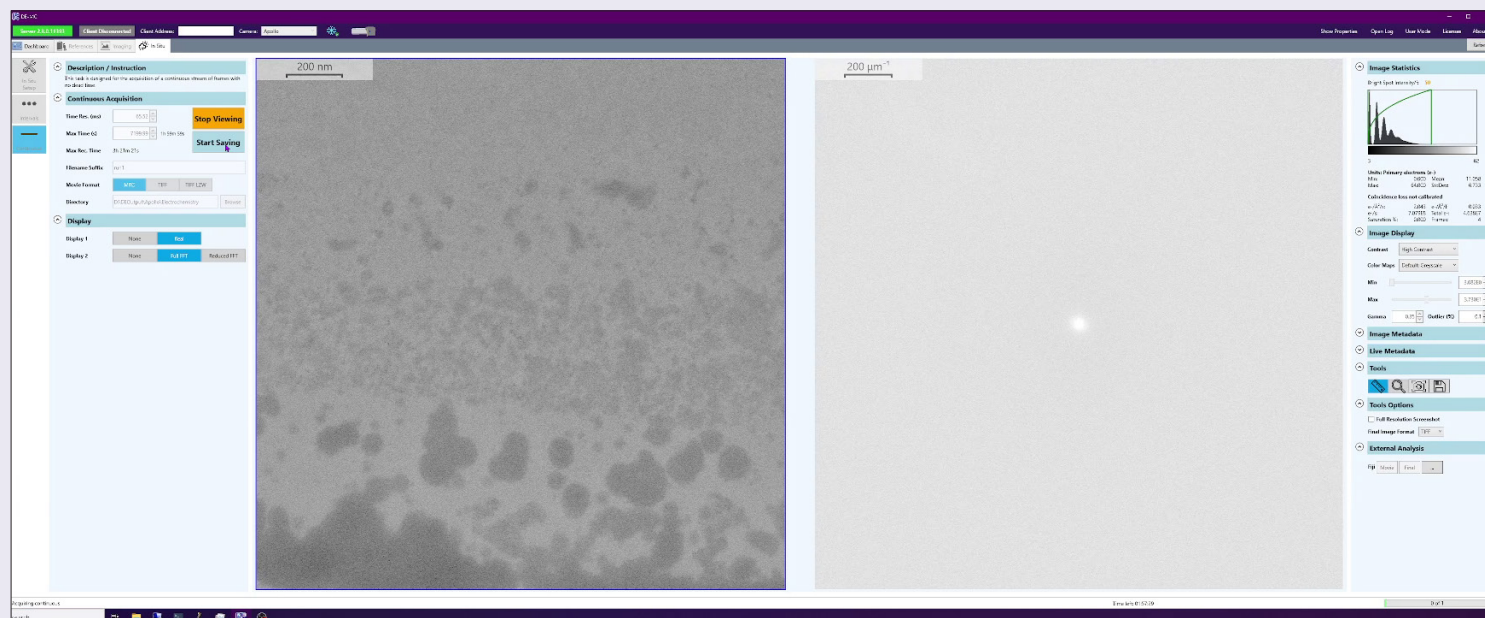
No background noise for crystallography of micro-crystals



Imaging Beam Sensitive Materials

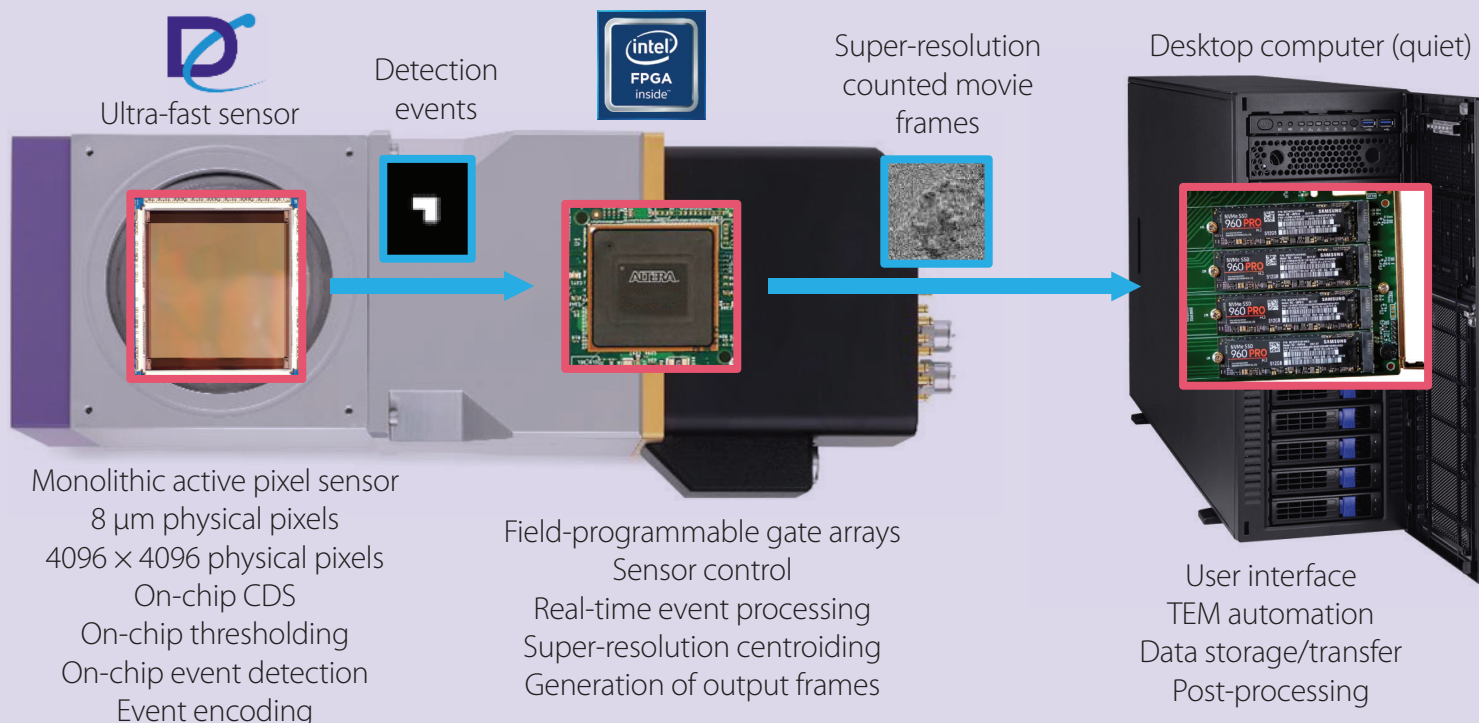
Electron counting ensures the highest DQE and incredible resolution

IN-SITU ACQUISITION SOFTWARE

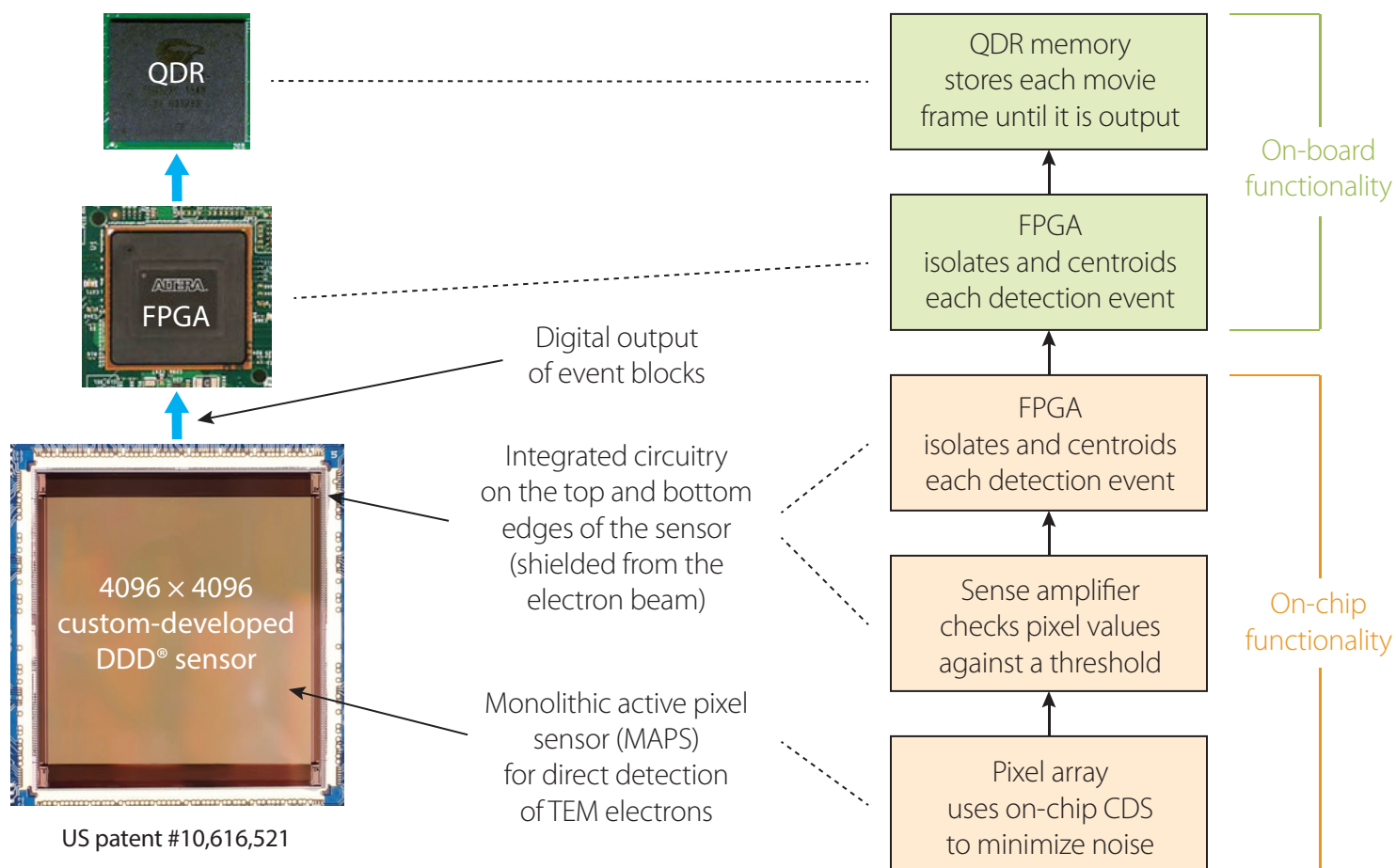


Mission Control: in-situ electrochemistry movie acquisition with Artemis at 15 fps and $0.4 \text{ e}/\text{\AA}^2/\text{s}$ corresponding to $47 \text{ e}/\text{pix}/\text{s}$

A NEW STRATEGY FOR ELECTRON COUNTING: EVENT DETECTION IN HARDWARE



NEXT-GENERATION REAL-TIME ELECTRON COUNTING



Tem Electron Energy
Pixel Array Size
Sensor Design

Sensitive to 80 keV – 1.25 MeV | optimized for 200 - 300 keV

4096 × 4096 (16.8 million pixels) | 8 μm pixel pitch

Novel event-based ultra-fast DDD® sensor
on-chip correlated double sampling (CDS) | on-chip thresholding | digital readout
backthinned | radiation hardened

Acquisition Modes
Data Output

Event-based electron counting, *always*

Images, movies or event streaming

Detection Efficiency

>90% For 200 - 300 kV

Exposure Rate

~0.01 - 75 e-/pixel/second (ranging ~4 orders of magnitude)

Linearity

>95% linear up to ~15 e-/pixel/second

Dose Fractionation

8k x 8k super resolution readout at up to 391 μs time resolution with event streaming
Standard resolution movie output at 120 fps

TEM Compatibility
Mounting Position

All major TEM manufacturers & models

Fully retractable | compatible with a wide-range of configurations typically in TEM bottom port, pre- or post-energy filter, or in JEOL film drawer

Sensor Protection
Computer System
Image Format

TEM blanking/shuttering | failsafe software

High-performance computer | Windows 11 | Nvidia GPU(s) | up to 55 TB storage

Non-proprietary | MRC, TIFF, Tiff LZW or CEF

Automation Software

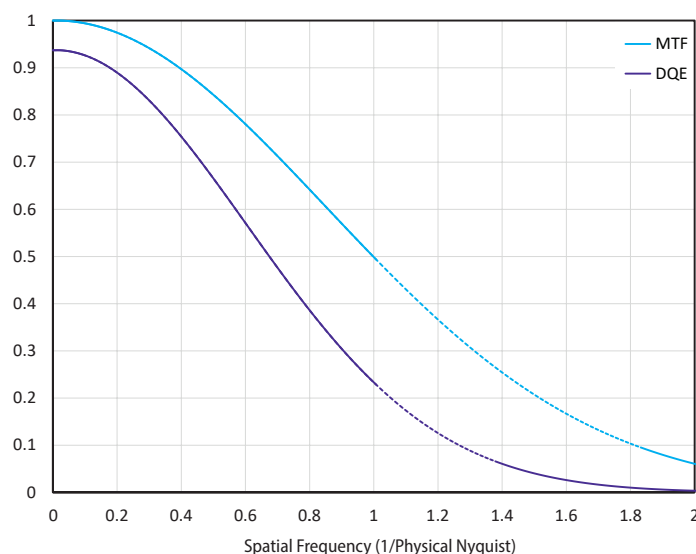
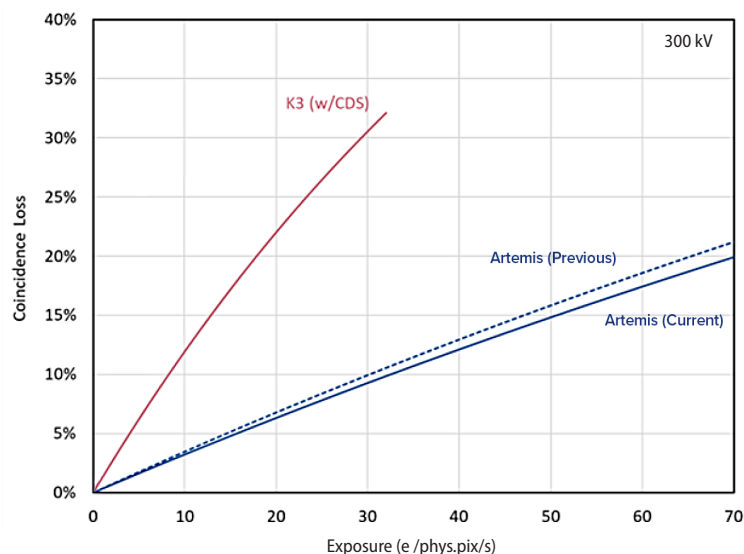
SerialEM | Leginon | JADAS (JEOL) | open API (supporting Python, C, C++, C#, etc.)

Integrations

CEFID post-column energy filter (CEOS)

Analasys Software

SpyDE GUI provides in-situ movie analysis, annotation, exporting & 4D-STEM strain, orientation, electric or magnetic field mapping



Left: Coincidence loss is a failure to detect electrons when the beam is too bright compared to the speed of the sensor. As you can see from the graph above, Artemis's ultra-fast counting is unmatched [1-3].
Right: DQE curves are shown for 300 kV electrons with Nyquist meaning the physical (non-super-resolution) Nyquist | Specifications and performance are subject to change.