AMSTERDAM SCIENTIFIC INSTRUMENTS

FeliS

Timepix3

The most flexible event-based detector for your SEM

FeliS transforms any SEM into a high-speed characterization platform, enabling 4D-STEM, electron diffraction, EBSD, and more, allowing you to inspect your samples with unprecedented detail and extract richer information directly in the SEM.

Technology

FeliS is the most flexible, event-based, zero-suppressed electron detector designed to enable advanced characterization directly in scanning electron microscopes. By recording only meaningful electron events instead of full frames, it removes dwell-time limitations and significantly increases acquisition speed while reducing data volumes by up to 1000×. Operating at up to 320 Mhits/s, FeliS supports high-performance workflows including 4D-STEM, orientation mapping, and time-resolved experiments. Its modular design allows full control over sensor mounting, integration, and data pipelines, enabling seamless deployment on existing SEM systems without hardware redesign while delivering clean, analysis-ready datasets.

General Features

- Event-driven (data-based) readout — no frame acquisition
- Zero-suppressed detection (stores only electron events)
- Up to 320 Mhits/s maximum throughput
- 512 × 512 pixels, 55 µm pitch
- Time-of-Arrival (ToA) and Time-over-Threshold (ToT) per pixel
- ~1.56 ns timing binning
- Compatible with SEM transmission, STEM-in-SEM, and EBSD
- Modular mechanical and software integration

Specifications

Parameter	Value
Pixel Size	55 µm
Active Area	28.16 x 28.16 mm^2
Bandwith	120 (Standard) / 320 (Turbo) Mhits/s
Time bin Resolution	1.56 ns
Sensitivity	Down to 5keV
Readout	Event-Driven
Technology	Timepix3

Applications

• **4D-STEM in SEM:** High-speed acquisition of diffraction patterns for strain, orientation, phase, and field mapping at the nanoscale.

• **EBSD & Orientation Mapping:** Event-based diffraction capture enabling fast, high-dynamic-range crystallographic mapping.

• **Nano-beam Diffraction (NBD) & 3DED:** Sharp diffraction disk acquisition with high sensitivity for crystal structure and materials analysis.

• **Low-dose Electron Imaging & Diffraction:** Sparse electron counting enables imaging of beam-sensitive materials such as polymers, biological samples, and hybrid materials with reduced damage.

• **In situ SEM Experiments:** Real-time monitoring under heating, mechanical loading, electrical biasing, or environmental conditions.

• **Ultrafast SEM:** Time-stamped electron detection enables pump–probe and stroboscopic experiments with nanosecond-scale precision.

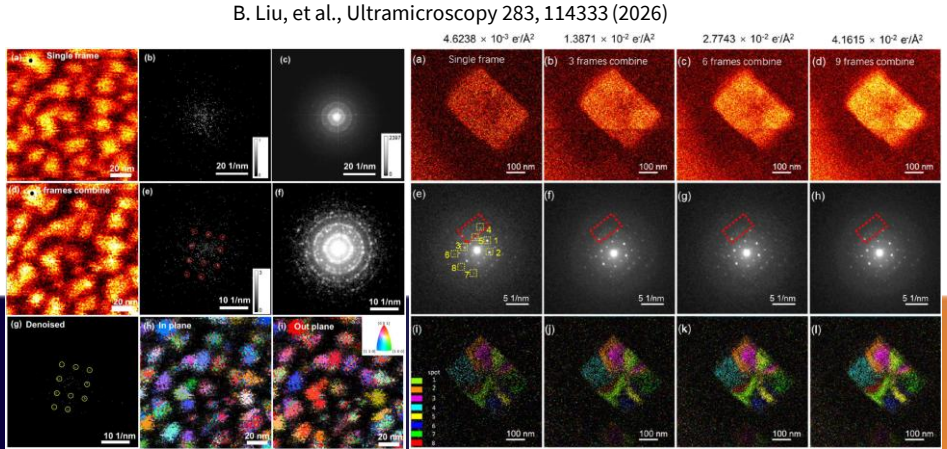
• **Bunch-structured Beam Synchronization:** Correlation of detected electrons with pulsed beams, beam blankers, or modulated electron sources.

• **Transient Diffraction & Dynamic Imaging:** Capture structural evolution, phase transitions, and non-equilibrium processes.

• **Correlative Multimodal Characterization:** Combine diffraction with complementary signals (e.g. EDS, CL) for integrated structural, compositional,and functional analysis.

Strain & orientation mapping · 4D-STEM · 3DED

B. Liu, et al., Ultramicroscopy 283, 114333 (2026)



Seamless Integration

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