

Tescan TENSOR

Fully Integrated, Precession-Assisted, Multimodal Analytical 4D-STEM

Tescan TENSOR is a new multimodal analytical STEM microscope optimized for advanced electron diffraction measurements.

It features fully integrated beam precession and near-UHV environment for nanoscale, compositional, and structural characterization of functional materials, thin films, and (sub)micron nanoparticles.

The system delivers enhanced analytical performance, unprecedented usability, and increased productivity.



Measurements

Tescan TENSOR provides user-guided workflows for STEM imaging, EDX analysis, 4D-STEM measurements, STEM/EDX tomography, and 3D-ED structure determination. Advanced electron microscopists and method developers can utilize the proprietary API with full access to all microscope functions.

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| ■ BF/ADF/HAADF STEM Imaging | ■ Strain Analysis and Mapping |
| ■ STEM Lattice Imaging | ■ 4D-STEM and Virtual STEM |
| ■ EDS Compositional Analysis | ■ STEM and EDS Tomography |
| ■ EDX Elemental Mapping | ■ Diffraction Tomography (3D-ED) |
| ■ 4D-STEM Phase-Orientation Mapping | ■ ExpertPI Workflow Development |

Performance

Tescan TENSOR is equipped with state-of-the-art components and modules to provide high quality data, fully integrated with perfect synchronization of STEM scanning, beam blanking, beam precession, and readout of all detectors.

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| ■ 100 kV FEG for superior analytical STEM performance on samples up to 200 nm thick | ■ Integrated electrostatic beam blanker (< 1 MHz) |
| ■ Diffraction mapping (4D-STEM) using a fast, hybrid-pixel direct electron diffraction detector (Dectris Quadro, < 4,500 fps) | ■ Negligible sample contamination due to near-UHV in the column (10^{-6} Pa at the specimen location) |
| ■ High quality EDX data acquired with two windowless EDX detectors (collection solid angle of 1.6 srad) | ■ On-the-fly data processing and visualization for interpretable results and interactive data analysis (Tescan EXPLORE™) |
| ■ Fast electron beam precession enabling high speed of PED data acquisition (at 72,000 Hz it is about 100× faster compared to stand-alone systems) | ■ EDX enhanced 4D-STEM phase analysis |
| | ■ EDX elemental mapping improved with beam precession |

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Usability

Tescan TENSOR is an analytical STEM designed to be as intuitive and easy to use as a SEM. It enables advanced analytical STEM, EDX, and 4D-STEM workflows in an accessible form, for both TEM/STEM experts and non-experts alike.

TENSOR allows users to focus on specimen interaction, rather than spending excessive time adjusting the microscope and setting parameters for data acquisition. With TENSOR, novice users require only minimal training. TENSOR expert and novice users both benefit from fast time to accurate multimodal analytical results.

Experienced users can customize measurements and export acquired analytical datasets for offline processing. It is also possible to develop new measurements and workflows with a dedicated Python-level API suite. Data collection works in conjunction with data analysis using HyperSpy, LiberTEM, py4Dstem, or other third-party software packages.

Summary

- Run advanced analytical STEM/EDX/4D-STEM workflows with ease, powered by application-driven and analytics-integrated design.
- Achieve consistent, high-quality analytical results independent of operator skill level, thanks to automated workflows and centralized software with pre-defined templates.
- Highly accurate phase, orientation, and strain (4D-STEM) analysis and large-area mapping without complex post-processing, is enabled by fast and precisely aligned beam precession for 4D-STEM.
- Using flexible workflow control, powered by open architecture and a programmable ExpertPI interface, TENSOR adapts to your requirements and infrastructure instead of forcing your team to adapt to the microscope.

