

# Titan Themis

High-throughput sub-Ångström imaging for atomic 2D and 3D analytics

## Titan Themis<sup>3</sup> 300

	ENERGY SPREAD	POINT RESOLUTION	INFORMATION LIMIT	STEM RESOLUTION
Image corrector	0.7 to 0.8 eV**	80 µm	80 µm	136 µm
Probe corrector	0.7 to 0.8 eV**	200 µm	100 µm	70 µm
Monochromator / X-FEG Image + probe corrector	0.2 to 0.3 eV*	80 µm	70 µm	70 µm
Image + probe corrector	0.7 to 0.8 eV**	80 µm	80 µm	70 µm
* Depending on energy filter option	** S-FEG 0.7 eV, X-FEG 0.8 eV		Note: All specifications are at 300 kV For a list of specifications of other acceleration voltage please contact your sales representative	

### Dens Solutions In-Situ Holders:



Liquid



Heating and Biasing



Gas

### FEI Holders:

Single tilt

Double tilt



## Technical highlights:

- Optional ultra-stable, high brightness Schottky field emitter gun (X-FEG, for more details see separate product data sheet)
- New three lens condenser system with quantitative indication of convergence angle and size of illuminated area for quantitative measure of electron dose and illumination conditions
- Flexible high tension range: from 60 to 300kV (60, 80, 120, 200, 300kV)
- Electron gun monochromator for high energy resolution EELS and improved spatial resolution, especially at low kV HR-S/TEM
- STEM and TEM: up to 70pm performance in both STEM and TEM;
- Environmental enclosure to relax the acoustic and temperature room variation requirements with Titan3 Themis.
- Patented modular column design allows accurate mechanical stacking system for low excitation of deflector units in the column to minimize instabilities due to electronic noise
- ConstantPower™ lens design for ultimate thermal stability in mode switches · Low hysteresis design to minimize cross-talk between optical components for ultimate reproducibility · Symmetric Ruska-Rieke S-Twin objective lens with wide pole piece gap design of 5.4mm and “space to do more” allowing the use of special holders such as heating, cooling and STM/AFM holders · Objective aperture in the back focal plane of the objective lens for optimum TEM dark field application work
- Field upgradable for the addition of a probe Cs-corrector
- Automatic apertures for remote control operation and reproducible recall of aperture positions during aperture change
- Rotation-free imaging for easy operation and clear orientation relationship between the image and diffraction plane
- New computerized 5-axis specimen piezo-stage for accurate recall of stored positions, tracking of the areas visited during search for the right area and ultra-stable, deep sub-Angstrom resolution with low specimen drift
- The new piezo stage allows for movements as fine as 20pm for centering of feature of interest in the field of view.
- Linear drift compensation provided by piezo stage can be used to mitigate limitations caused by thermal drift unavoidable during in situ heating or cooling experiments
- Tilt range  $\pm 40$  degrees for analytical double tilt holder to orient the maximum amount of zone axis of one crystal in polycrystalline material. With tomography holder even  $\pm 75$  degrees to minimize the missing wedge in 3D reconstructions
- New cold trap design for up to one week of operation to maximize up-time
- Field-free imaging in Lorentz mode with 2nm resolution for magnetic property studies
- onic noise
- TruelImage™ Atlas focus series software for quantitative HR-TEM applications (for more details see separate product data sheet)
- Xplore3D™ software for automated tomography S/TEM experiments and Xplore3D Xpress for ultra-fast 3D reconstructions (for more details see separate product data sheet)
- New fully digital system for remote controlled operation using the SmartCam suite
- The new Velox SW enables fast and reproducible operation through intuitive and easy workflow from optical mode setting, detector choice to acquisition and analysis providing successful and fast results
- Velox SW enables fast and up to four simultaneous STEM signal acquisition
- The new choice to use smart scanning technology for high image quality in STEM
- The SuperX option and Velox provides, together with the Gatan Ultrafast EELS or DualEELS option, up to 1000sp/s of simultaneous EDS and EELS data acquisition
- Velox analytics for live peak identification and background fitting during ultra-fast EDS acquisition
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**EDX microanalysis:**

· Super-X: High-sensitivity, windowless EDX detector system based on SSD technology (patented)

· Output count rate: up to 200 kcps

· Energy resolution ·

≤ 136 eV for Mn-K $\alpha$  and 10 kcps (output)

· ≤ 140 eV for Mn-K $\alpha$  and 100 kcps (output)

· 0.7 srad solid angle · 120 mm<sup>2</sup> combined detector area

· Fast mapping: pixel dwell times down to 10  $\mu$ s

· High P/B ratio (Fiori number) > 4000

· Excellent in-hole performance and Low system background in EDX