# TESCAN Vega 4 GMU equipment and specifications

### Electron optics

- High-performance thermal emission-SEM column, with dual-anode source emission geometry, fixed objective aperture and through-the-lens differential pumping
- Filament lifetime > 100 hours

### Resolution

- High-vacuum
  - 3 nm at 30kV (SE)
  - 8 nm at 3kV (SE)
- Low-vacuum
  - 3.5 nm at 30kV (SE)
  - 3.4 nm at 30kV (BSE)
- Accelerating voltage: 200eV – 30keV
- Probe current: 1pA - 2µA  (continuous)
- Maximum field of view: 7.7 mm at 10 mm WD, >50 mm at max. WD
- Probe current: 1pA - 2µA  (adjustable)

### Detectors

- Everhardt-Thornley SED
- Low-vacuum Gaseous SE-Detector
- YAG Szintillator-Detector (motorized)
- EDS-Detector Xplore (retractable)
- CL-Detector Tescan (motorized)
- IR-CCD

### Chamber vacuum

- High-vacuum:  < 1e$^{-4}$ Pa
- Low-vacuum: 7-500 Pa

### Vacuum system

- 1 x Turbo-Molecular-Pump
- 1 x Oil rotary-Pump

### Chamber

- 340 x 315 mm (width and depth)
- 15mm analytical WD
- Ports: 20+
- EDX take-off angle: 35°

### 5-axis motorized stage

- Compucentric stage
  - X = 130mm
  - Y = 130mm
  - Z = 100mm
  - T = -70° to +90°
  - R = 360° continuous

- Max. specimen height: 92 mm
- Max. Specimen size: 180 mm
- Max. specimen weight: 8 kg (full XYZ moves), 1 kg (XYZRT moves)

### System control

- High performance PC: Intel Core i7-8700, RAM Hyper Fury 2 x 8GB 2400MHz DDR4, 250 GB SSD M.2 and 2 TB S-ATA 7200 RPM, Nvidia GTX 1060 3GB GDDR5 PCI-E x16, Windows 11  64-bit
- Image display: 2 x 32" QHD monitor
- TESCAN Essence™ Software
- Keyboard and Mouse, Control panel, trackball

### Image aquisation

- Max. frame size: 16k x 16k
- Aspect ratio: 1:1, 4:3 and 2:1
- Image stitching (requires Essence Image Snapper
- Up to 8 channels can be acquired simultaneously
- Color mapping and multi-channel signal mixing
- Multitude of image formats including TIFF, PNG, BMP, JPEG and GIF
- Dynamic range: 8 or 16 bits

### EDS / CL-System

### OXFORD AztecLiveLite  EDS

- Xplore 30 SDD Detector
- Manual insertion mechanism with mobile detector sled
- Sensor: 30 mm$^2$
- Resolution: at Mn K (at 100000cps) min 129 eV; at C K 52 eV
- Max count rates in excess of 1Mcps
- Detection of elements from boron (B)
- X1 Pulse Processor & Imaging Unit
- Digital pulse processor for efficient processing of high counting rates

- Effective pile-up correction (sum peak correction) for measurements with high count rates
- Software: AztecLive Lite Analytik 160 AZtecLiveOne chemical imaging, Spectrum Acquisition, X-Ray Mapping and LineScanning in Tru-QTM, in TrueMap with instant feedback in the form of live electron image, live X-Ray maps and Live automatically labelled spectrum, fully interactive during acquisition

- Applications
  - Quickly spot any differences between a production sample and a 'control' sample with instant Live spectrum compare
  - The AZtecLive interface enables real-time chemical investigation of the samples, viewing Live TV rate electron image and X-ray maps until you find a feature of interest

**TESCAN CL**
- Deben Centaurus Detector
- Scintillation type panchromatic CL-Detector with parabolic collection tip
- Photomultiplier-array with housing (spectral band: 185 -850nm)
- Pre-amplifier built into head unit
- Motorized insertion mechanism with mobile detector sled
- Excellent performance from 5kV to 30kV
- Standalone video processor with brightness and contrast controls
- Video output adjustable for different SEM input .