

JEOL JEM-ARM200F NEOARM TECHNICAL DETAILS

ACCELERATION VOLTAGE	From 30 to 200 kV
ACCELERATION VOLTAGE STABILITY	5×10^{-7} /min
ELECTRO-OPTICAL ALIGNMENTS	Automatic for three different acceleration voltages: 60, 80 and 200 kV
PUMP SYSTEM	<p>Oil-free, with vacuum values:</p> <ul style="list-style-type: none"> • 1×10^{-8} Pa at the end of the accelerating tube, or about 10-10 Pa in the cathode area • 2×10^{-5} Pa at column and sample chamber level
ELECTRON SOURCE	<p>Cold cathode field emission with high spatial and temporal coherence (Cold-FEG) with Flash & Go technology:</p> <ul style="list-style-type: none"> • Energy spread $\leq 0.33\text{eV}$ to 200kV (FWHM) • Brilliance $1.5 \cdot 10^{-9}$ A/cm²·sr at 200kV • Current density: ranges from 0 - 10 nA • Temporal coherence: longitudinal of $1.17 \cdot 10^{-14}$ m and transverse of $2.04 \cdot 10^{-16}$ m • Source: at a transverse coherence length of about 42.4 nm and a longitudinal coherence length of approximately 2.43 μm at 200kV
CORRECTORS	<ul style="list-style-type: none"> • ASCOR-type STEM corrector that can correct up to the 5th order of aberration • CETCOR-type TEM corrector that can correct up to the 4th order of aberration
EMISSION CURRENT	From 0 to 15 μA
CURRENT AT SAMPLE LEVEL	From 0 e 10 nA
OBJECTIVE LENS FEATURES	<ul style="list-style-type: none"> • The NEOARM is equipped with HR "High Resolution" type polar expansions • The distance between the polar expansions of the objective lens is > 4 mm • In situ experiments, 3D high-angle tilt tomography, cryo, etc.
PHASE CONTRAST RESOLUTION	At 200 kV: 72 pm

STEM-HAADF MODE RESOLUTION	At 200 kV: 73 pm on GaN, obtained in single frame acquisition mode, 63pm on GaN which is available in frame accumulation acquisition mode
DIAPHRAGMS	<ul style="list-style-type: none"> • Condenser lens: 10, 20, 30, 40, 50, 70, 100, 150 μm • Objective lens (diffraction plane): 5, 30, 40, 60 μm • Selected area (image plane): 10, 20, 50, 100 μm
INFORMATION LIMIT	90 pm
MINIMUM DIAMETER OF THE PROBE	Up to 63 pm with a current density of 30 pA
TEMPORAL COHERENCE	Longitudinal of $1.17 \cdot 10^{-14}$ m and transverse of $2.04 \cdot 10^{-16}$ m
SPATIAL COHERENCE	Transverse coherence approximately 42.4 nm and a longitudinal coherence length of about 2.43 μm at 200 kV
GONIOMETRIC EXCURSION	Controlled with a trackball or graphical interface: <ul style="list-style-type: none"> • X= ± 1 mm • Y= ± 1 mm • Z= $\pm 0,2$ mm
SYSTEM STABILITY	Atomic Resolution Microscope (ARM) platform: <ul style="list-style-type: none"> • Column with increased diameter and new base frame with anti-vibration system and optimized gravity center, to achieve the atomic resolution • Protective cover for sample holder • Arrangement and reduced weight of pumps on column • Sample drift compensation system in STEM-EDS mode, operating in the range of drift ± 100 nm
SAMPLE HOLDER AXIAL TILT	For combined EDS and crystallographic analysis: <ul style="list-style-type: none"> • X= $\pm 30^\circ$, Y= $\pm 30^\circ$ • For 3D tomography, maximum tilt angle of $\pm 80^\circ$ • Cryogenic double tilt specimen holder with maximum tilt in X, Y of $\pm 15^\circ$

DETECTOR	Dual EDS detector, with SDD technology : <ul style="list-style-type: none"> • Active area of each detector 100 mm²: • 133 eV Resolution • Spurious spikes: ≤1% • P/B ratio on Ni: ≥4000 • Overall solid angle: a solid angle of 1.76 sr is achieved by the two detectors to ensure maximum analytical performance • Minimum dwell time in fast mapping conditions is 10 μs
EDS CONTROL SOFTWARE	<ul style="list-style-type: none"> • Point analysis, line scan, mapping X • Qualitative and quantitative analysis including by Cliff-Lorimer method • Self-identification of peaks
EXPORT OF EDS INFORMATION	Smile View Map, Microsoft Word, Power Point etc.
NEOARM EQUIPMENT	Gatan Imaging Filter (GIF) type "Continuum ER," includes: <ul style="list-style-type: none"> • New CMOS detector with low background noise and high dynamic range, 2048 · 2048 pixels with Gatan's revolutionary patented fast-decay XCR scintillator with 18 μm pixel size • Ultrafast electrostatic shutter (100ns) • High-speed DualEELS™ with 2 kV offset • Specific BF/DF detector with integrated beam stopper dedicated for STEM-EELS applications • Aperture mask with 81 holes, 9 mm diameter imaging aperture, 5.0 / 2.5 mm diameter EELS apertures and energy selection unit
LICENSE	On-line and off-line licensing of Gatan Digital Micrograph software
DIGITAL CAMERA	CMOS Gatan Rio16, with the following features: <ul style="list-style-type: none"> • 16 MP (4,096 · 4,096) • Active sensor area 36.9 · 36.9 mm² • Pixels size: 9 μm • Read out speed maximal 20 fps • Displayed and saved image: sum with sample drift correction of 20 fps • Dynamic range with frame sum: ≥16 bits • Installation position: placed on axis to the electron beam, retractable and GIF compatible • Primary acceleration voltage: 30-200 kV

CAMERA	<p>GATAN "K3 IS base" with the following features:</p> <ul style="list-style-type: none"> • 14.2 MP (3,456 · 4,092) • Pixel size: 5 μm • Working mode: standard, in-situ and counting modes • Read out: full resolution 1500 fps with on line frame accumulation system that allows recording of images derived from the sum of at least 20 fps (standard mode). In the in-situ mode, 150 fps recording is possible at full resolution and up to 3,500 fps (256 x 256 pixels) • Accelerating voltage: 80-200 kV
VACUUM SYSTEM	<p>Fully automatic with integrated diagnostics in the TEM GUI, oil-free, and consisting of:</p> <ul style="list-style-type: none"> • NEG pump (200L/s) • Ion pumps at the source (200L/s and 20L/s), ion pump (150L/s) • Turbomolecular pump (300L/s) in the column and dual scroll pumps (each 500L/s) for pre-vacuum
STEM DETECTOR	<p>Configuration:</p> <ul style="list-style-type: none"> • Bright Field (BF): of P47 phosphor scintillator type with 8mm diameter, 1us/dwell time and with sensitivity expressed as ~100% quantum efficiency • Annular Bright Field (ADF): phosphor-type P47 annular with 0.8 mm inner diameter and 1.6 mm outer diameter, 1us/dwell time and with sensitivity expressed as ~100% quantum efficiency • Dark field (DF): high-sensitivity YAP-Ce/P47 hybrid detector having inner diameter of 4mm and outer diameter of 16mm, 1us/dwell time and with sensitivity expressed as ~100% quantum efficiency. • New High Angle Annular Dark field (DF) "Perfect Sight": high-sensitivity hybrid detector • YAP-Ce/P47, having inner diameter of 4mm and outer diameter of 16mm, 1us/dwell time and with sensitivity expressed as ~100% quantum efficiency • Maximum resolution in pixels for individual acquisition STEM channel: 4096 • Detector collection angle as a function of camera length
TEM MAGNIFICATIONS	<p>From 50 up to 2,000,000</p>
STEM MAGNIFICATIONS	<p>From 200 up to 150,000,000</p>

