NanoFrazor® Scholar and Explore

NanoFrazor Explore

Specification Data Sheet

	NanoFrazor Scholar	**NanoFrazor Explore**
Sample		
Maximum sample size (X,Y,Z)	30 mm, 30 mm, 10 mm	100 mm, 100 mm, 20 mm
Substrate material	no restrictions (transparent, conducting, magnetic, ...)	no restrictions (transparent, conducting, magnetic, ...)
Patterning		
Physical lateral patterning resolution (feature size and half-pitch in resist)	< 30 nm	< 25 nm
Digital lateral patterning resolution (address grid)	< 0.5 nm	< 0.3 nm
Physical vertical (3D) patterning resolution (distinguishable step size in resist)	< 3 nm	< 2 nm
Digital vertical (3D) patterning resolution (max. number of levels)	8 bit (256 depth levels)	8 bit (256 depth levels)
Tip Temperature Control		
Tip heater: Temperature range	RT to 1100°C	RT to 1100°C
Tip heater: Temperature setpoint resolution	< 5 K	< 5 K
Tip heater: Thermal time constant	< 10 us	< 10 us
Topography Imaging		
Lateral imaging resolution (topography feature size)	< 10 nm	< 10 nm
Vertical imaging resolution (topography sensisitivity)	< 0.3 nm	< 0.3 nm
Overlay & Stitching		
Stitching accuracy	< 30 nm	< 20 nm
Overlay accuracy	< 30 nm	< 20 nm
Scanner		
Scan range Z scanner	15 um	20 um
Scan range XY scanner	50 um x 50 um	75 um x 75 um
Resolution of positioning sensors	< 0.3 nm	< 0.15 nm
Scan speed (during patterning and imaging @ 30 nm pixel size)	0.5 mm/s	1 mm/s
Long range positioning system		
Travel range (X,Y,Z) positioning system = max. sample size	30 mm, 30 mm, 15 mm	100 mm, 100 mm, 25 mm
Resolution of positioning sensor	< 150 nm	< 5 nm
Travel speed	20 mm/s	20 mm/s
Optical Microscope		
White Koehler illumination	manual on/off	PC controlled
Resolution (diffraction limit of optics)	3.6 um	2.4 um

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Field of view	1.3 mm x 1 mm	1.3 mm x 1 mm
Camera	2592 x 1944 pixel	2592 x 1944 pixel
Electronics		
Real time processor	500 MHz	1 GHz
High speed, low noise ADC/DAC channels	8 channels (up to 18 bit)	8 channels (up to 24 bit)
Calibration procedures		
Cantilever calibrations (distance, temperature, actuation, sensing, ...)	automatic (total time < 10 s)	automatic (total time < 10 s)
Perfect parallel alignment of sample surface and scan plane	automatic (within < 10 s)	automatic (within < 10 s)
In-situ drift corrections	automatic (during patterning & imaging)	automatic (during patterning & imaging)
NanoFrazor Software		
Intuitive user interface and work flow based on Igor Pro	included	included
Layout input formats	GDSII, JPG, PNG, BMP, TIFF	GDSII, JPG, PNG, BMP, TIFF
Major functions also accessible via a DLL library	included	included
Environment Control		
PC monitored humidity & temperature sensors	no	yes
Gas flow control	manual	PC controlled
Damping quality of vibration isolation (vertical & horizontal)	vibration isolation not included	> 98 % @ 10 Hz, resonance < 1.5 Hz
Acoustic isolation	one layer	three layers, 40 dB (@ 50–5000 Hz)
Housing		
Footprint	50 cm x 32 cm (excl. external controller)	128 cm x 78 cm
Height	30 cm (excl. external controller)	185 cm
Weight	100 kg	650 kg
Facility requirements		
Power input	1x 110 or 220 VAC	1x 110 or 220 V AC
Nitrogen gas input	max. 30 psi (external valve and flow control required)	max. 30 psi
Compressed air input	not required	max. 30 psi
Vibration isolation	required	not required (integrated)
Upgrade Options		
Trade-in upgrade to NanoFrazor Explore	possible	not applicable
Integrated Laser Writer Unit	not possible	yes (under development)
Multi-tip cantilever operation (chip with up to 10 cantilevers)	not possible	yes (under development)

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