

DWL 66⁺ THE ULTIMATE LITHOGRAPHY RESEARCH TOOL



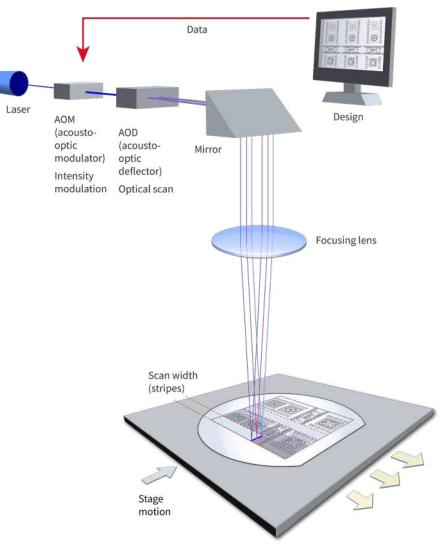


DWL 66⁺ THE ULTIMATE PHOTOLITHOGRAPHY TOOL FOR RESEARCH & DEVELOPMENT

The DWL 66⁺ laser lithography system is a highly versatile, high-resolution pattern generator for direct writing and low-volume mask making. Its customer base includes over 300 leading universities, research facilities, and companies worldwide.

The system features powerful standard options such as the High-Resolution Mode, backside alignment (BSA), and the optical autofocus. In addition to high-resolution 2D patterns, the system also supports the creation of complex 2.5D structures in thick photoresist with the help of the gray-scale exposure mode. The DWL 66^+ can be equipped with either a 405 nm laser for work with all broadband resists, or with a 375 nm UV laser that in addition allows the use of SU-8 and other i-line-resists. Advanced professional options like the High-Accuracy Coordinate System and an automatic loader are also available.

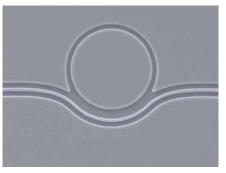
With a minimum structure size of 300 nm, the DWL 66⁺ provides the ultimate in high resolution, outperforming the most powerful optical lithography systems in the Research & Development market segment. The system's main application areas can be found in optical sciences, material research, micro-engineering and micro-electronics.



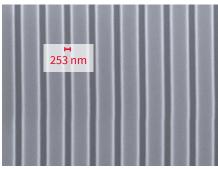
DWL 66⁺ exposure strategy

THE HIGH-RESOLUTION MODE

This is one of the six write modes that are available for the DWL 66⁺. The optimized optics and electronics setup of the High-Resolution Write Mode provide ultimate stability and resolution and enable exposures of structures with a minimum feature size of 300 nm.



A channel waveguide coupled to a ring resonator. The waveguide is approximately 320 nm wide, the resonator diameter is 3 μ m. The exposure laser wavelength was 405 nm. Design created with [1].

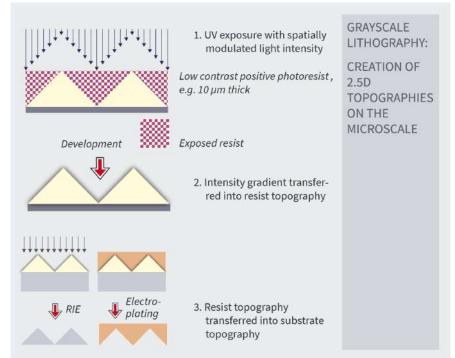


Minimum feature size: 300 nm - or even less. The image shows the result of a high-resolution test exposure with a nominal linewidth of 250 nm!

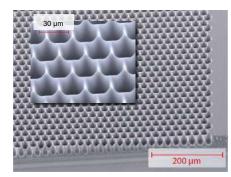
A CHOICE OF GRAYSCALE CAPABILITIES

Grayscale lithography uses a low-contrast positive photoresist. The exposure intensity gradient transfers directly into exposure depth. The result after processing is a 2.5D topography on the microscale.

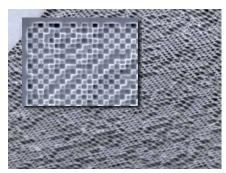
Whether standard, advanced or professional - the grayscale mode presents a powerful tool for the creation of complex topographies - for example for microoptical components or MEMS.



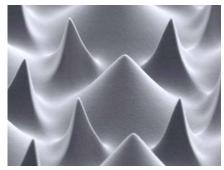
APPLICATIONS



Microlens array: Width of lenses 20 μm, depth 30 μm



DOE: Resist AZ 4633, resist thickness 4 µm, structure size 2 μm



Diffuser: Resist AZ 4562, structure size < 5 μ m Image courtesy of IGI

ADVANCED OPTIONS AND UPGRADES

• Professional Grayscale

Allows the exposure of CAD files with up to 1024 gray levels in order to create complex topographies for applications such as microoptics. Includes highly sophisticated software package.

High-Accuracy Coordinate System

Includes various technical measures to improve the thermal stability and position accuracy of the stage's coordinate system. Provides improved specifications for 2nd layer overlay accuracy.

Automatic Loader

Handling of masks up to 7" and wafers up to 8" with two carrier stations, prealigner and wafer scanner.

Basic Freeform (BFF) .

Exposures on non-planar substrates with features down to 3 $\mu m.$ Typical $\mbox{ Grating on concave lens}$ applications are microstructures on top of convex or concave lenses.

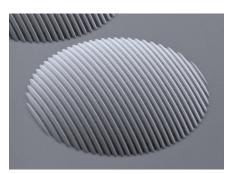


Image courtesy of Fraunhofer IOF

DWL 66⁺ SYSTEM SPECIFICATIONS

Writing Performance Visiting Performance Minimum Teature Size (µm) 0.3 0.6 0.8 1 1.5 3 5 Minimum Tiesand Spaces (µm) 5 10 25 50 100 200 Edge Roughness (30, nm) 50 50 70 80 110 160 CD Uniformity (30, nm) 60 70 80 130 180 250 2nd Layer Alignment over 55 mm² (nm) 250 250 500 500 500 800 1000 Backside Alignment (nm) 500 500 500 500 600 2000 Exposure Time for 100x100 mm² area (min) 30 74 25 72 20 7 Write Speed [mm³/min] 2 10 30 110 - - - Write Speed [mm³/min] 2 10 30 110 - - - Write Speed [mm³/min] 2 10 30 110 - - - System Features Diode laser with 405 nm or 375 nm Subtrate Sizes Variable: 5 × 5 m² to 9	Write mode	HiRes	I	П	Ш	IV	V	
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With UV Diode Laser (375 nm)Image: Control of the second sec	Write Speed [mm ² /min]	3	13	40	150	600	2000	
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Exposure Time for 100x100 mm² area [min]50001015350100-System FeaturesLight SourceDiode laser with 405 nm or 375 nmSubstrate SizesVariable: 5 x 5 mm² to 9" x 9" Customizable on requestSubstrate Thickness0 to 12 mmMaximum Exposure Area200 x 200 mm²Temperature controlled Flow BoxTemperature stability ± 0.1°, ISO 4 environmentReal-Time AutofocusOptical autofocus or air-gauge autofocusAutofocus Compensation Range80 µmStandard or Advanced Grayscale Mode128 / 256 gray levels respectivelyVector ModeEnables the writing of stitching-free linesOverview CameraAllows the alignment of exposure to marks and substrate navigationBackside Alignment (optional)Allows the alignment of exposures to structures on the backside of the substrateHigh-Accuracy Coordinate SystemIncludes golden plate calibration and climate monitoring: 2nd layer alignment down to 350 mProfessional Grayscale Mode1024 gray levels, professional data conversion software Handling of masks up to 7" and wafers up to 8" with two carrier stations, pre-aligner and wafer scannerSystem Dimensions of Standard Version1300 mm x 1100 mm x 1950 mm (lithography unit only)Weight1000 kg (lithography unit only)Itastaltation Requirements230 VAC ± 5 %, 50/60 Hz, 16 A	With UV Diode Laser (375 nm)							
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Electrical 230 VAC ± 5 %, 50/60 Hz, 16 A	Weight	1000 kg (lith	1000 kg (lithography unit only)					
	Installation Requirements							
Compressed air 6 - 10 bar	Electrical	230 VAC ± 5	%, 50/60 Hz	z, 16 A				
	Compressed air	6 - 10 bar	6 - 10 bar					

Please note: Specifications depend on individual process conditions and may vary according to equipment configuration. Write speed depends on exposure area. Design and specifications are subject to change without prior notice.

Visit product website for more information

To contact your local representative, please consult our website *heidelberg-instruments.com*

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