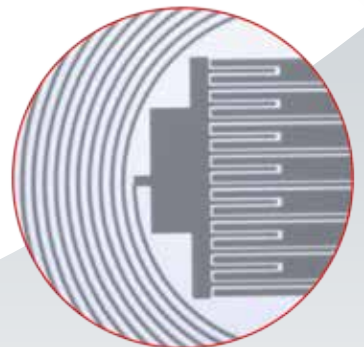
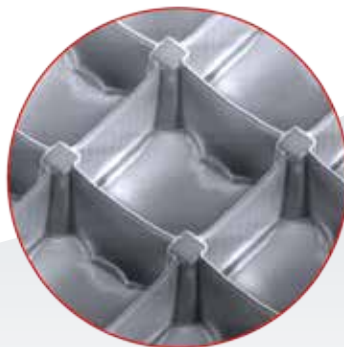


μ MLA

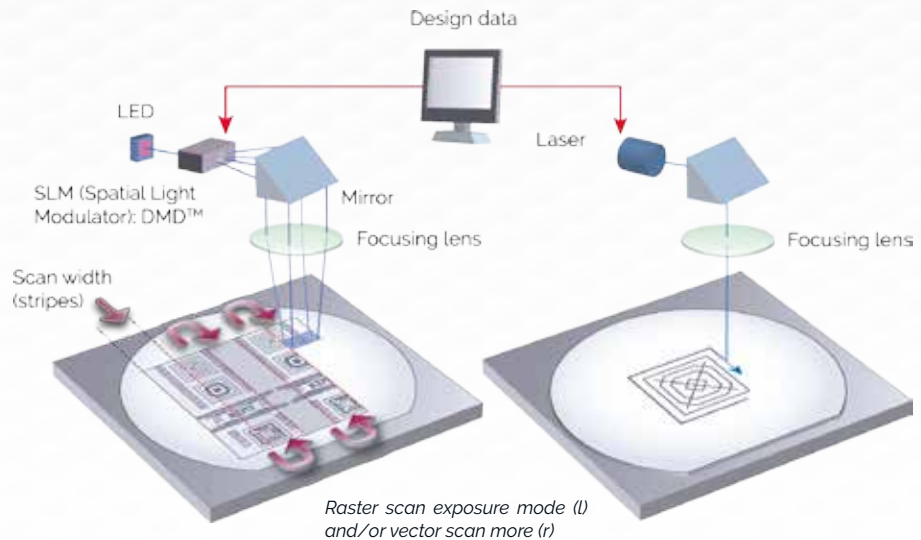
The Tabletop Maskless Aligner



μMLA THE TABLETOP MASKLESS ALIGNER

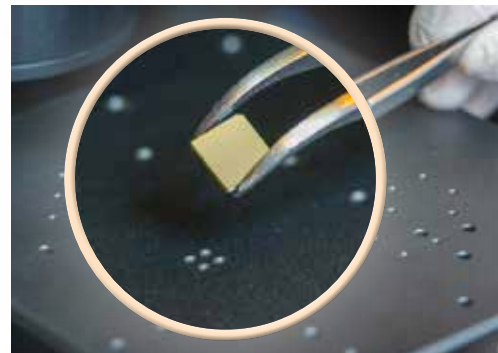
The Maskless Aligner was first introduced in 2015. Since then, the revolutionary, state-of-the-art maskless technology has become firmly established. The μMLA presents a new generation of tabletop laser lithography tool: Configure the set-up precisely to your needs with raster scan and vector scan mode (or both) and a variable resolution write head.

In many applications, the traditional photomask has become a thing of the past as your design file is exposed directly onto the resist-coated wafer via a 2-dimensional Spatial Light Modulator (SLM). The μMLA is the direct successor of the MLA100 and is the „little brother“ of our Advanced Maskless Aligner MLA150, which serves as a trusted, indispensable workhorse in many multi-user facilities, nanofabrication labs, and national institutes.



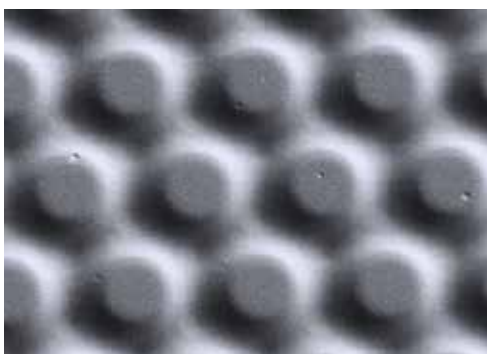
In the development of our brand-new entry-level system μMLA, we introduced new features such as variable resolution and created a table-top system that is flexible and highly customizable. And of course small sample handling is straightforward. Building on our many years of experience, the μMLA features all that was best in our previous tabletop systems, while offering more options and higher performance than ever before.

Applications include Research & Development in areas such as MEMS, micro-fluidics, micro-optics and all other fields where an affordable, compact, and powerful pattern generator for microstructures is required.



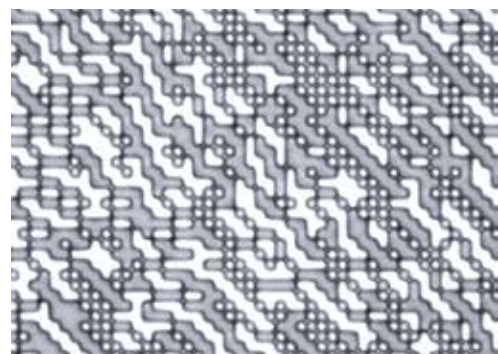
Small sample handling

APPLICATIONS



Micro-Optics: Binary diffractive optical element (DOE). The design is made up of $1 \mu\text{m}^2$ squares. →

← The μMLA offers a standard Grayscale mode, which allows the creation of micro-lenses. Resist: $15 \mu\text{m}$ thick AZ4562. Pitch $30 \mu\text{m}$, radius of curvature $16 \mu\text{m}$.



CUSTOMIZE YOUR μMLA

Two Exposure Modes

The μMLA allows you to either choose between Raster Scan Exposure Mode and Vector Mode, or to even run both exposure modes on one and the same system! The Raster Scan Exposure mode is fast and provides excellent image quality and fidelity, while the write time is independent of structure size or pattern density. The Vector Scan Mode can be helpful for exposing designs consisting of curved lines, where smooth contours are required. While Vector Mode creates similar image quality as the Raster Scan exposure mode, it cannot achieve the same write speed, especially for patterns with high fill factor.

A Choice of Wavelengths

In consequence, you can use up to three different wavelengths (LED and/or laser diodes) on one system.

Variable Resolution

Our newly developed variable resolution function allows you to choose up to three different resolutions for a particular write mode. Simply select the resolution of choice in the software menu and optimize the parameters for your application.

The Surface at One Glance

The optional overview camera provides an easy way to locate alignment marks or other features of interest on your substrate.

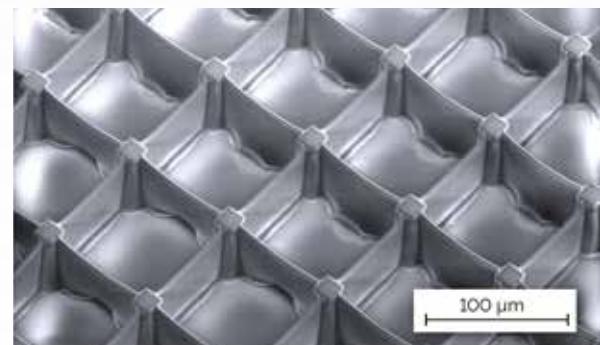
Small Sample Handling

Small sample handling is straightforward with the μMLA: The optical autofocus option allows accurate exposure right up to the edges of a sample.

APPLICATIONS

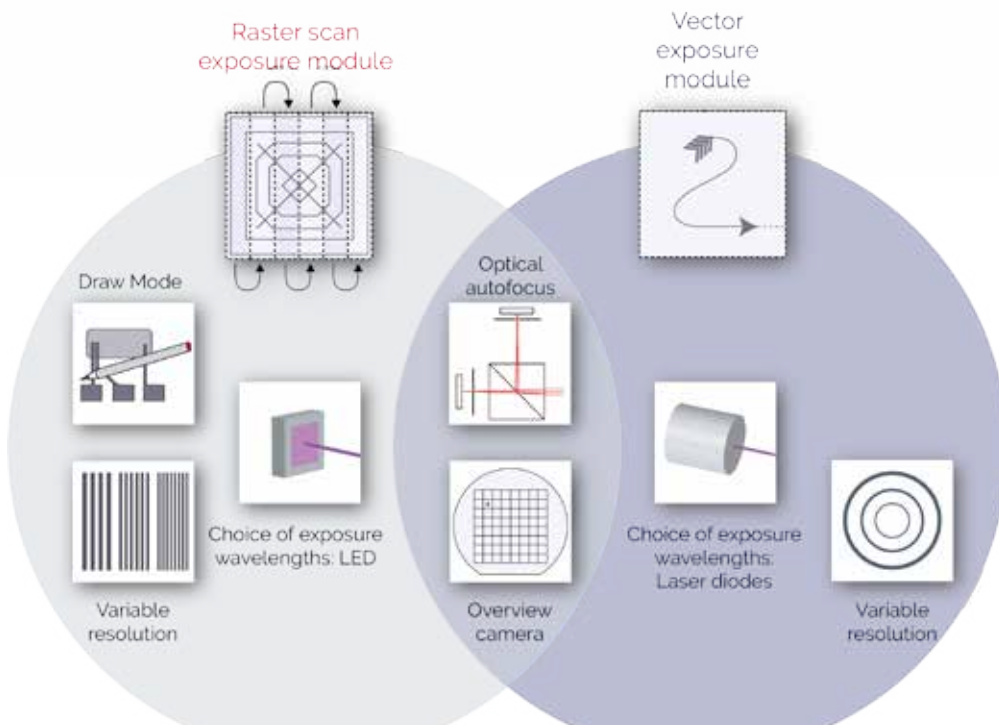


Microfluidics



Cage structures made of circa 50 μm thick SU-8. The structures are used in biological applications to trap and grow cells.

Courtesy of the University of Hamburg



Options offered by the Raster Scan Exposure Mode (gray circle) and by the Vector Exposure Mode (blue circle)

Overlap: Options available for both modes

μMLA

SYSTEM SPECIFICATIONS

	Write Mode I*	Write Mode II*		
Writing performance (both Raster Scan and Vector Exposure Module)				
Minimum structure size [μm]	0,6	1		
Minimum lines and spaces [half pitch, μm]	0,8	1,5		
2nd layer alignment over 5 x 5 mm ² [3σ, nm]	500	500		
2nd layer alignment over 50 x 50 mm ² [3σ, nm]	1000	1000		
Writing performance with the Raster Scan Exposure Module				
Line width variation [3σ, nm]	200	300		
Max. write speed [mm ² /min]	10	30		
Write speed with optional "Variable Resolution for Raster Scan Exposure Module" (UMVAR) for different minimum structure sizes	10 mm ² /min at 0,6 μm	30 mm ² /min at 1 μm		
	20 mm ² /min at 1 μm	60 mm ² /min at 2 μm		
	25 mm ² /min at 2 μm	100 mm ² /min at 4 μm		
Writing performance with the Vector Exposure Module				
Address grid in vector mode [nm]	20			
Edge roughness [3σ, nm]	30	50		
Line width variation [3σ, nm]	70	80		
Maximum linear write speed	200 mm/s			
System specifications				
Maximum substrate size	5" x 5"			
Minimum substrate size	5 mm x 5 mm			
Substrate thickness	0.1 to 12 mm			
Maximum write area	100 mm x 100 mm			
	Raster scan exposure module	Vector exposure module		
Light source	LED; 390 nm or 365 nm	Laser; 405 nm and/or 375 nm		
System dimensions (lithography unit)				
μMLA	Width	Depth	Height	Weight
Main system housing	630 mm (25")	800 mm (31.5")	530 mm (21")	100 kg (220 lbs)
Optional antivibrational table plus user PC table	1400 mm (55")	700 mm (28")	750 mm (30")	350 kg (770 lbs)
Installation requirements				
Electrical	230 VAC ± 5%, 50/60 Hz, 16A			
Compressed air	6 - 10 bar, stability ± 0.5 bar			

* Only one write mode can be installed on the system

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.

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