PRODUCT BROCHURE

Modular Alignment System

for shadow mask or other substrate alignment

Modular system for accurate and reproducible alignment of a shadow mask and a wafer with an integrated vibration-resistant clamping chuck.

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creative engineering and manufacturing

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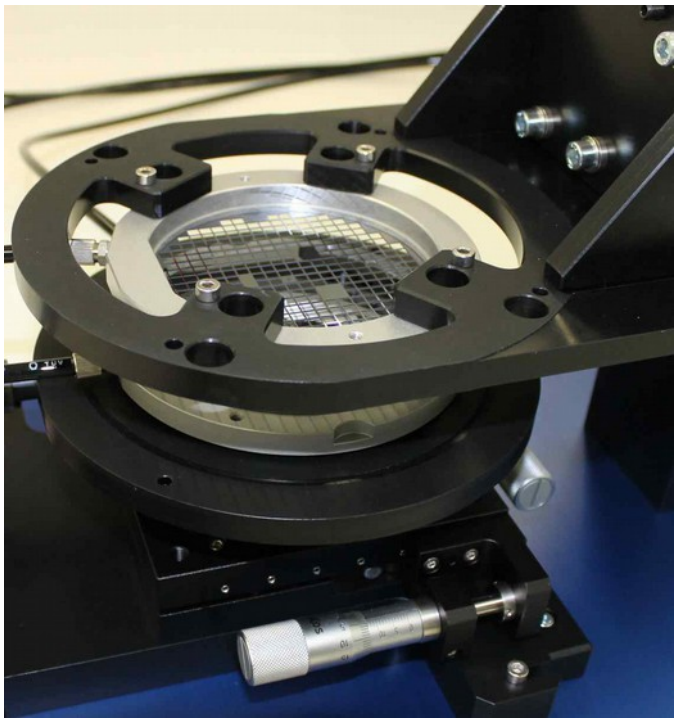
General Information

Thin film deposition through a shadow mask is a powerful process for PVD layer structuring. It allows to replace one photolithographic and one etching step by precise masking of the substrate during deposition. A basic problem of the process is the alignment and temporary fixation of the shadow mask and the wafer.

Idonus provides a system for accurate and reproducible alignment of a shadow mask and a wafer with an integrated vibration-resistant clamping chuck. An alignment tolerance of 6 µm was demonstrated with the help of a microscope. The chuck can directly be inserted in the vacuum chamber for PVD. After deposition the chuck is opened and the wafer and the mask are separated without damaging the wafer. The shadow mask can be reused.

Deposition chucks can be supplied for any substrate size and can be adapted to your requirements. We also provide precise and cost efficient shadow masks made of various materials like metal, silicon, glass or ceramic.



Benefits of the Shadow Mask Aligner

Precise and reproducible PVD layer structuring
Vibration-resistant chuck for PVD
Easy, damage free wafer clamping mechanism
Simple handling during alignment due to vacuum clamping
Ideal for different wafer sizes
Customized chuck
No installation
Low running costs

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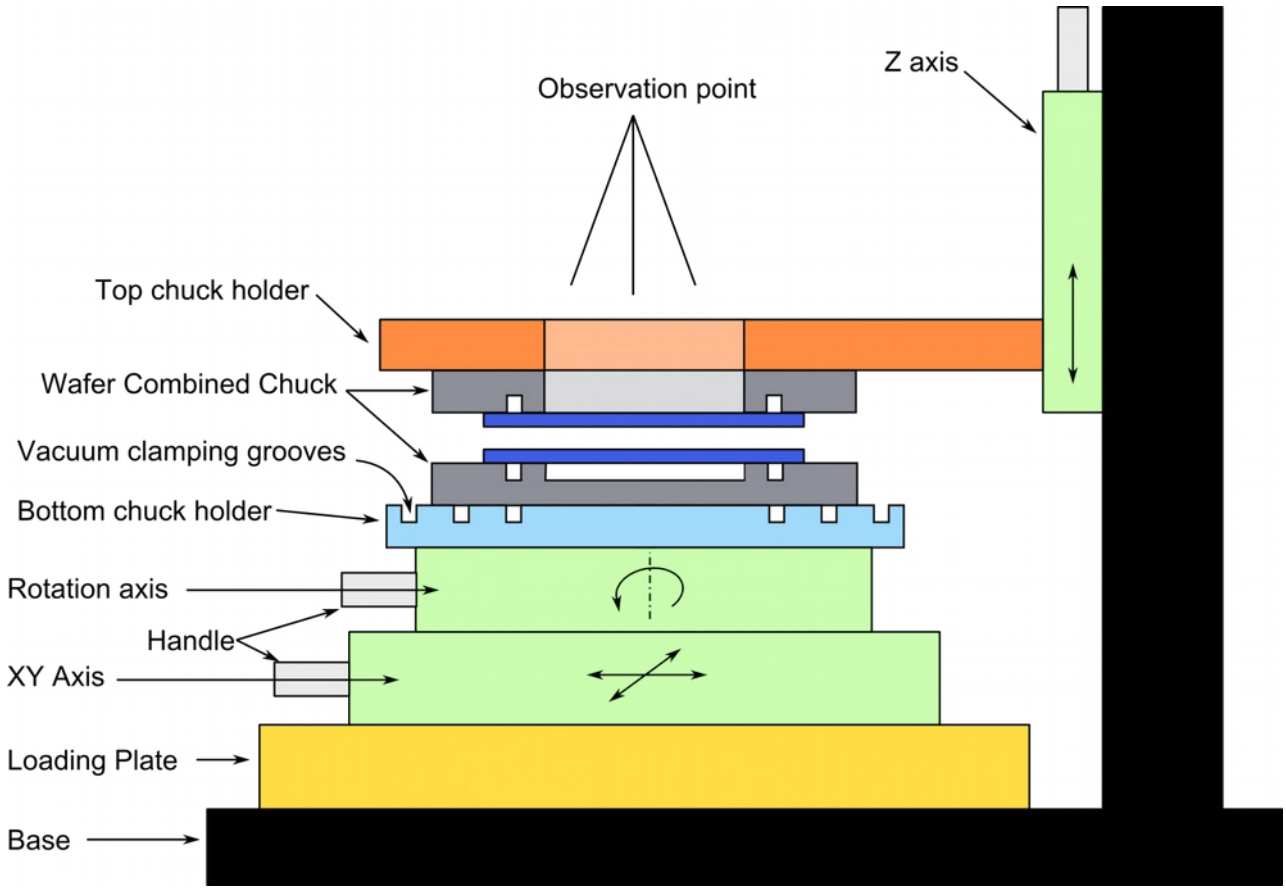
Schema



Principle section view of the complete system

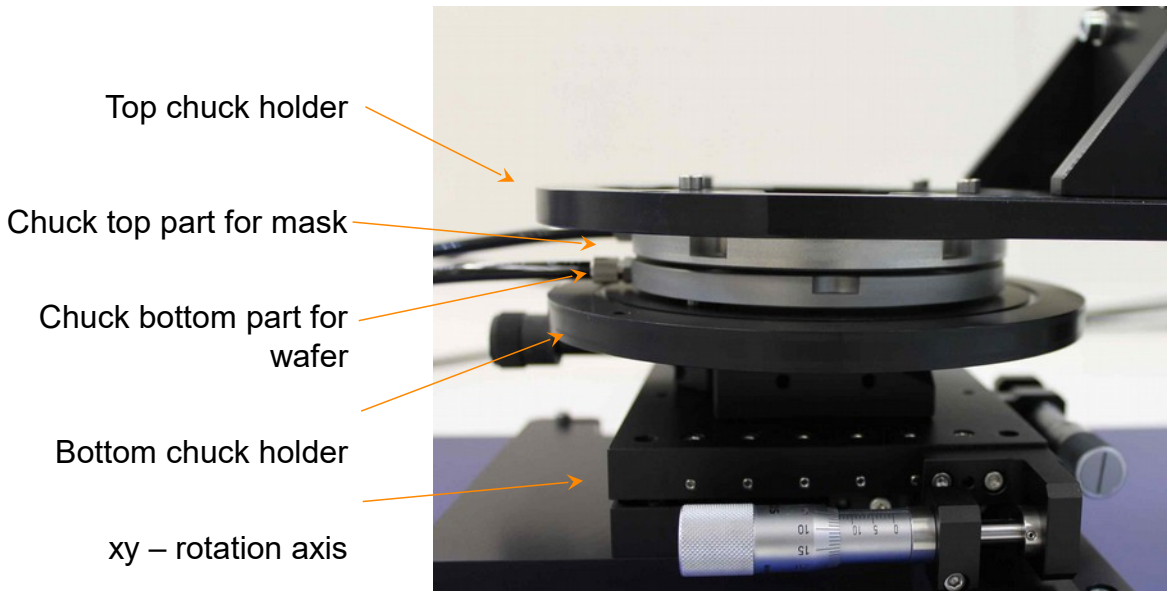


Image of a 100 mm system with a chuck ready for alignment

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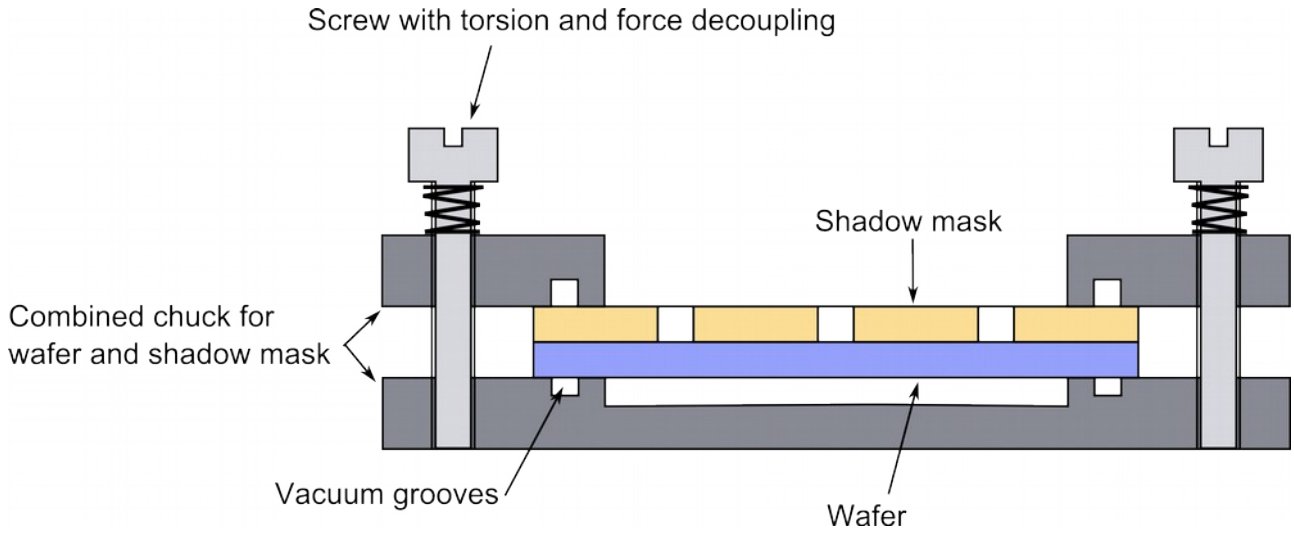
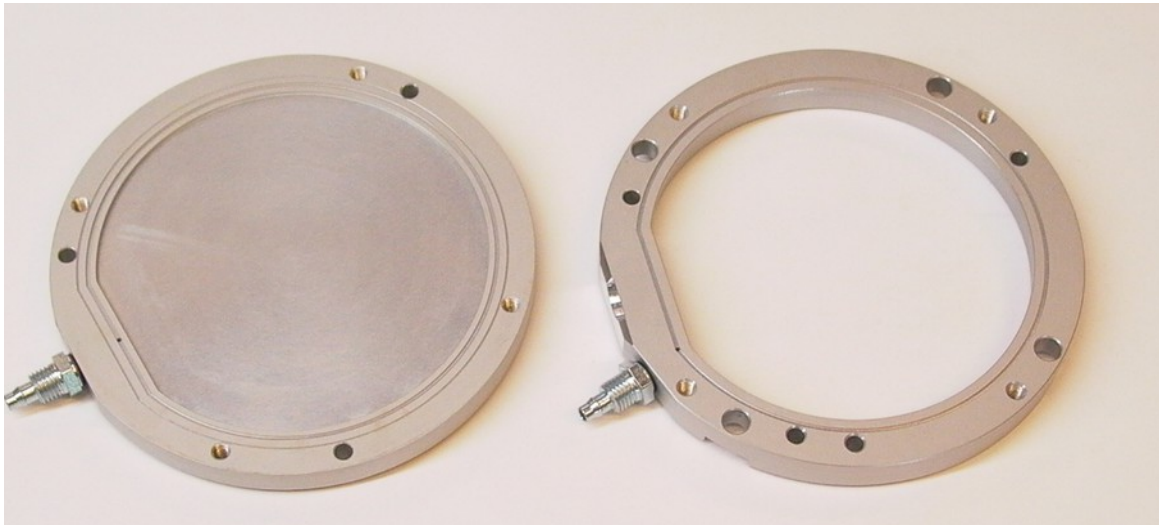
Details: Chuck



Principle section view of the chuck with clamped wafer and mask. With the chuck any wafer and mask thickness can be clamped. The chuck exists for 100 / 150 and 200mm standard wafer size. Special sizes can be supplied.



Bottom (left) and top part of the chuck with vacuum connector. For the bottom part we also fabricate a version with opening.

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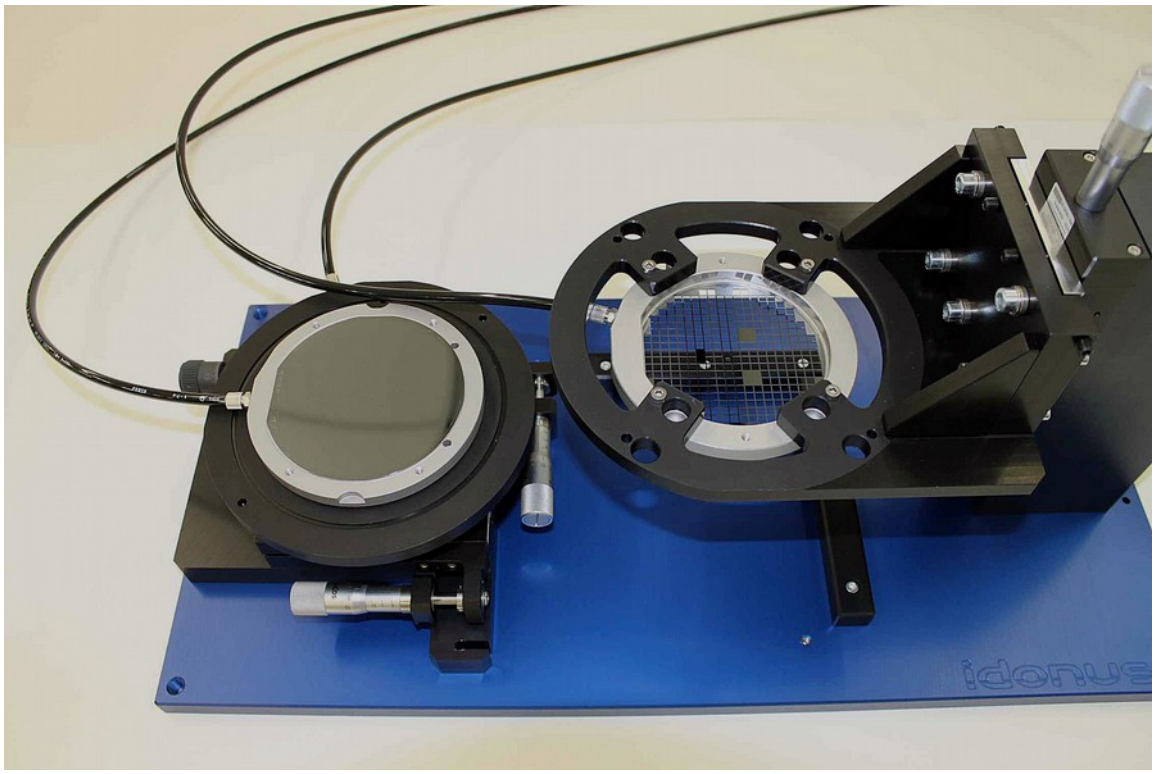
Details



Bottom unit slid out to load bottom chuck with wafer.
Top chuck ready with mask.

Pneumatic board for individual regulation of wafer, mask and chuck clamping during alignment.

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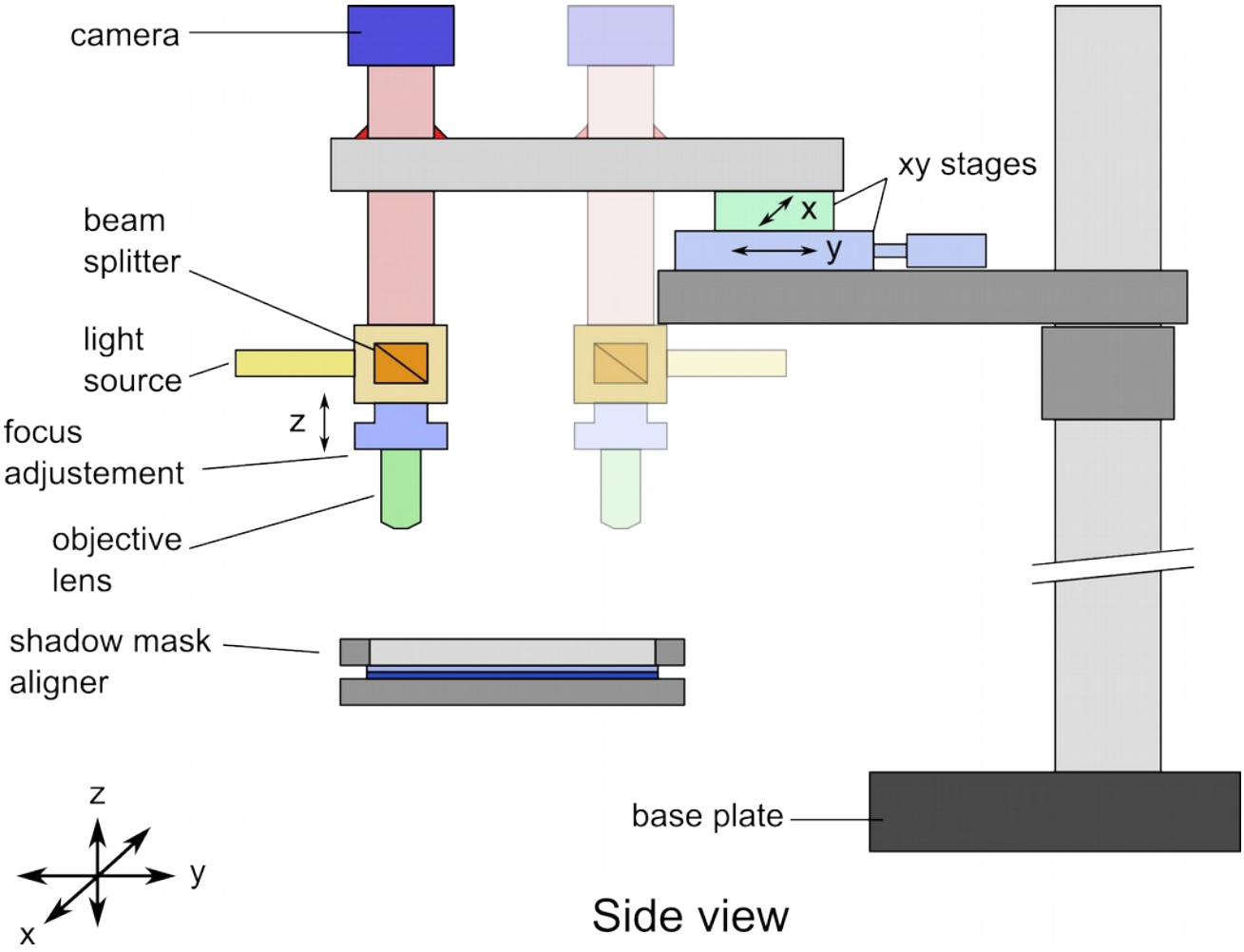
Optional: Double Image Microscope for alignment control

For the precise alignment of wafer and mask a microscope has to be used. To be efficient a system with two independent microscopic optics is required so that during the actuation of the XY and rotation axis both images of your alignment marks are visible at the same time.
The microscope tube lens has a 5x very long working distance objective lens, USB camera and a LED top light reflective illumination through the objective. For very different applications the objective lenses can be exchanged. A wheel above the objective lens allows focus adjustment.
Each microscope tube lens is mounted on manual XY stages. The system can simply be turned 90° around the column to bring it out of the workspace to load/unload the chuck.
If you require any special configuration please contact us.



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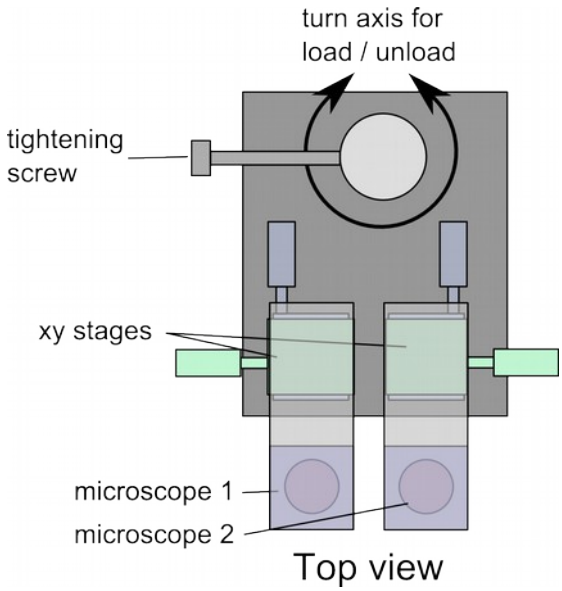

Double image microsope with shadow mask aligner

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Technical Specifications

Product Code	**SMA**
Wafer and mask sizes	
Diameter	100, 150 or 200 mm depending on equipment configuration
Thickness	independent
Stage characteristics	
Range in X and Y	Scale step 10 µm - sensitivity 2 µm
Range in Z	Scale step 10 µm - sensitivity 2 µm
Rotation	360° endless – sensitivity 0.02°
Tilt	Factory calibrated and manual adjustment by technician
Alignment precision	After sputtering
Linear alignment	Typically 6 µm ; Max 10 µm
Rotation alignment	0.001 to 0.009 Deg
Chuck	
Wafer sizes	100 mm or 150 mm or 200 mm
Chuck material	Aluminium with or without anodizing
Chuck thickness	20 mm depending on wafer and mask thickness
Shadow mask	Customized shadow masks can be provided
Material	Silicon, quartz, glass, metal, ceramic
Dimension (mm)	
Footprint (WxD)	550 x 270 mm^2
Installation	
Need of	Microscope for visual control during alignment
	Vacuum
Optional: Double image microscope	for visual control during alignment
Objective lens	5x M Plan APO; WD 35 mm
Resolution	Better then 2 µm
FOV	1.35 mm x 1.08 mm
Camera	1.3 Mpx Monochrom, USB output, Software for image aquisition
Installation	requires PC or Laptop

Note: System can be customized, please sent us your special requirements!

Note: Idonus reserves the right to change specifications without notice at any time (Version 19.02.2019).