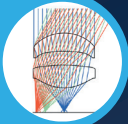


Your Vision Meets

Our Precision!

Optical
Design



Structural
Design



Process
Development



3D Printing
Service



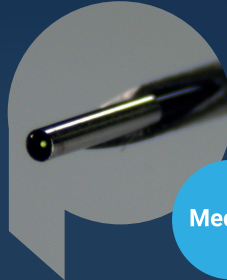
Post-Processing



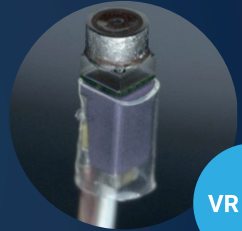
Measurement &
Analysis



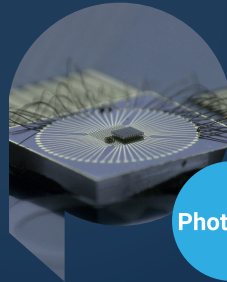
Series Production



Medical



VR & AR



Photonics



Smart
Devices



Illumi-
nation

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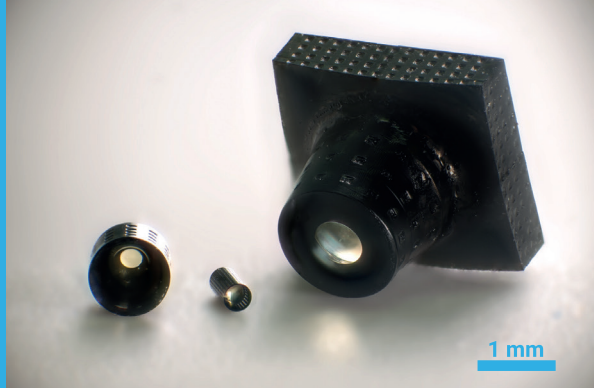
 Stuttgart, Germany



printoptix

3D PRINTED MICRO OBJECTIVE LENSES

Custom all-aspheric imaging objectives in the smallest possible form factors



Perfectly aligned all-freeform lens stacks

Our entirely new approach to lens fabrication leads you to optical solutions that were previously unthinkable.

Shortest development cycles thanks to 3D Printing

- First prototypes in two weeks.
- Ramp up to series production within one month.

Key Features



Size ranges from 100 μm to 5 mm, very short variants possible.



Direct integration of black apertures and baffles, custom geometry adaptations.



Freeform surfaces that are inherently alignment free.
Field of view range: 10° - 160°.



Biocompatible polymers that are longterm stable, autoclavable and highly transparent.



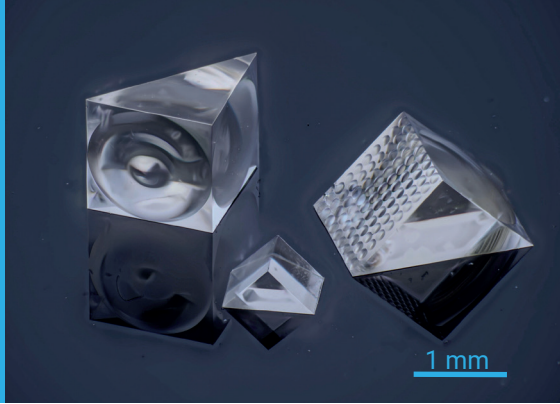
Surface roughness <10 nm RMS.
Shape errors <diameter/1000.



Printing on sensors with <1 μm alignment precision in x, y, and z.

MICRO-OPTICAL COMPONENTS

Micro-optical elements with arbitrary shape and size



Highly individualized parts

Our approach to optical microfabrication leads you to solutions that were previously unthinkable.

Examples

- Lenses
- Prisms
- Diffractive parts
- TIR lenses
- Lensed prisms
- Fresnel lenses
- Hybrid components

Key Features



Size ranges from 10 μm to 5 mm.



Alignment-free integration of absorbing structures.



Full freeform surfaces and designs with undercuts are possible.



Highly transparent print materials with low fluorescence.



Surface roughness <10 nm RMS.
Shape errors < diameter/1000 PTV.



Integration of mounting structures with no alignment errors.

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FIBER TIP OPTICS

Highly compact refractive, reflective, diffractive, and hybrid optical structures

200 μm

Examples

- Lensed fibers
- OCT probes
- Fiber-To-PIC coupling lenses
- Mode matching lenses
- Beam shaping
- Chromatic fiber probes
- Objective lenses on fibers

Powerful optical components, perfectly aligned to the fiber mode field

Our approach of direct fabrication on the fiber tips leads you to optical solutions that were previously unthinkable.

Key Features



Optical surface quality with feature sizes $< 1 \mu\text{m}$.



Freeform, segmented, or diffractive surfaces.



Surface roughness $< 10 \text{ nm RMS}$.
Shape errors $< \text{diameter}/1000 \text{ PTV}$.



Custom integration of absorbing structures and encapsulation features.



Direct integration of optics into common fiber connectors.



Direct alignment to fiber mode field with $< 1 \mu\text{m}$ precision.

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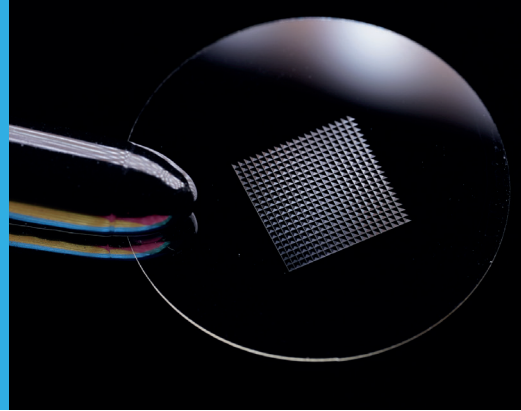
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OPTICAL ARRAYS

Custom optical arrays with freeform shapes, high aspect ratios and 100% fill factor



Almost unlimited design freedom

Our approach to optical array fabrication leads you to solutions that were previously unthinkable.

Various options for volume production

- Step & repeat scale-up.
- Soft stamps for UV nano-imprint lithography or roll-to-roll.
- Hard stamps, e.g. by electro-forming and hot embossing, roll-to-roll, or micro injection molding.

Key Features



Array lateral dimensions from $100 \times 100 \mu\text{m}^2$ to 6" wafer size.



Element aspect ratios (height to diameter) of > 10 .



Lenses or unit cells sized from $3 \mu\text{m}$ to 2 mm, fill factors up to 100%.



Freeform elements, variable pitch, undercuts, randomised structures.



Surface roughness $< 10 \text{ nm RMS}$.
Shape errors $< \text{diameter}/1000 \text{ PTV}$.



Aligned printing with $< 1 \mu\text{m}$ absolute precision in x,y, and z.

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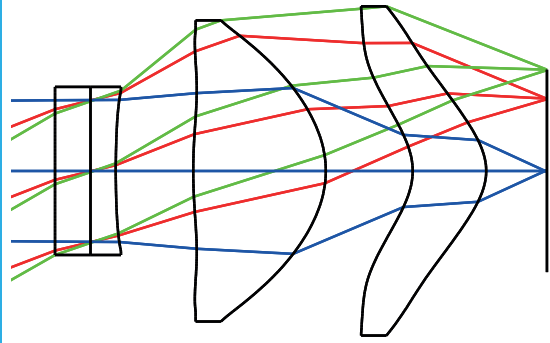
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OPTICAL DESIGN & SIMULATION

We develop powerful ray-optical and wave-optical designs to reach your most demanding specifications



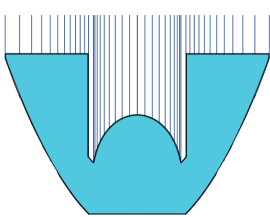
Utilizing all modes of light manipulation

We design complex systems leveraging refraction, diffraction, reflection, absorption, polarization or, combinations of them in hybrid optical systems.

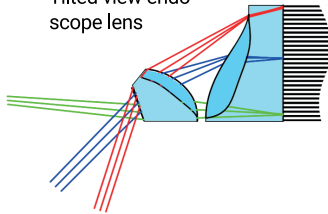
Using the correct methods for the problem

- sequential or non-sequential ray-tracing.
- angular spectrum propagation.
- scalar 3D wave propagation.
- rigorous simulation (FDTD, FEM).

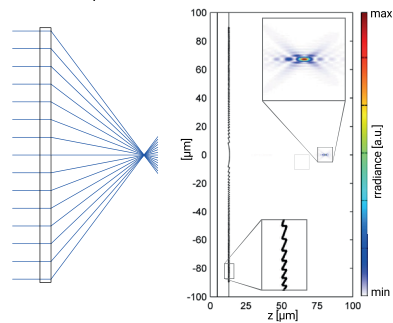
TIR concentrator



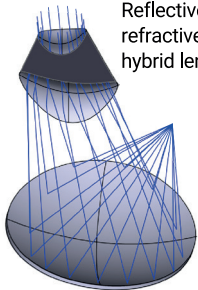
Tilted view endoscope lens



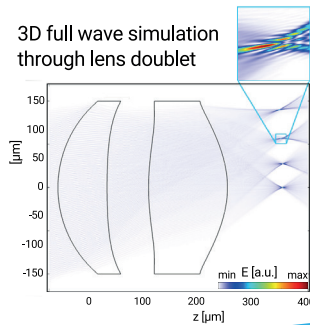
Flat lens / metalens



Reflective-refractive hybrid lens



3D full wave simulation through lens doublet



Fresnel-TIR hybrid lens

