

femto second soluti ons

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wophotonics.com

— W O P —

WORKSHOP OF PHOTONICS

Introduction Video

Press for Video
YouTube link



— W O P —
WORKSHOP OF PHOTONICS

About WOP



18+ years of expertise

in femtosecond laser micromachining with a high focus on glass



6 in-house and 2 licensed patents

enabling cutting-edge technologies



50+ professionals

5 Ph.D., 30 M.S. and B.S.



R&D studies

with more than 10 academic and research partners

Members of



ISO certified



We deliver **solutions**
for **your μ tasks**



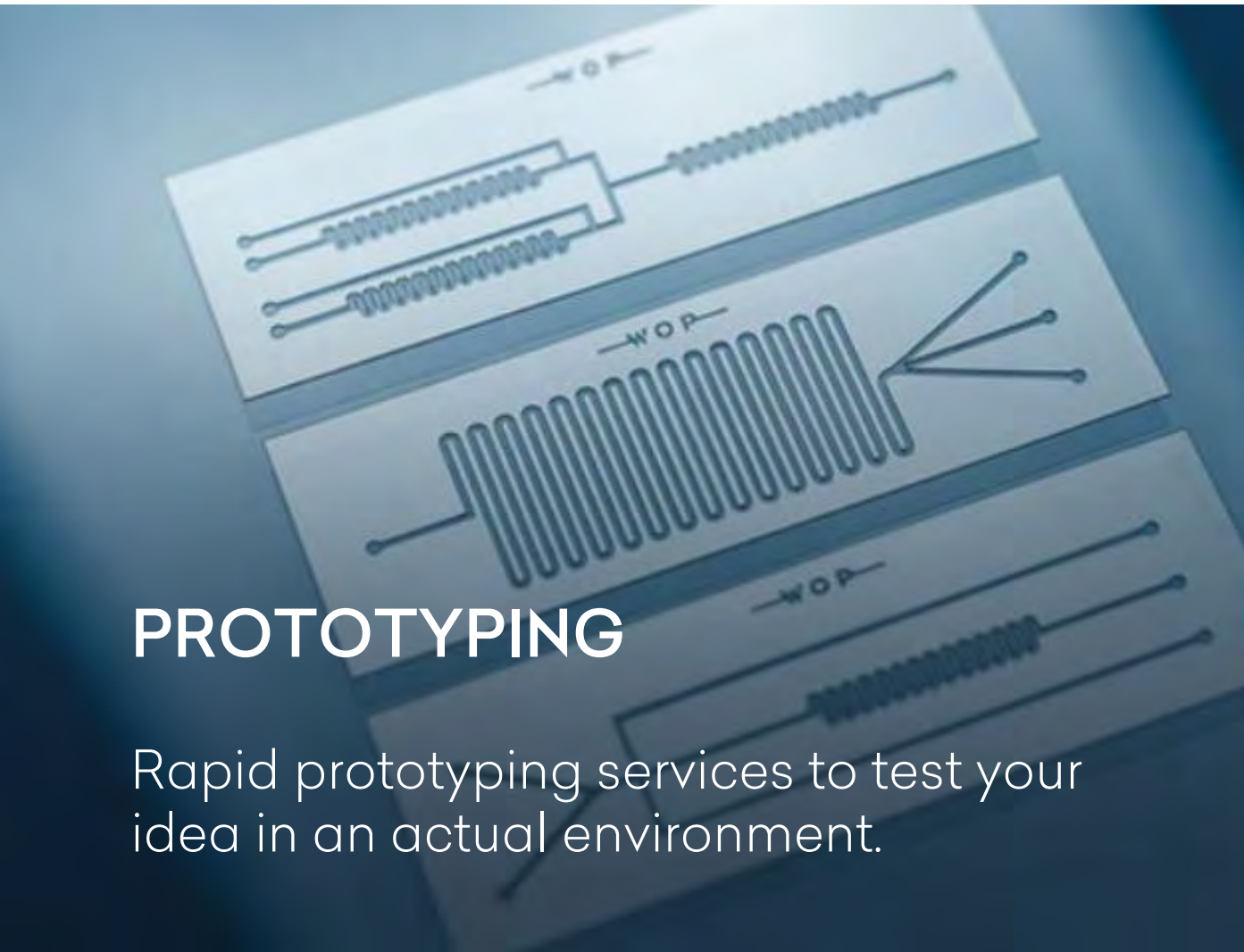
wophotonics.com

Full-service solutions

for industry & science

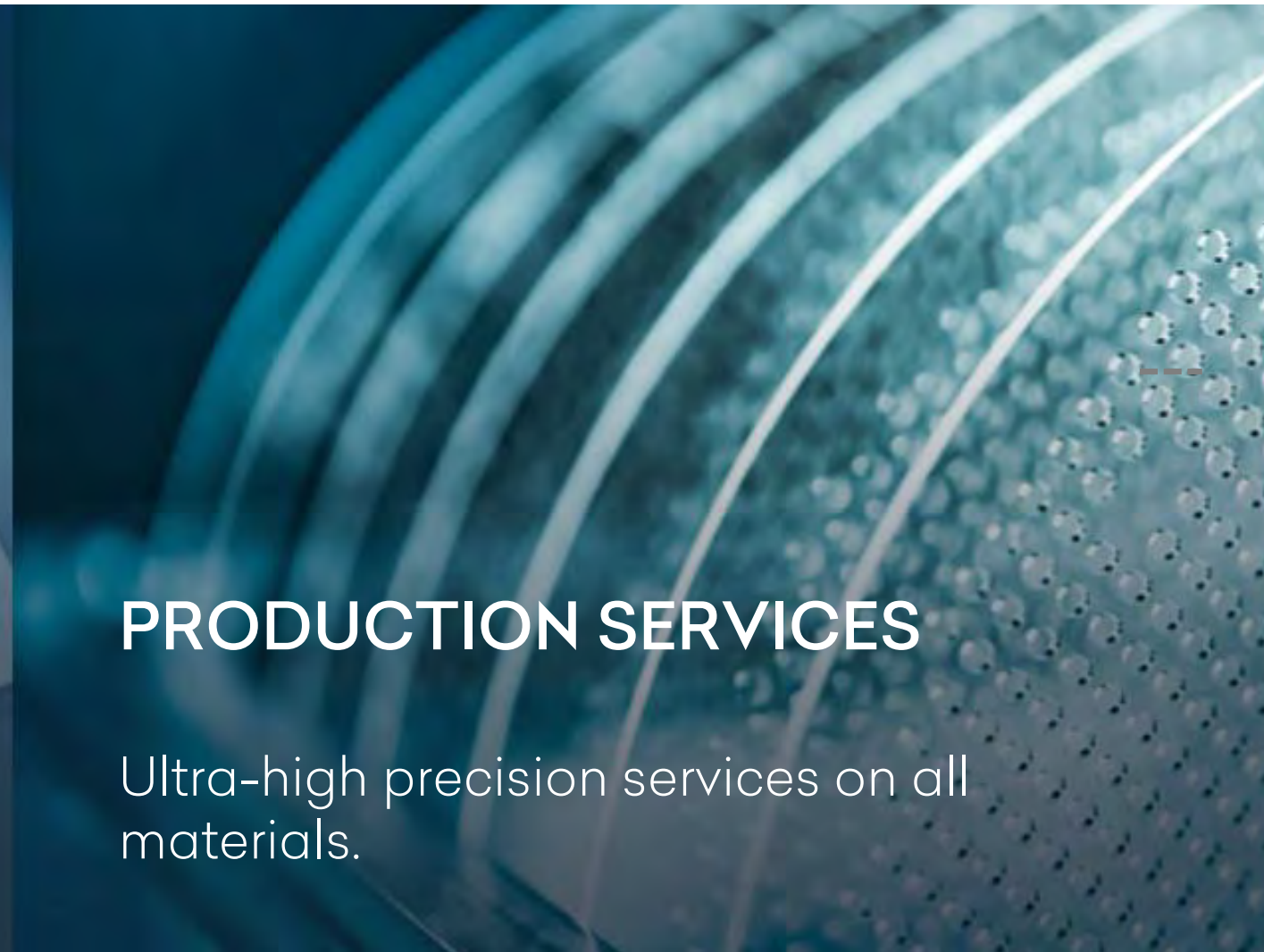


HAVE A MICRON CHALLENGE?

A close-up, angled view of several white printed circuit boards (PCBs) with various electronic components and traces. The WOP logo is visible on each board.

PROTOTYPING

Rapid prototyping services to test your idea in an actual environment.

A close-up, angled view of a circular, perforated metal mesh or filter, with a bright light source creating a lens flare effect across the surface.

PRODUCTION SERVICES

Ultra-high precision services on all materials.

A large, white industrial laser system with a control panel featuring a monitor and a keyboard. The WOP logo is visible on the top of the machine.

LASER SYSTEM DEVELOPMENT

Tailor-made laser systems designed for your specific application.

All materials: glass, sapphire, ceramics, silicon, metal, plastic, optical fibers.

Our Capabilities



In-house laser processing facilities complemented by post-processing capabilities



Scanners

Galvoscaners 1030/515/343

Positioning stages

up to 380 mm travelling range

Wet etch benches

Disco dicing saw

DAD3350

High-end metrology

Scanning electron microscope | SEM
Sensofar Neox profilometer



Clean room ISO7

Lasers

Femtosecond
Picosecond
Nanosecond
CO2

5 axis scanners

Scanlab Precsys 1030nm
Aerotech AGV5D 515nm



Birefringence measurement system

Services & Solutions



CONTRACT MANUFACTURING

- Ultra-high precision & quality
- All types of material
- Rapid prototyping



LASER WORKSTATIONS

- Results-based
- Upgradeable
- Flexible
- Full support



SPACE-VARIANT RETARDERS

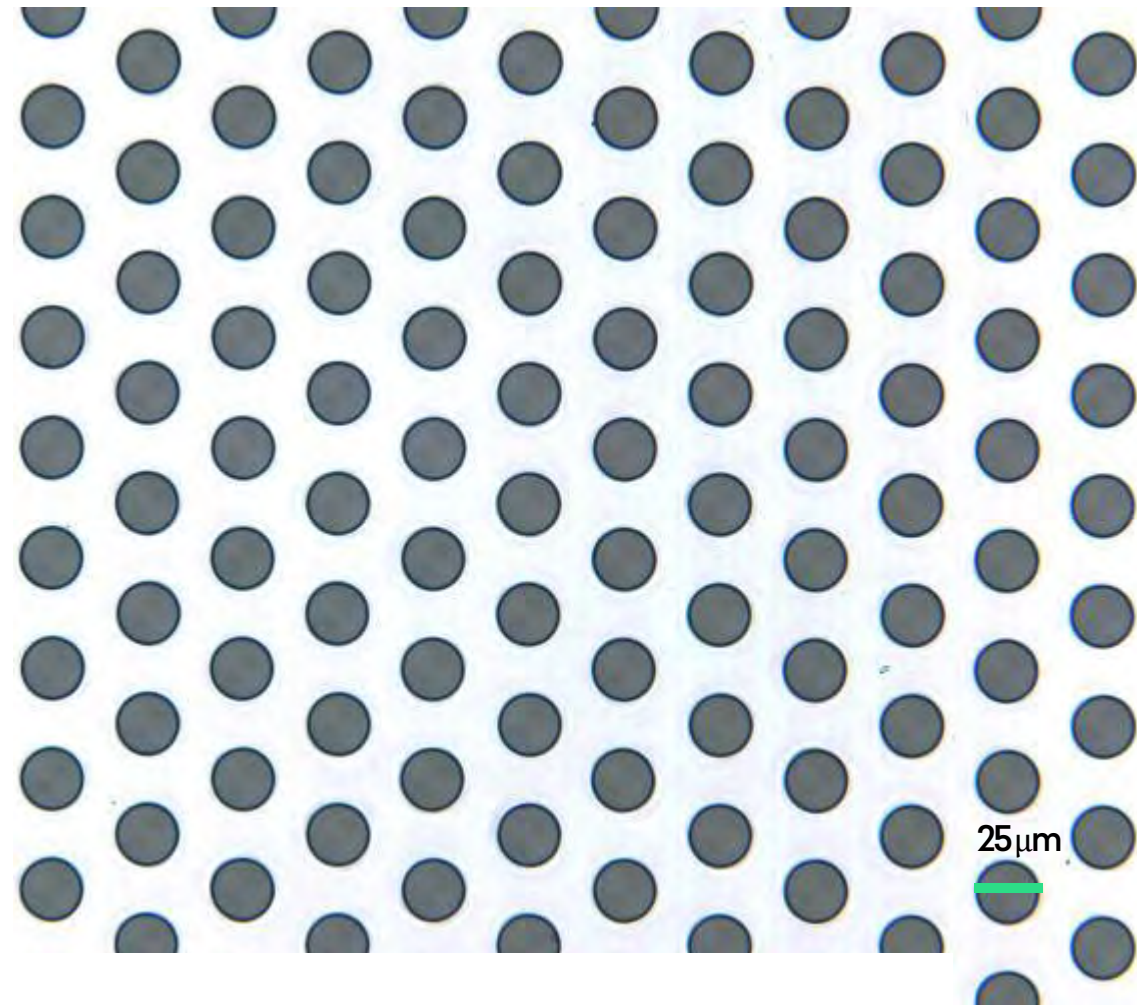
- Ultra-high damage threshold
- High transmission
- Reliable and resistant surface



TECHNOLOGY FOR CUTTING GLASS & SAPPHIRE

- Unique laser technology developed by WOP
- Ultra-high precision and quality

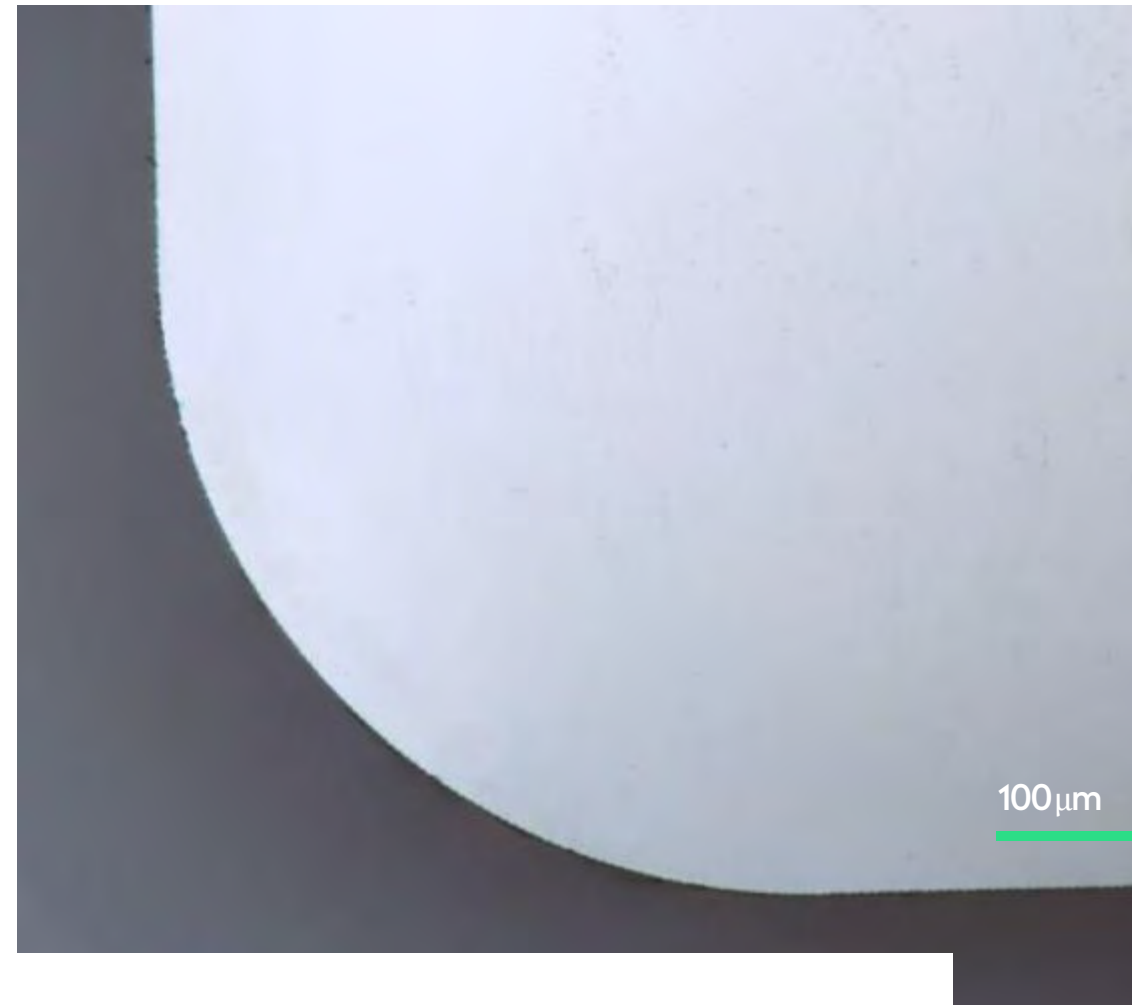
Main Applications | 1



LASER MICRO DRILLING

Glass, Sapphire, Silicon, Ceramics,
Optical Fibers, Metal, Plastic

Picture: glass wafer drilling



LASER MICRO CUTTING

Glass, Thin Films | Foil, Sapphire

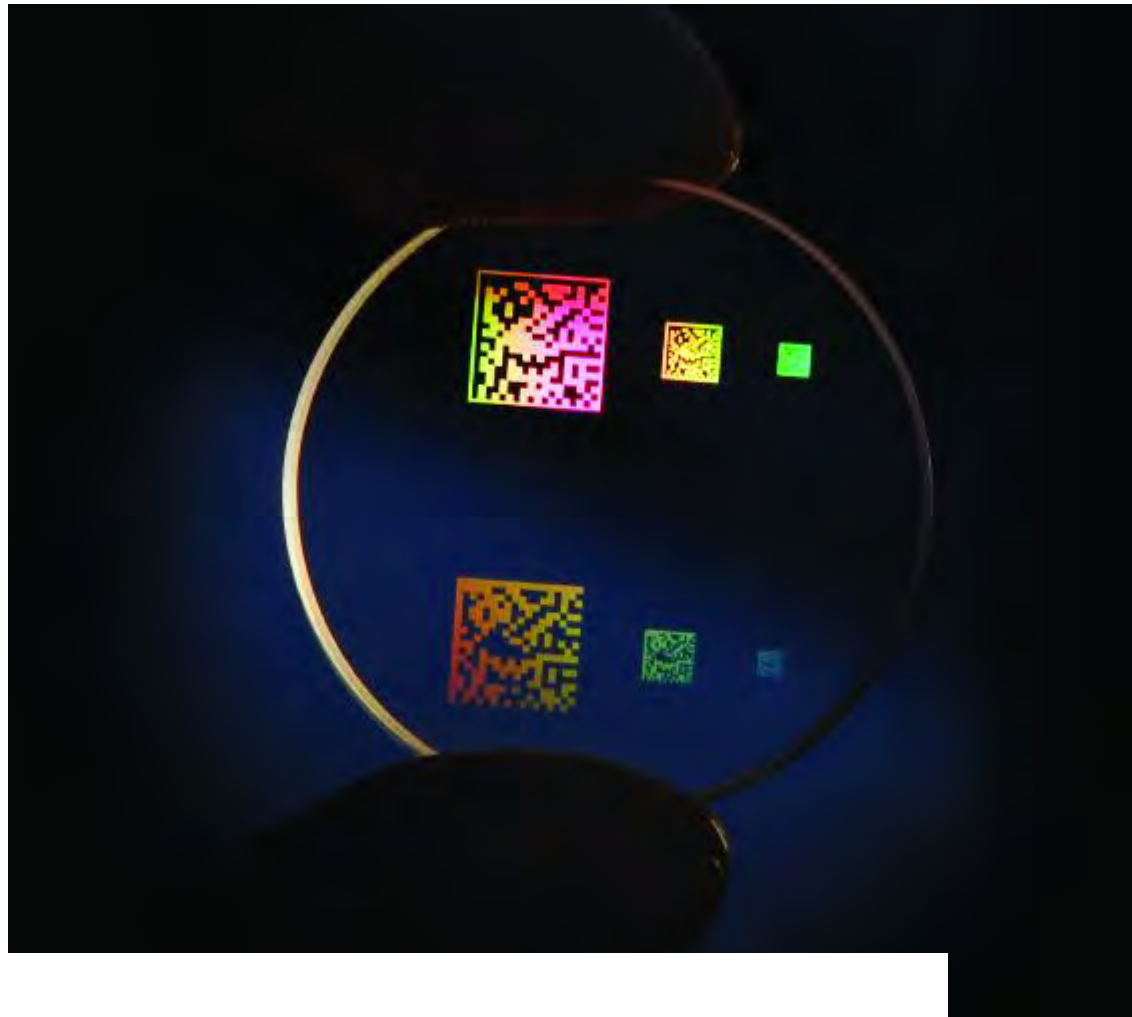
Picture: sapphire cutting, thickness 0,6 mm



SELECTIVE LASER ETCHING

Picture: fiber alignment arrays, with SLE

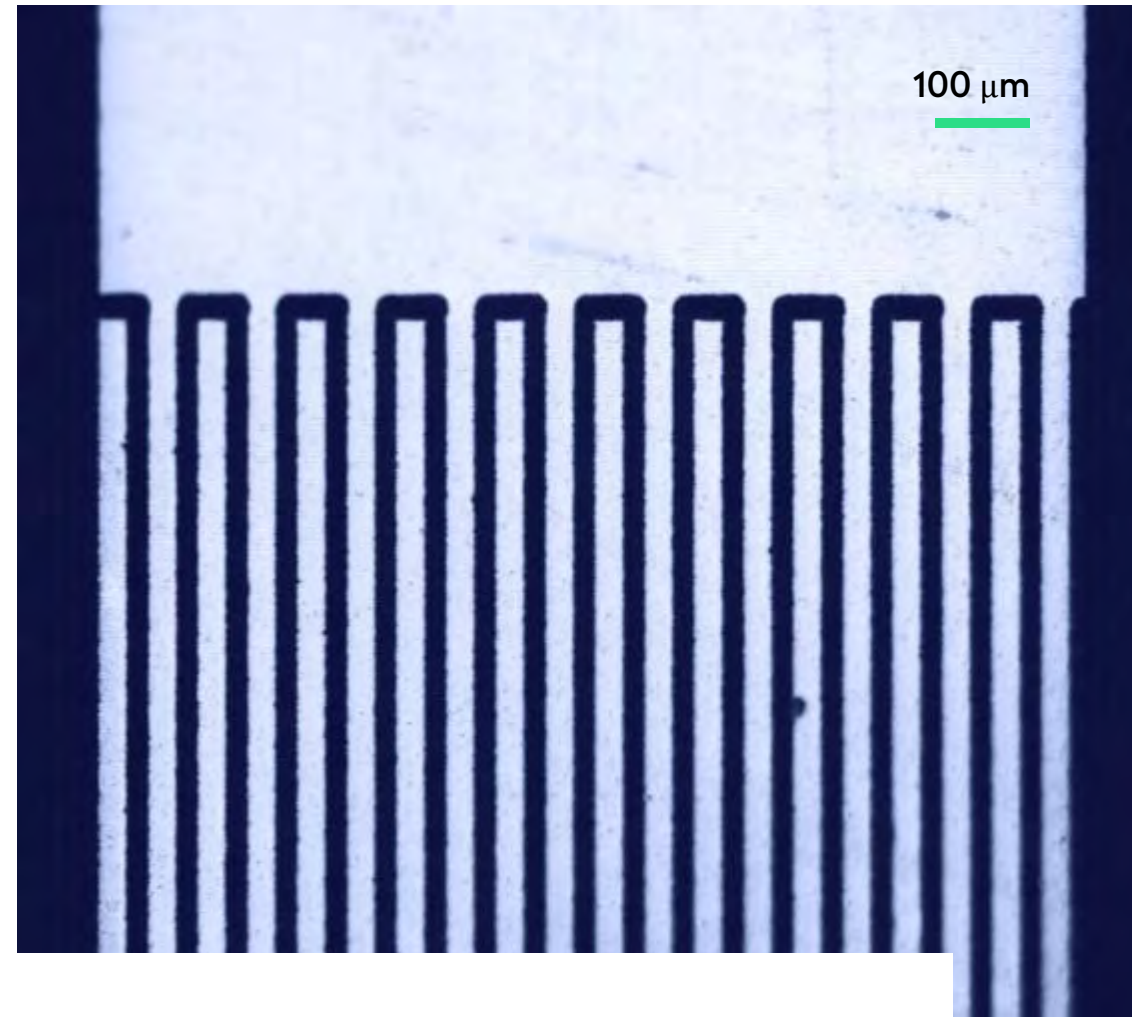
Main Applications | 2



LASER MICRO MARKING

Inside transparent materials
On the surface of various materials

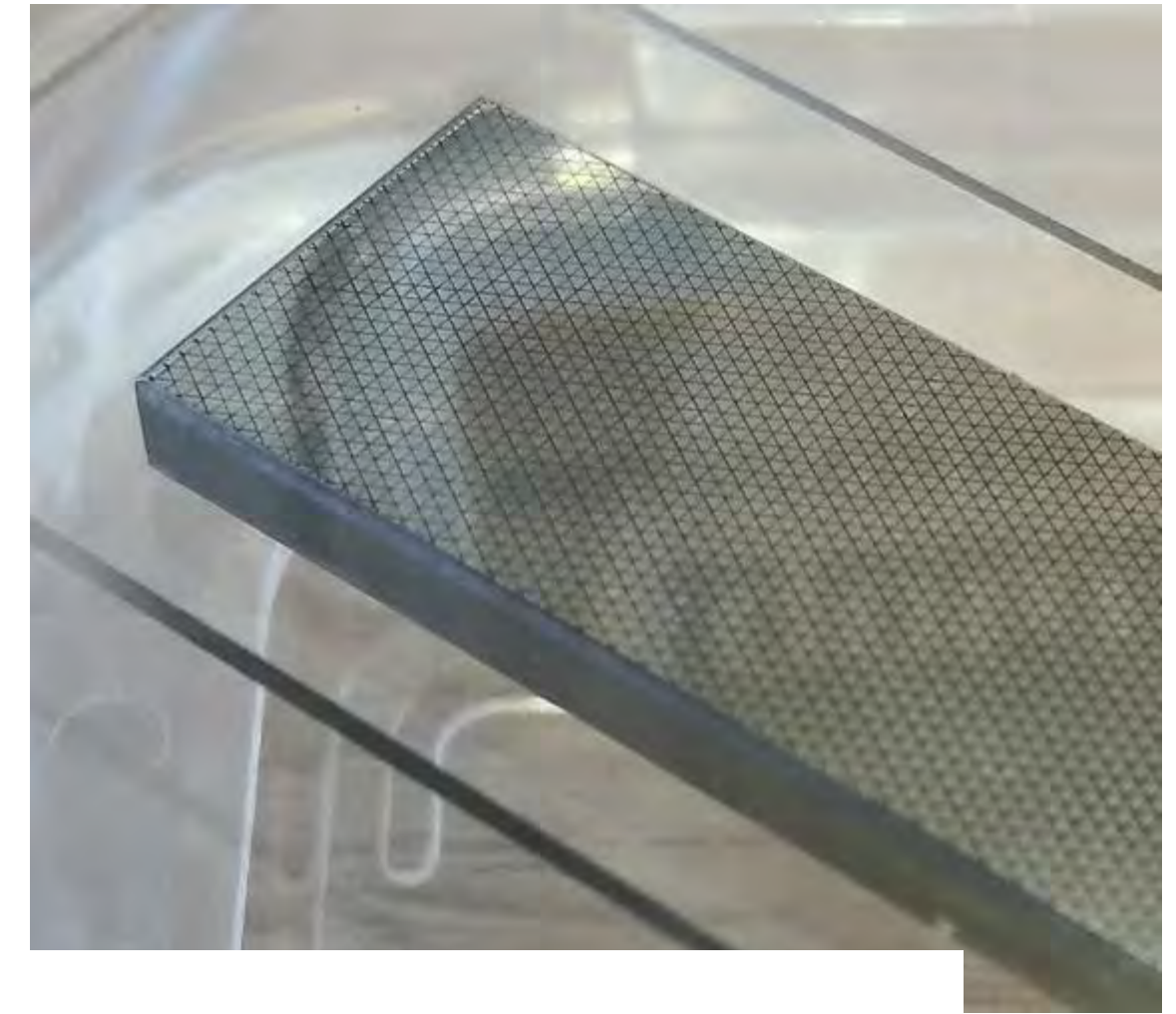
Picture: written directly inside the object by making refractive index irregularities without damaging the surface.



SURFACE STRUCTURING

Selective laser ablation
Functional surface modification
Fiber tip processing

Picture: chrome ablation from glass substrate

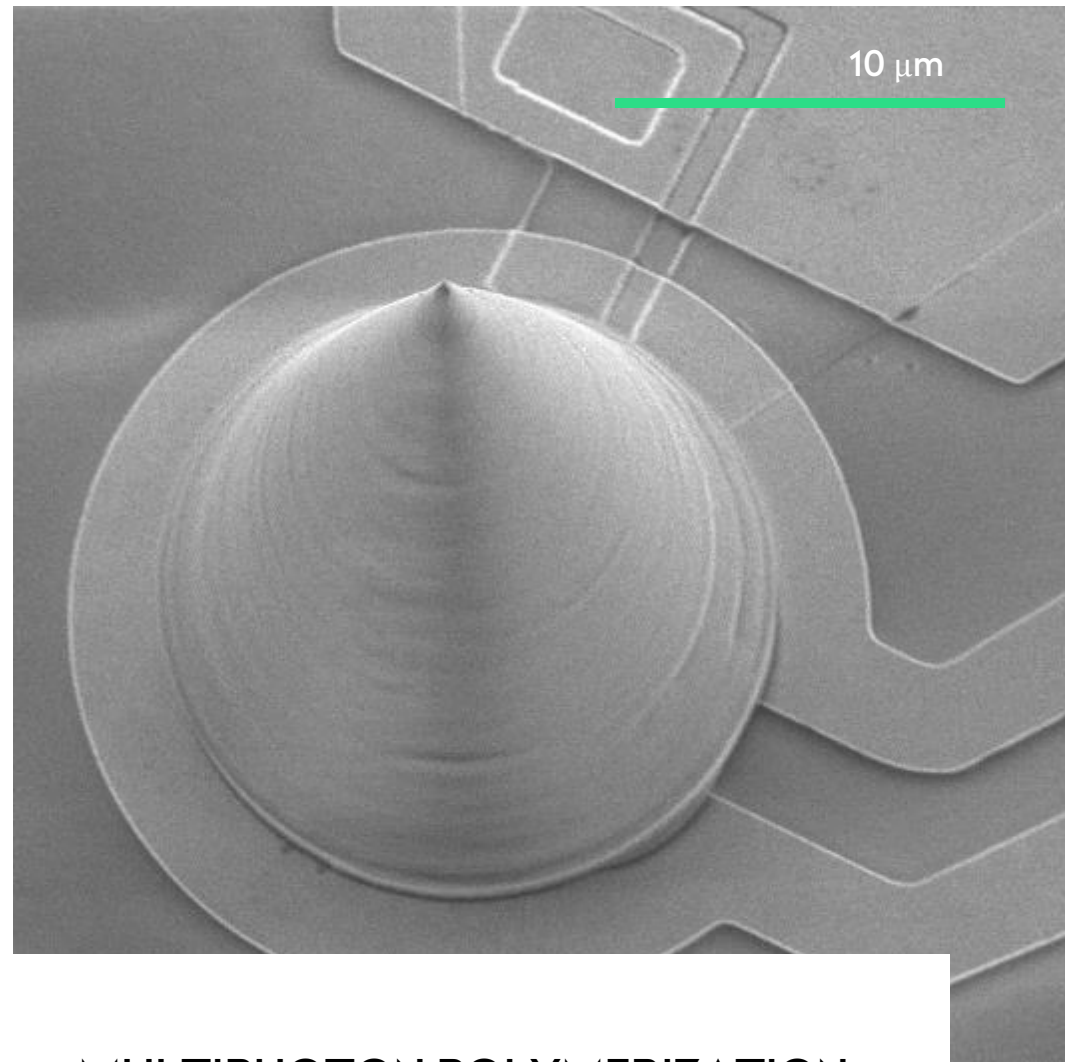


LASER WELDING

Transparent materials with transparent and non-transparent materials

Picture: glass to metal welding

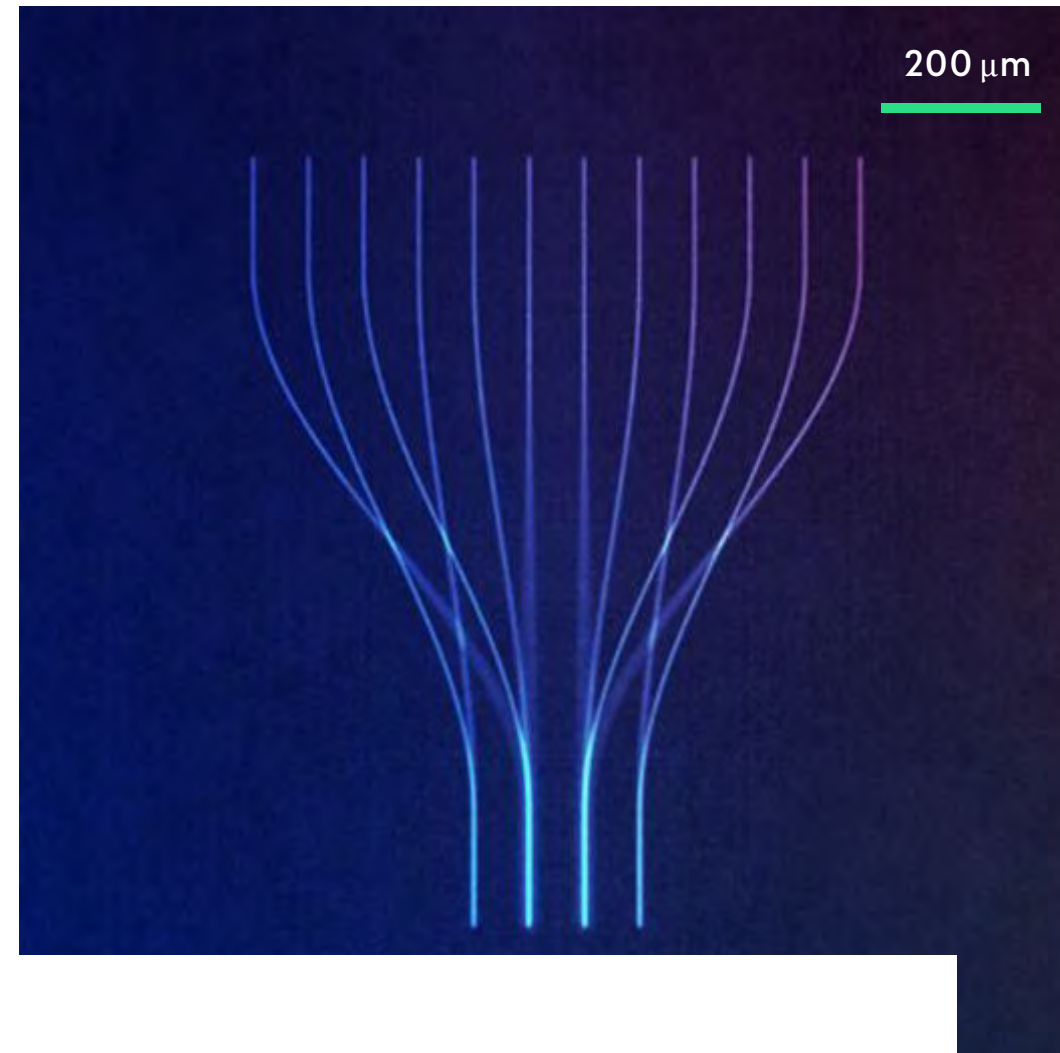
Main Applications | 3



MULTIPHOTON POLYMERIZATION

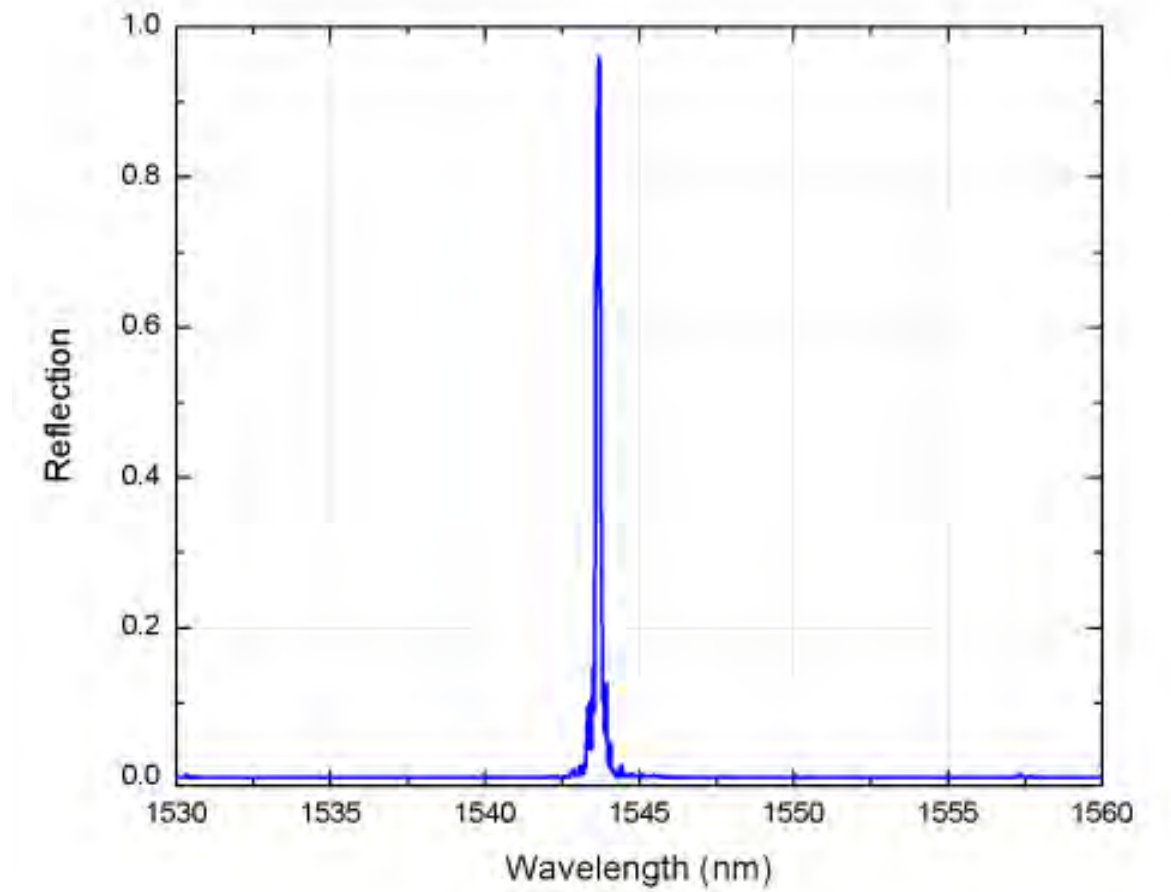
MPP, 2PP

Picture: functional structures nano printing on existing functional devices



WAVEGUIDE WRITING

2D & 3D waveguide writing



FBG WRITING

High reflectivity and transmission FBG's

Contract Manufacturing



Ultra-high precision & quality



All types of materials



Submicron resolution



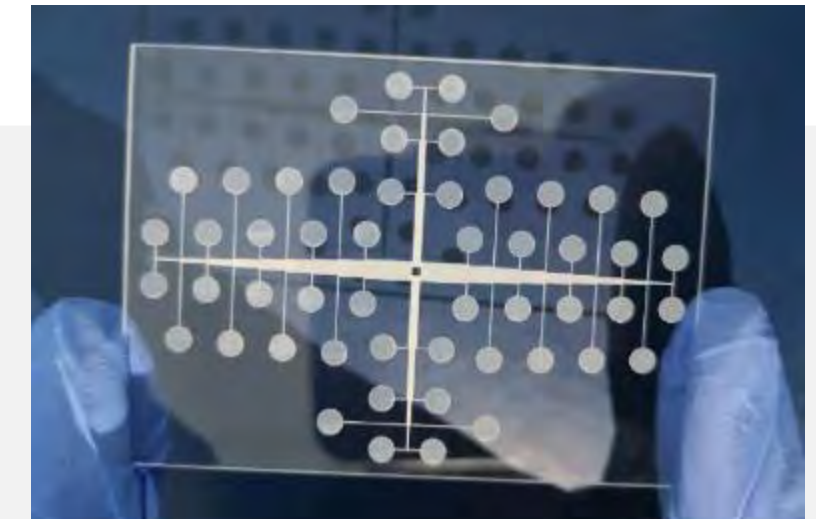
Individual design



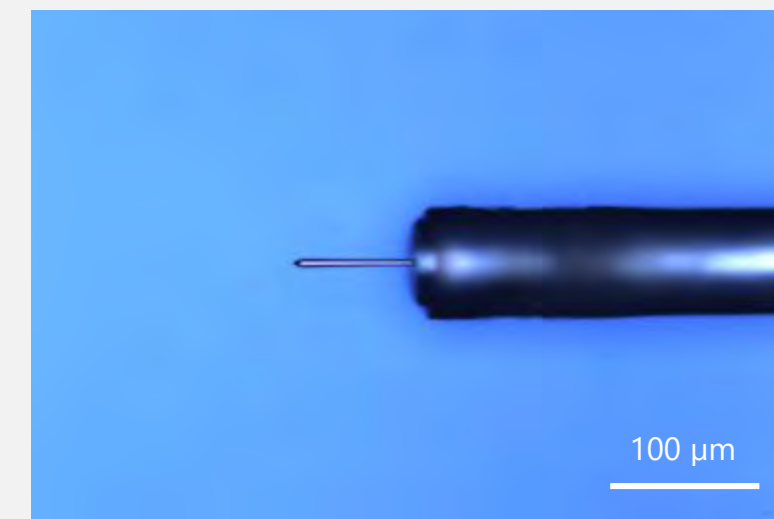
Prototyping



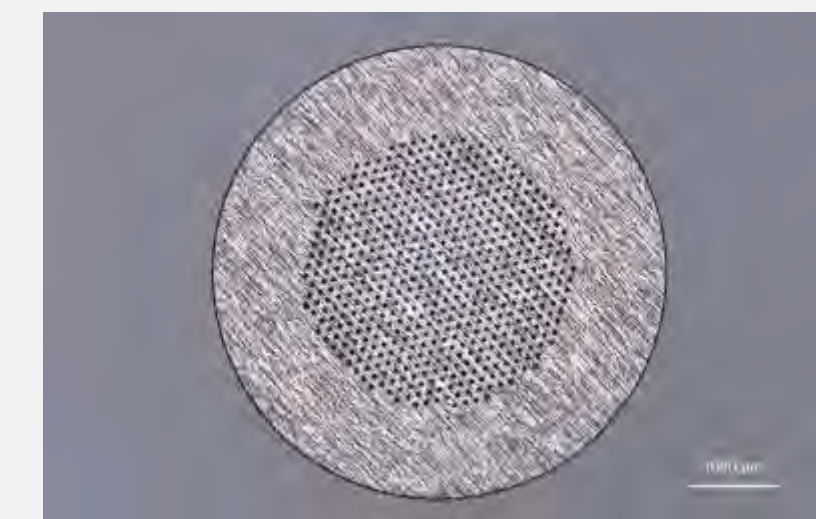
Glass wafers drilling



Microfluidic chips & devices



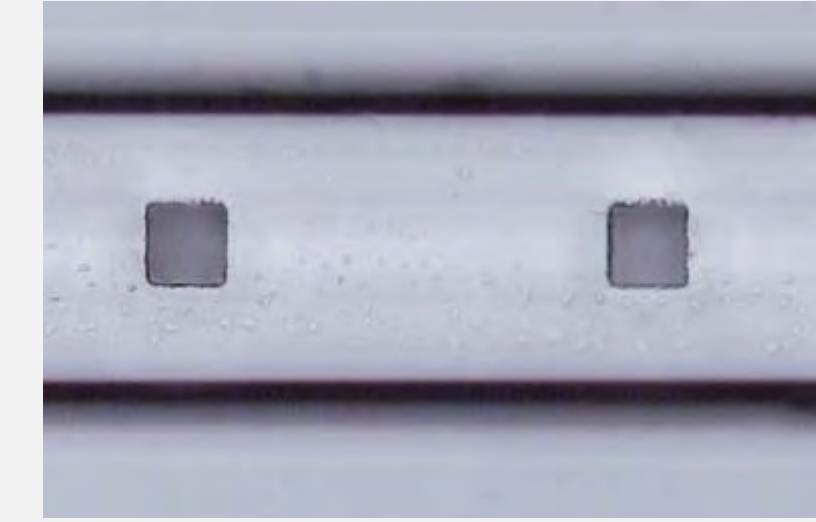
Metal needle micromachining for biomedical R&D project



Metal drilling: mesh filters

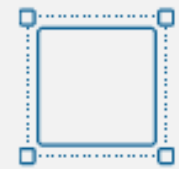


Ceramics drilling for guide plates for probe cards



Optical fibers drilling for sensors

Laser Workstations



**Custom |
Results-based**



Upgradeable



Flexible



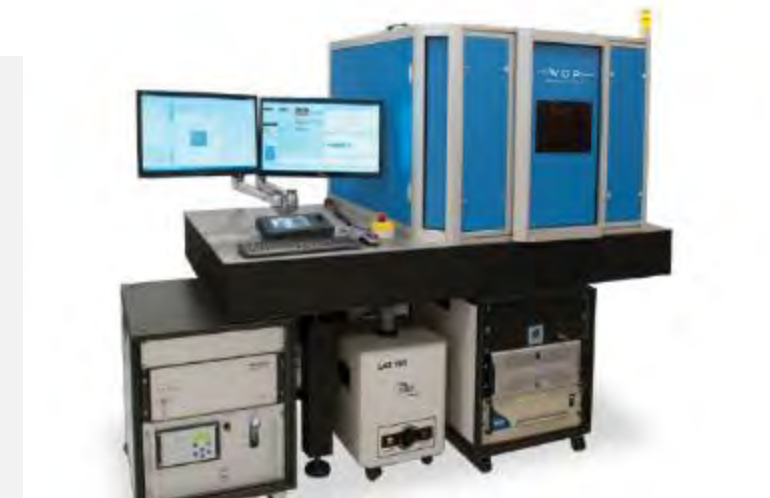
Full support



**1 year
warranty**



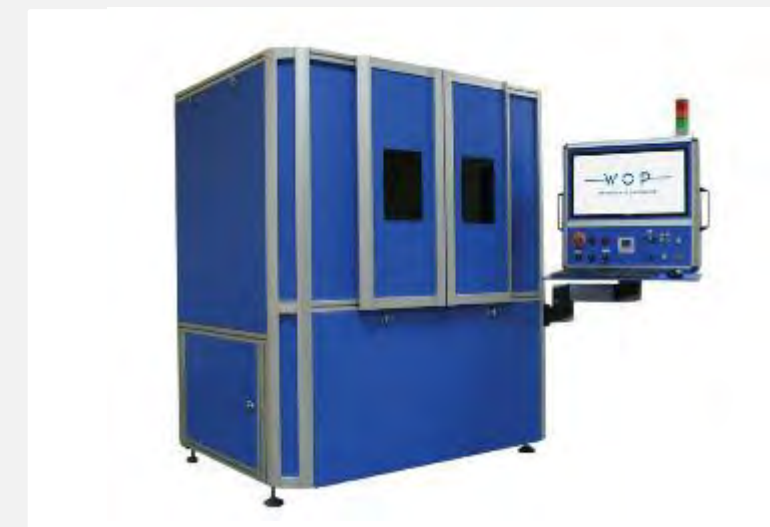
References



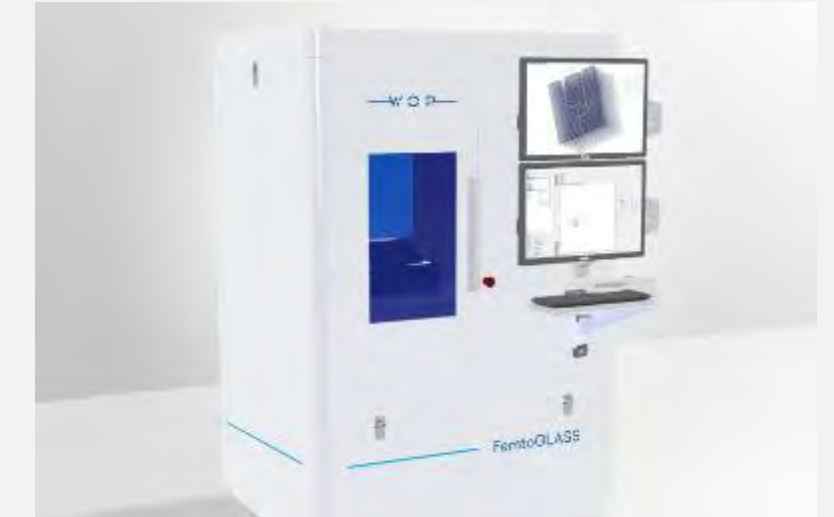
FemtoLAB



FemtoLAB KIT – without laser source



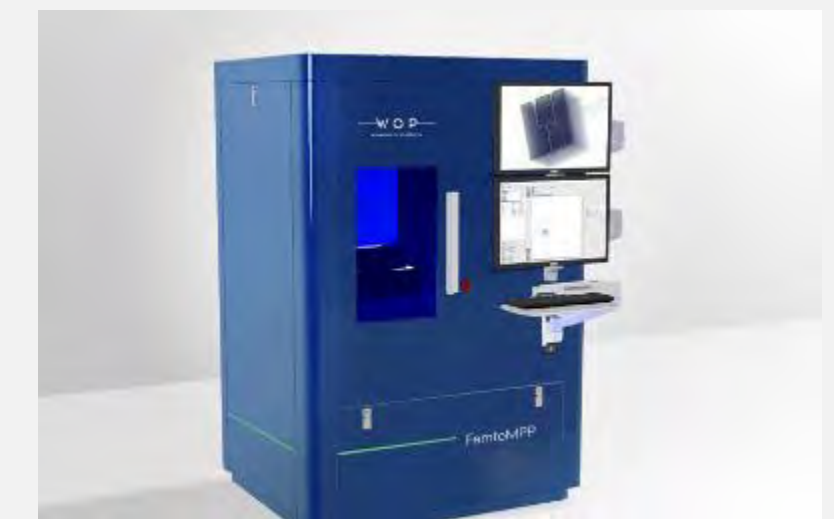
FemtoFAB



FemtoGLASS



FemtoFBG



FemtoMPP

Space-Variant Retarders



S-WAVEPLATE

Converts linear polarization to radial or azimuthal



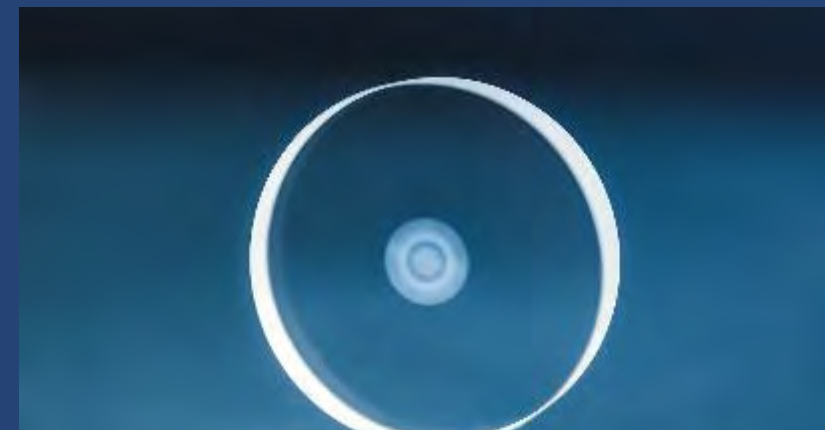
HIGHER-ORDER S-WAVEPLATE

Converts linear polarization to higher-order polarization patterns



CIRCULAR GRATING

a.k.a. Flat Axicon, transforms Gaussian beam into a Bessel-Gauss beam



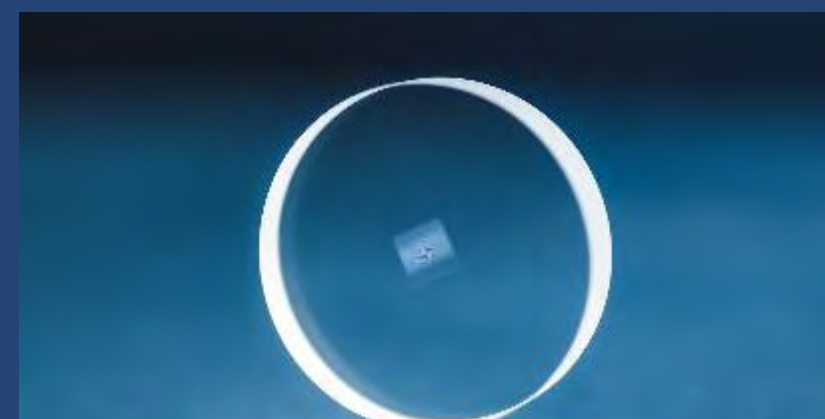
FLAT TOP | TOP HAT

Acts as a space-variant transmission filter and transforms Gaussian beam to a flat-top beam



DEPOLARIZATION COMPENSATOR

Compensates depolarization loss in the gain medium



CUSTOM MADE OPTICS

Fresnel Lens, Airy Beam, etc.

Features

- **Large variety** of beam shaping possibilities
- Exceptional for **ultra-high damage threshold**
- Suitable for **high power lasers**
- **Reliable and resistant** surface – the structure is inside the bulk
- **Stand-alone** – no additional optical elements needed

Space-Variant Retarders

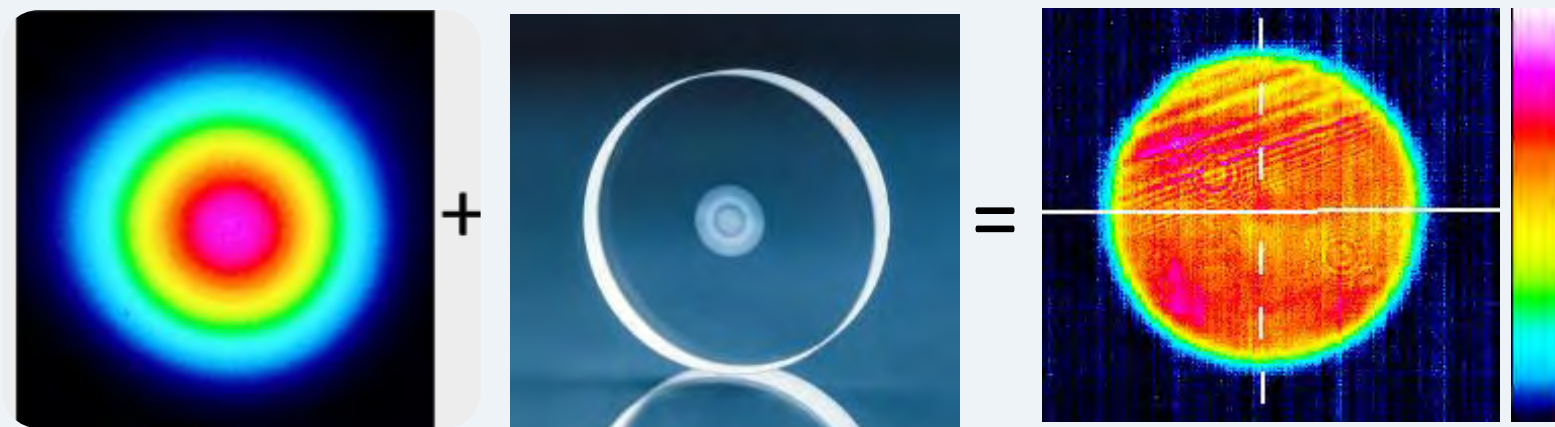
Beam shaping elements



S-waveplate – linear to radial / azimuth **polarization converter**



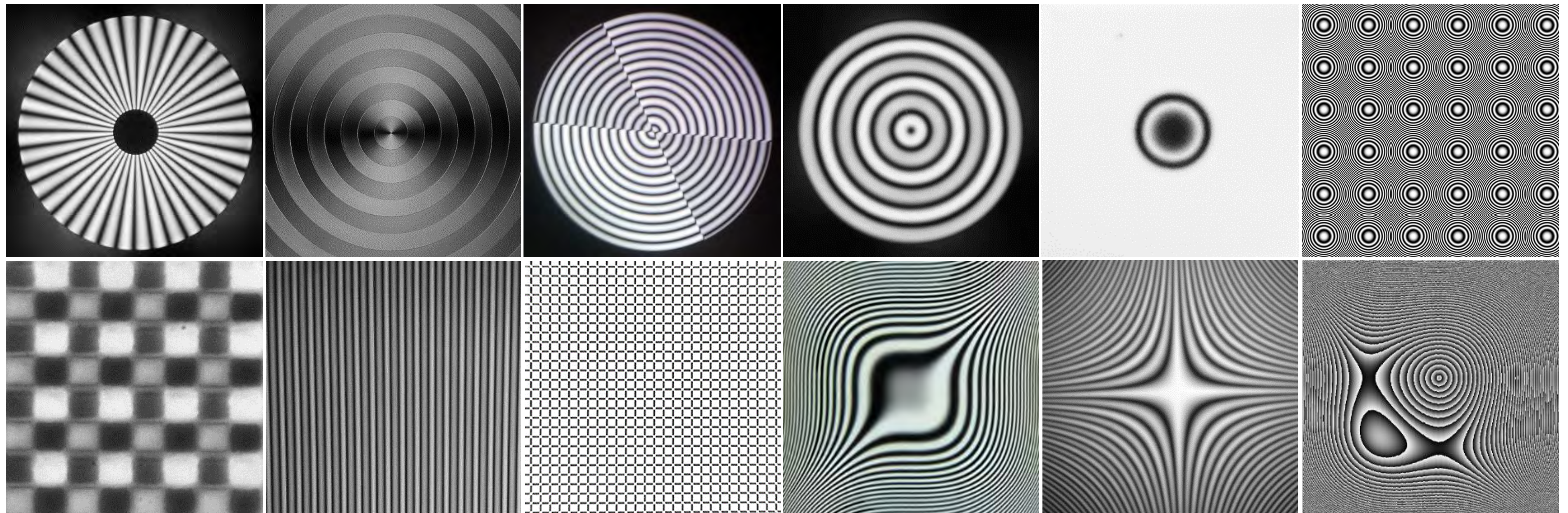
Special shapes of beams for **focus lines**, e.g. Airy beam



Special shapes of beams for **focus spots**, e.g. top-hat

We Can Fabricate Various SVRs

for tailored polarization conversion and beam shaping



Glass & Sapphire Cutting Technology



Possible applications:



Cell phones camera lenses



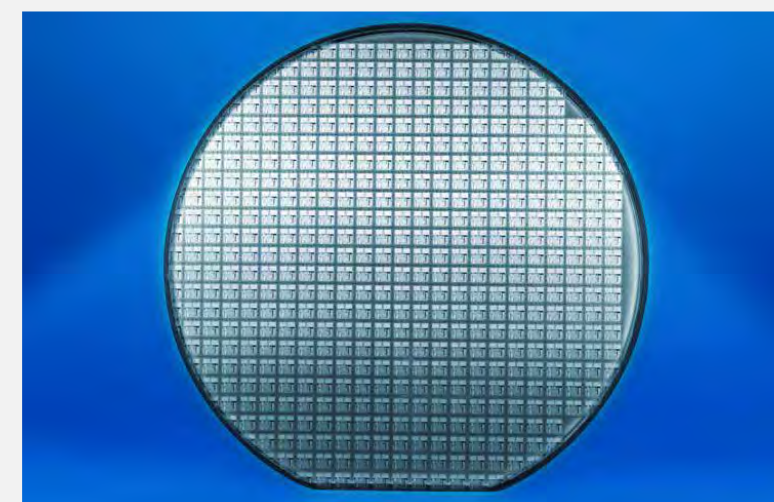
Cell phones screens



Cell phones sapphire buttons



Smart glasses screens



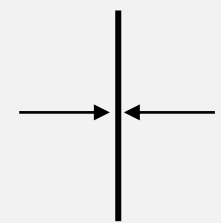
Wafer level glass product dicing
Micro optics elements



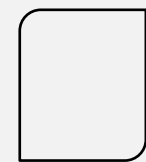
Thin glass & sapphire cutting



Ultra-fast up to
1000 mm/s



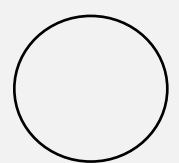
Thin glass &
sapphire
30 μm – 3 mm



All shapes



Ultra-high
**precision &
quality**



No chipping
Smooth sidewalls,
Ra < 1 μm

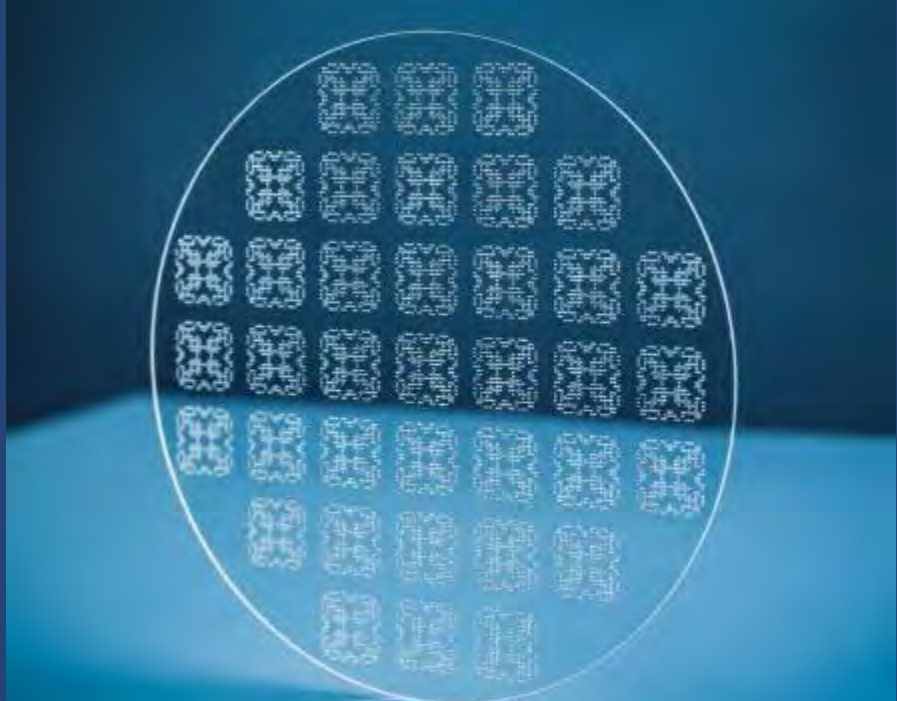
WOP technology
outperforms other
glass-cutting methods



Glass Products Range



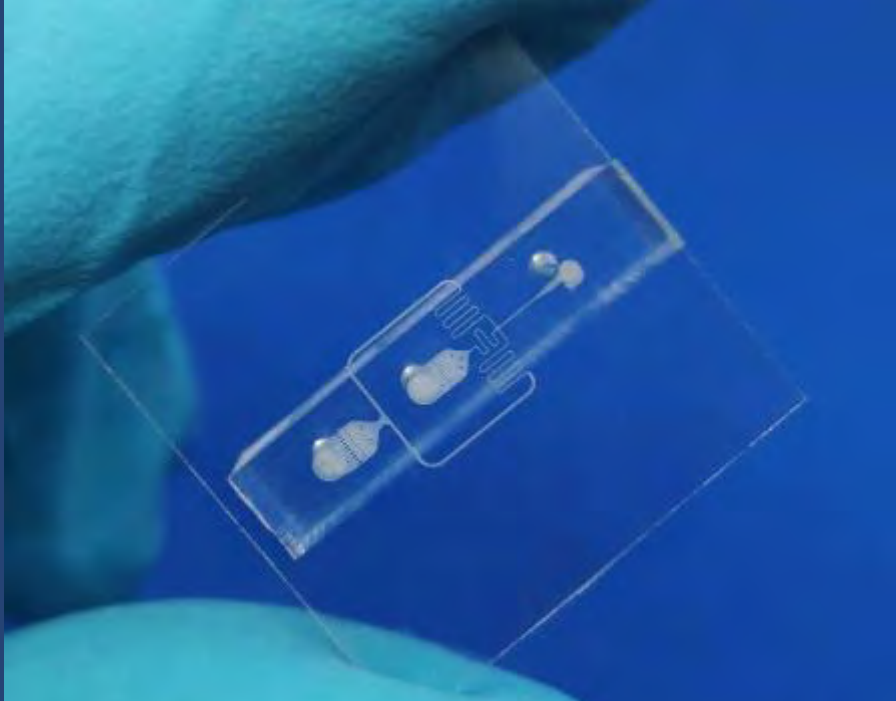
GLASS SPACERS



MICRO DRILLED GLASS



GLASS GUIDE PLATES FOR PROBE CARDS



MICROFLUIDIC CHIPS



PACKAGING GLASS PRODUCTS



GLASS CARRIER WAFERS



GLASS CUTTING



MICROWELL PLATES

Glass Processing Features

—W O P—



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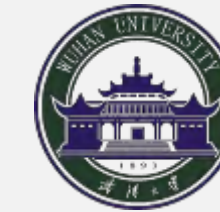
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- Shenzhen University, China
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for your μ task!

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