



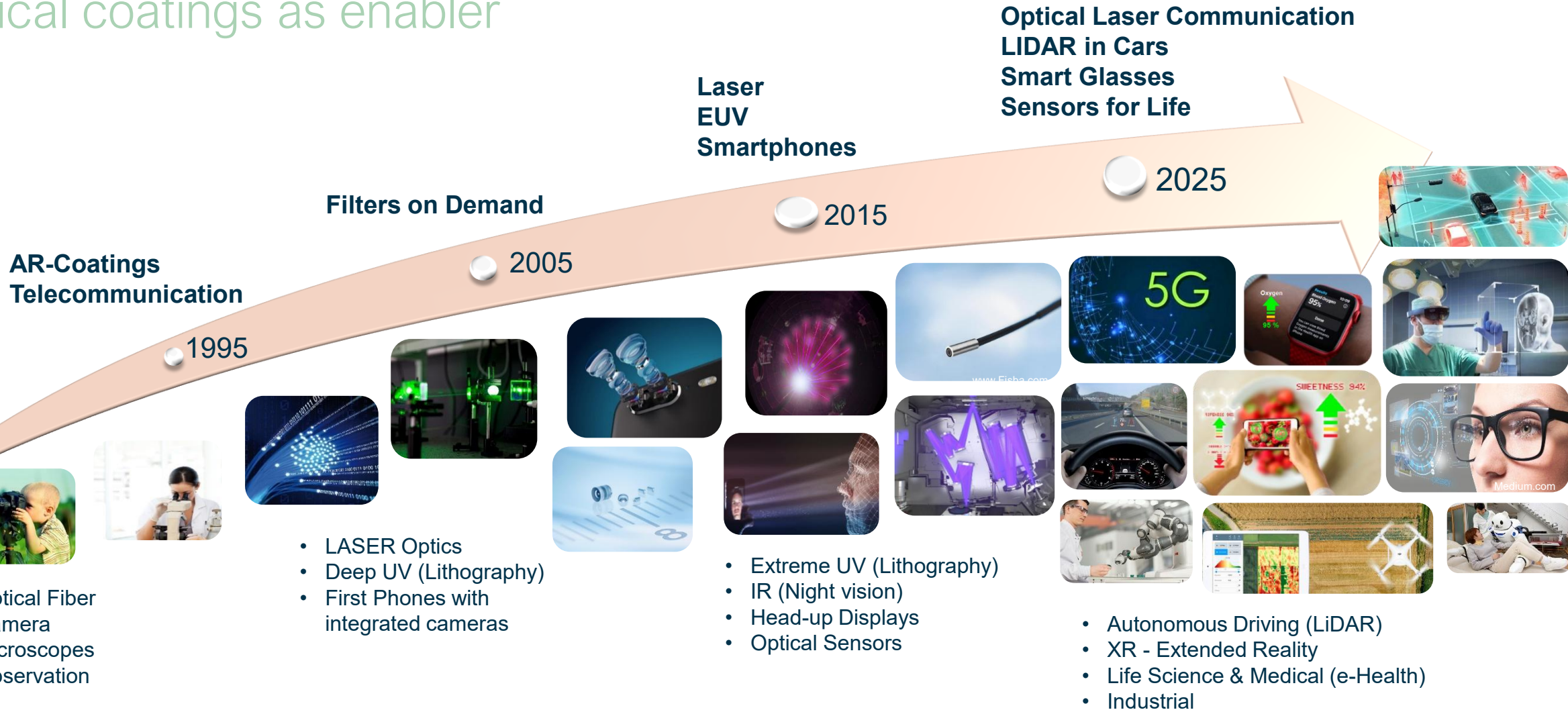
Laser Coatings by
LEYBOLD OPTICS

LASER World of Photonics
2025

Dr. Alexander Kunz

From classical Optics to Photonics

Optical coatings as enabler



Leybold Optics at a glance



Leybold Optics Hub – Raleigh, USA

- Machine refurbishing
- Application center

Center of Competence – Owatonna

- Sputtering components

Leybold Optics Hub – Alzenau, Germany

- Machine manufacturing
- Application center

Center of Competence Leipzig

- Ion Beam figuring & trimming
- Measurement technology

Center of Components Hasselroth

- Fabrication of key technology components

Leybold Optics Hub – Beijing, China

- Machine manufacturing
- Application center



600
FTE employees
worldwide



3500+
Installed system



7%
of turnover for
innovation

Leybold Optics core: Focus in 7 Market Segments.

Business Area

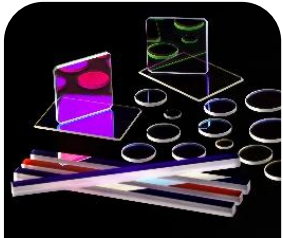
Leybold Optics

Business Unit

Optics

Business Unit

Energy



Precision



Automotive



Semi



Consumer



Ophthalmic



Glass



Flexible

Customer Support

3x Center of Competence for Key Technology Parts (SCI, Leipzig, Hasselroth)

3x Application Center in Alzenau (Germany), Beijing (China) and Rayleigh (USA)

Leybold Optics

LASER Coating / Figuring Equipment Portfolio

Low-Loss / High-LIDT Mirrors

Gyroscopes, Aerospace, R&D



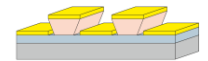
Life Science & Medical

Endoscopy, Microscopy, LASIK, Surgery



LASER diodes

EEL, MEMS



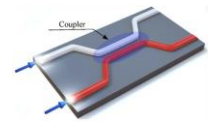
Fibre Optics / Communication

Anti-Reflex, Wavelength Selection



Photonic Integrated Circuits

Waveguides, Optical Modulators



● HELIOS 800



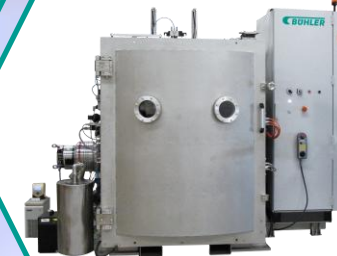
● IBS 1400/1600



● SYRUSpro



● Ion Beam Figuring



- Sputtering
- Evaporation
- Figuring

Key Applications for LEYBOLD OPTICS IBS

LASER Technology
High-End
High-Precision

- Low Loss Mirrors
- High Laser-Induced Damage Threshold

Used in:

- Analytics
- Positioning
- Surveillance
- High Power Lasers

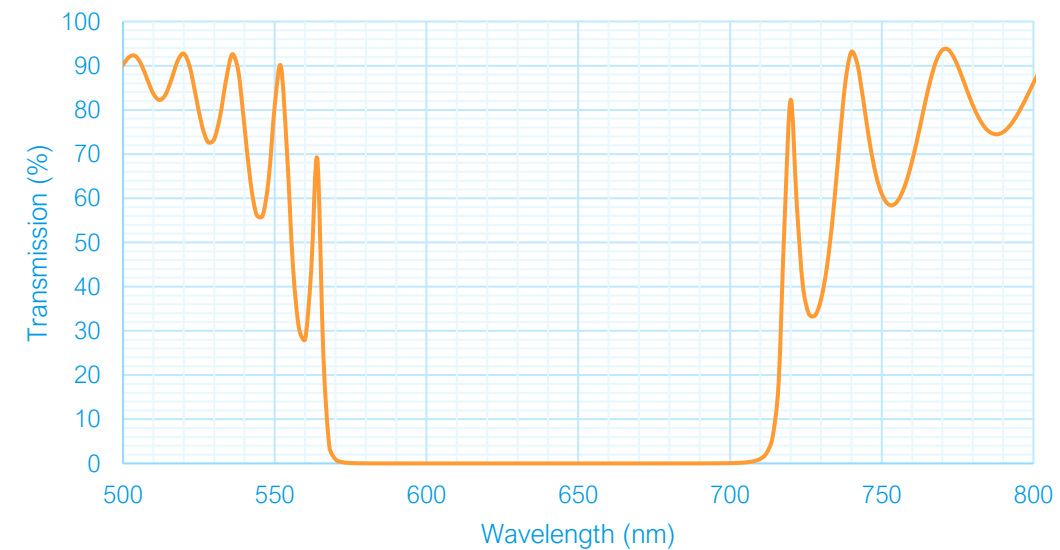
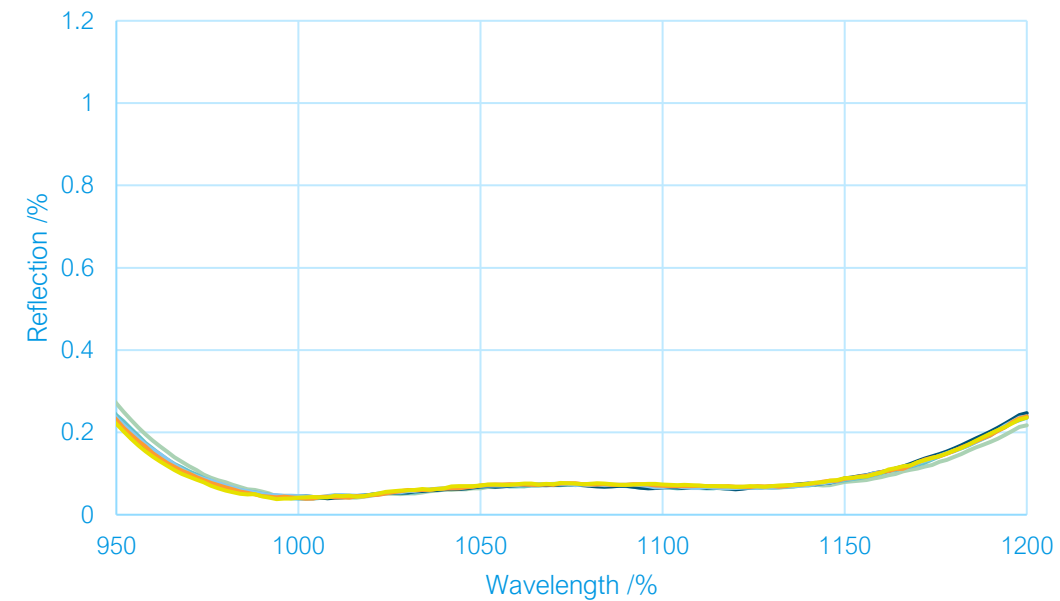
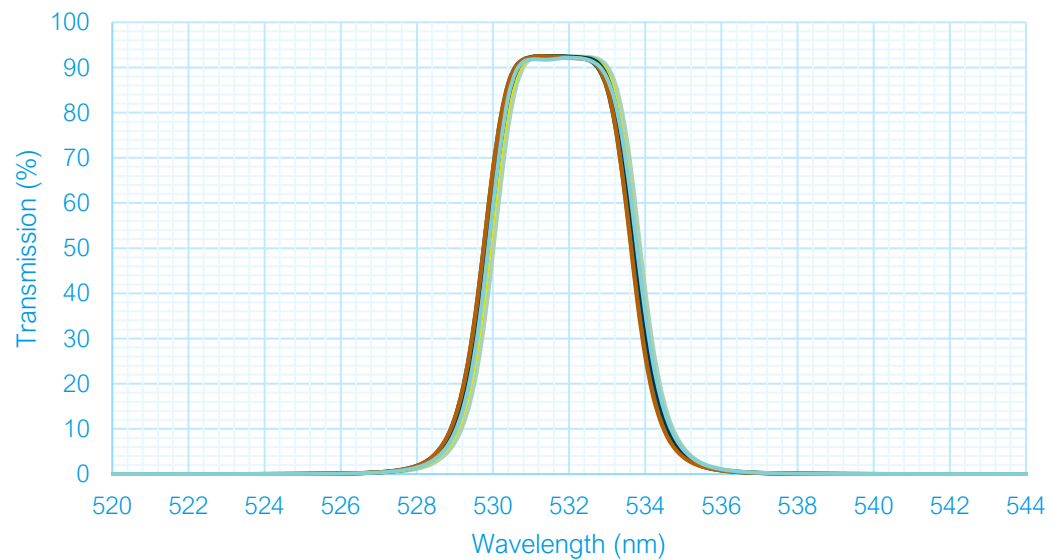
Complex Filters
Benchmark
Optical Performance

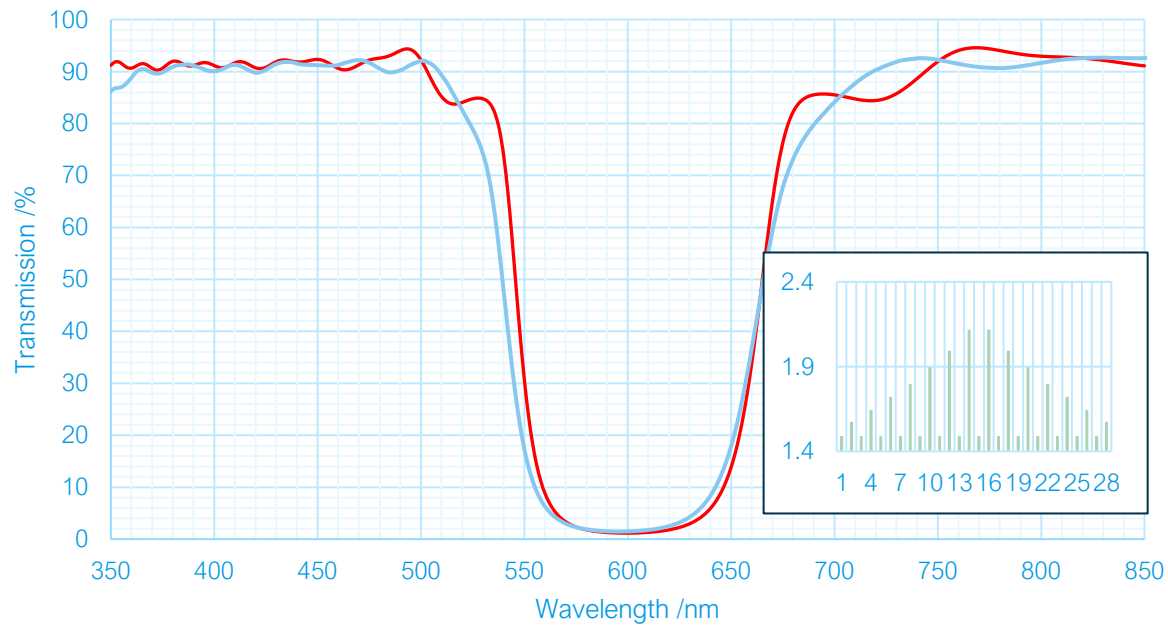
- Manifold Notch-Filters
- Extreme Narrow Band Pass Filters
- Steep Edge Filters
- Optical Density ≥ 4 achievable over large wavelength ranges
- Extremely low Particle Levels
- Best fit to theoretical designs

LASER
Applications
IBS

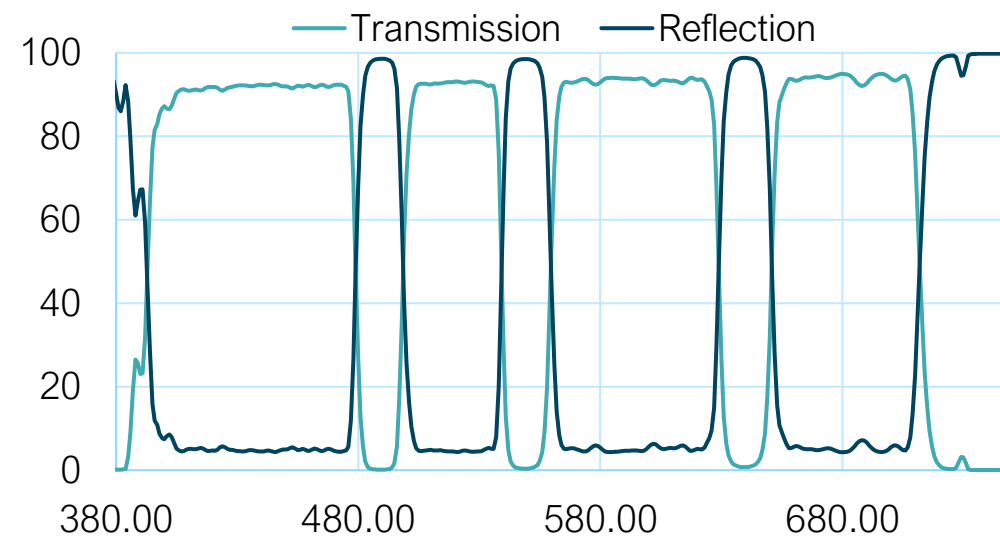
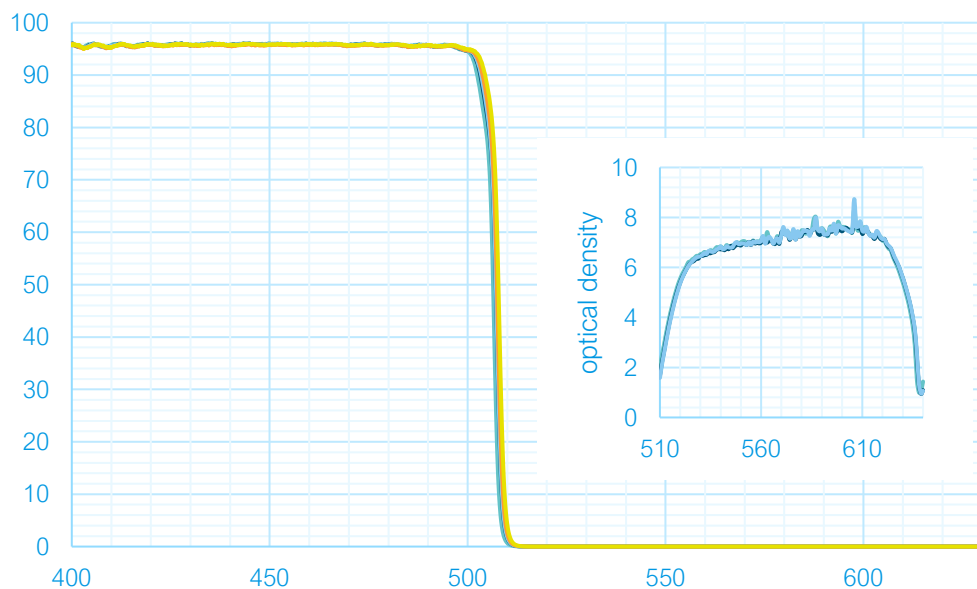
- ✓ Low Loss Mirrors
- ✓ High LIDT
- ✓ Narrow Band Passes
- ✓ Anti Reflex

- ✓ Absorption-free
- ✓ Lowest Scattering
- ✓ Precise Performance





- ✓ Steep Edge Filters
- ✓ High Blocking OD6
- ✓ Multifold Notch Filters
- ✓ Rugate
- ✓ High deposition rate
- ✓ High Reproducibility
- ✓ Low Stress



Success Story

LEYBOLD OPTICS IBS

Redevelopment on SYRUSpro 1100

Platform Prototype



- First IBS machines in production on customer site
- IBS HP
- IBS HT

Remote-Installation of many customer machines during pandemic



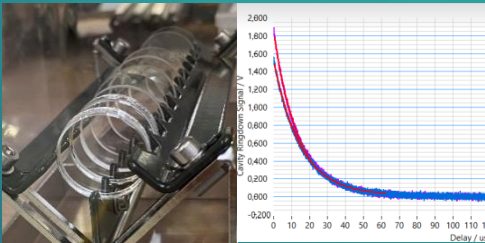
Introduced new options with Ion-Assist Sources

1990 ... 2013 2017/18 2020 2021 2022 2023/24

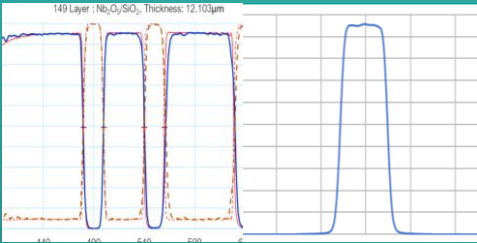
- Coating Development
- Redesign of components
- Improved monitoring



Beta Tests completed
First Processes established



Challenging Low Loss Mirror demonstrated $633\text{nm} \leq 20 \text{ ppm}$



Broadened portfolio on complex filters

Leybold Optics IBS Series

Ultra-high Performance Thin Films



Key benefits

- Lowest optical losses and defect densities
- High precision

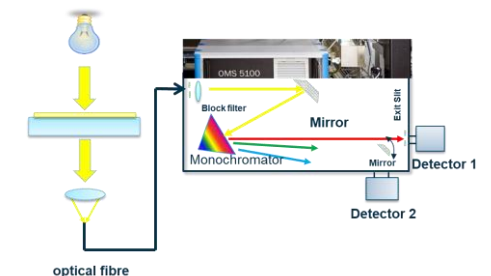


Key figures

- Coating of substrates up to Ø600 mm
- Highest uniformities of $\pm 0.2 - 0.5\%$
- Various substrate holder possibilities
- Movable target tower
- RF 220 Ion Beam Sputter source
- RF Assist Ion source
- Direct optical monitoring
- Load Lock optional
- Flat and curved geometries possible



Optical Monitoring with OMS 6000



Benefits with LEYBOLD OPTICS IBS



- ✓ Most flexible Substrate Dimensions
- ✓ Best Target Usage
- ✓ Highest Deposition Rates
- ✓ Best Monitoring Capabilities
- ✓ Technical Service Network
- ✓ Proven Process Knowledge



Laser
World of
Photonics
2025

Join us!

June 24th - 27th 2025
Messe München, Munich, Germany
Booth No. B1 419

Booth No. B1 419

LASER
WORLD OF
PHOTONICS

BUHLER

An aerial photograph of a two-lane road with white dashed lines, cutting through a dense, lush green forest. The trees are vibrant green, and the road is a dark, straight line. The text "Innovations for a better world" is centered over the road.

Innovations for a better world