

Complex dielectric broadband mirrors for astronomy applications (astro combs)

Manufacturer: Laseroptik

Product: Dielectric coating for large optics to achieve best spectral performance

Features: This was a major challenge in coating: With a diameter of 520 mm and a weight of 35 kg each, the two optics shown were guest stars in our giant IBS machine 'Teresa'. Special thanks to Prof. Christian Schwab (Macquarie University of Sydney, Australia) and KU Leuven (Belgium) for this exciting coating task.

The optics were coated to become broadband high reflectors from 380 – 950 nm. Although they resemble metal coatings, they are fully dielectric (> 85 layers) to achieve optimal spectral performance, resulting in better signal for the intended application compared to silver or alumina coating. A key focus was on achieving a flattened yet still superior reflectivity profile. Due to a notably curved surface of the optics, both the coating design and 'Teresa' were optimized to minimize distribution effects.



These broadband mirrors are used in an astrophotonic spectrograph setup designed to discover earth-like planets, i.e. other habitable worlds by detecting resonant light.

Many other large optics we coat are intended for high-energy laser experiments,

such as laser fusion research. In collaboration with ELI Beamlines (Czech Republic), LASEROPTIK developed coatings made by ion beam sputtering for large turning mirrors and very high laser power. LIDT values of 0.9 J/cm² at 805 nm/45° S-pol, 42 fs, 1 kHz, S-on-1 (referenced to sample surface) were measured by ELI Beamlines and remain unparalleled.

Cover story

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A Decade of Discovery: Heidelberg Instruments' MLA 150 Maskless Aligner turns 10

Manufacturer: Heidelberg Instruments

Product: MLA 150 Maskless Aligner

Features: Heidelberg Instruments proudly celebrates the 10th anniversary of the MLA 150 Maskless Aligner – a breakthrough that has redefined high-resolution lithography in cleanrooms around the world. Since its launch in 2015, the MLA 150 has provided researchers and engineers with a flexible, mask-free alternative to traditional photolithography, transforming microfabrication across both academia and industry.

At the heart of the MLA 150 is a digital micromirror device (DMD), acting as a dynamic mask, paired with solid-state light sources and advanced alignment capabilities. This combination made the system a game-changer from day one. With exposure times under 10 minutes, full process cycles under 30 minutes, and user training completed in under an hour, the MLA 150 quickly set a new benchmark for R&D lithography. By enabling users to go from digital design to a perfectly patterned substrate in minutes, the MLA 150 empowers rapid innovation in fields such as quantum devices, MEMS, micro-optics, and life sciences.

Refined through close collaboration with leading institutions – including EPFL, the Kirchhoff Institute for Physics (KIP) at Heidelberg University, and the Harvard



Center for Nanoscale Systems (CNS) – the MLA 150 quickly proved its value. At KIP, for example, it enabled a threefold increase in yield for complex SQUID (superconducting quantum interference device) sensor fabrication, demonstrating its transformative impact. While initially embraced by research labs, the system's versatility and cost-efficiency soon attracted industrial users seeking agile solutions for rapid prototyping and small-series production. From foundational research in quantum materials to the development of life-saving biosensors, the MLA 150 has been a silent partner in countless discoveries.

In 2025, Heidelberg Instruments pushed the minimum feature size of the MLA 150 to 450 nm, expanding its capabilities for high-precision applications.

Today, the MLA 150 is a trusted workhorse in more than 250 cleanrooms

worldwide. As Heidelberg Instruments celebrates this milestone, it also honors the global community of users, engineers, and partners who have helped shape the MLA 150 into a transformative platform – one that continues to push the boundaries of what is possible in microfabrication.

About Heidelberg Instruments

With over 40 years of experience and more than 1,500 systems installed across 50+ countries, Heidelberg Instruments is a global leader in the design, development, and production of high-precision laser lithography systems, maskless aligners, and nanofabrication tools. The product portfolio ranges from compact tabletop solutions to high-end photomask manufacturing equipment.

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Smart vacuum controller for active total pressure gauges

Manufacturer: Jevatec

Product: Universal vacuum controller

Features: With the JEVAmet® VCU active, JEVATEC presents a universally applicable control and display unit for the simultaneous operation of up to three active vacuum sensors. Developed and manufactured in-house, this smart controller combines reliable measurement technology with modern user convenience. In addition to simple pressure display, the device offers advanced features such as leak rate determination, flexible display modes, and integrated data logging. For seamless integration into existing measurement environments, a LabVIEW driver is available.

A new highlight is the full integration with the SweepMe! measurement software, enabling convenient recording, vi-



sualization, and analysis of measurement data.

The device is compatible with a wide range of vacuum sensors with analog or digital interfaces – including the ATMION® wide-range gauge, JEVAmet® models, and sensors from leading manufacturers. A 3.5-inch TFT touchscreen allows intuitive display of measurement values in mbar, Pa, Torr, psi, or micron. Various display modes

and the integrated leak rate function enhance flexibility. For process integration, RS232/RS485 interfaces, digital control inputs, and one analog plus one recorder output per channel are available. Six freely programmable switching points and an error signal function ensure precise control. Data can be stored via USB stick. Thanks to its wide-range power supply (100 – 240 V AC) and robust aluminum housing in rack-mount format (1/4 19", 3 HU), the device is ideally suited for worldwide use.

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Turn your microscope into a powerful light stimulation tool

Manufacturer: AHF analysentechnik

Product: Innovative light pattern projectors

Features: AHF now offers innovative light pattern projectors from Canadian manufacturer Mightex Systems, the market leader in digital light pattern projection.

The projectors from the Mightex Polygon product family allow users to project arbitrary light patterns, pattern sequences, or even video sequences through the objective of a microscope, enabling precise temporal and spatial control of illumination. This makes the Mightex Polygon systems extremely powerful and user-friendly for optogenetics and the emerging field of photopharmacology – with broad applications in basic research, applied pharmacology, and industry.



High precision and ease of use are achieved by combining the latest DMD technology (Digital Micromirror Device) with modular, intuitive software – available free of charge in its basic version. Thanks to intelligent, high-quality adapter solutions, Mightex Polygon systems can be easily integrated into nearly all commercially

available laboratory microscopes via the Infinity Port, transforming them into user-friendly, high-end tools for modern life and natural sciences – at a manageable cost.

More than 700 systems are already in use worldwide and have been cited in over 150 research publications. If you would like to upgrade your microscope into a light stimulation tool, please contact AHF analysentechnik!

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Career in consulting

d-fine is a European consulting company with over 1,500 employees and a growing international presence with eleven offices distributed across seven countries. Our projects focus on quantitative challenges in data analytics, data science, modelling, and the development of sustainable technological solutions.

To expand our consulting & solutions teams, we are looking for students/graduates (m/f/d) of physics with a very good academic record, fluency in German and

English and a high mathematical and/or technological affinity.

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tive career and salary model, as well as a wide range of additional benefits, such as our extensive training program as part of the d-fine Academy. More information on d-fine can be found at: www.d-fine.com/karriere

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High-performance HOLO/OR beam shaping optics now available from Edmund Optics

Manufacturer: Edmund Optics Europe

Product: Diffractive diffusers and beamsplitters for high-power laser applications – in stock and ready to ship

Features: Edmund Optics now offers off-the-shelf HOLO/OR diffractive diffusers and beamsplitters, delivering premium beam shaping solutions for high-power laser systems.

HOLO/OR diffractive diffusers precisely convert collimated beams into square or circular profiles with exceptional homogeneity and minimal zero-order output – key for applications such as laser welding, ablation, and medical treatments. Unlike polymer-based or microlens diffusers, these are engineered for high damage thresholds and consistent intensity distribution, enabling improved process quality at higher laser powers.

HOLO/OR diffractive beamsplitters divide input beams into uniform spot arrays, perfect for laser scribing, 3D sensing, and fractional treatments. Optimized for Nd:YAG and CO₂ wavelengths (355 nm, 532 nm, 1064 nm, and 10.6 μ m), they support faster throughput, enhanced repeatability, and reliable operation under high energy loads.

Both product lines are passively designed, alignment-free, and available off-the-shelf through Edmund Optics with transparent pricing – addressing a critical need for fast-access, high-performance diffractive optics in demanding laser applications.

About Edmund Optics

With over 80 years of experience, Edmund Optics® is a trusted provider of high-quality

optical components and solutions, serving industries such as Life Sciences, Biomedical, Industrial Inspection, Semiconductor, and R&D. The company employs 1,300+ people across 19 global locations and continues to grow. Edmund Optics offers two specialized solutions: a robust Marketplace with 34,000+ off-the-shelf products and Advanced Manufacturing for custom and volume production of precision optical and imaging components.

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Precise and fast: Wavemeters from Bristol Instruments

Manufacturer: Bristol Instruments

Distributor: MG Optical Solutions

Product: New Wavemeter 872a with industry-leading resolution and automatic wavelength calibration

Features: Offering 1000 measurements per second with 200 kHz resolution, the new wavemeter 872a from Bristol Instruments is the most powerful commercially available wavelength meter on the market. Automatic calibration via an internal reference source, along with an additional port for using the customer's own stabilized lasers, makes it a valuable tool for quantum technology. Short delivery times and an integrated PID controller with switching capabilities make it an ideal choice for demanding projects.

About Bristol Instruments

Since its founding in 2005, Bristol Instruments has specialized in designing, man-



ufacturing, and marketing precision instruments based on optical interferometry. Its flagship products accurately characterize the wavelength and spectral properties of lasers and are used by scientists and engineers in universities, government, and industrial laboratories. Bristol's solutions also support the development and production testing of laser transmitters for optical fiber communications. Additionally, its interferometer technology is used in non-contact thickness gauges for highly accurate measurements of materials such

as specialty plastic films, medical tubing, displays, and ophthalmic products.

About MG Optical Solutions GmbH

Over the past 20 years, MG Optical Solutions has become a photonics specialist in the mid-infrared spectral range, laser technology, and spectroscopy. More recently, quantum technology and frequency combs have become central to its activities.

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