2025/2026

Trend Report Photonics

Industry Trends and Market Potential

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Message of Welcome

SPECTARIS Trend Report Photonics 2025/2026

Bavaria stands for innovation and technology! Under its High-Tech Agenda the Free State of Bavaria is investing some 5.5 billion euro in cutting-edge research on AI, robotics, quantum computing, additive manufacturing, hydrogen, life sciences and aerospace. We are interconnecting companies and universities, building a unique innovative ecosystem and supporting tech start-ups with substantial technology funding. As a leading location for innovation with a strong focus on the future, Bavaria is boosting the key technologies of tomorrow!

Photonics plays a particularly important role in this regard. The industry develops solutions for current and future challenges, drives progress and opens up opportunities. And, in addition, it creates jobs and contributes significantly to economic strength. This is where Bavarian and German companies set technological standards, as impressively demonstrated each year at the leading international trade fair LASER World of Photonics in Munich.

Companies in the sector can rely on the active support of the SPECTARIS industry association. It speaks up for their interests, promotes exchange and networking both within the industry and beyond and draws international attention to the pioneering role of Bavarian and German companies, not least with this publication! Thank you for this commitment and all the very best!

Sincerely,
Dr. Markus Söder

Dr. Markus Söder

Christian Social Union

Bavarian Minister-President

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Table of Contents

SPECTARIS at a Glance

We represent the high-tech industry in Germany

SPECTARIS is the German industry association for Optics, Photonics, Analytical and Medical Technologies. Innovation and growth characterize the four different industry sectors. The majority of the 400 member companies are medium-sized manufacturers that operate in their segments as "hidden champions" on the global market.

The industry association SPECTARIS is committed to creating a framework that promotes growth and innovation. We provide information on market developments, advise on regulatory and foreign trade issues, link companies with business partners and politicians, and put the most important industry topics on the public agenda.

Lobbying

Influence industry-relevant laws and regulations, whether in Berlin or Brussels.

Contact

Get in touch with decision-makers in the industry and politics.

Foreign trade and export promotion

Open up new foreign markets with our support.

Latest information on regulations

Get the latest information on legislative changes and share ideas on implementation.

News

Read before anyone else decision-relevant news from the industry.

Market research and statistics

Access exclusive economic and market data from Germany and abroad.

Further education

Continue your education in seminars on current business topics.

Exchange knowledge

Exchange knowledge in the committees and work groups.

Get visible

Introduce your company to new business partners and the general public.

Networking

Establish contacts with cooperation and research partners.

Photons in politics

The special value of an association membership in times of upheaval

Jörg Mayer
CEO

www.spectaris.de

SPECTARIS
German Industry Association for Optics, Photonics, Analytical and Medical Technologies

Germany's photonics industry is thriving, with €50 billion in sales (2024) and annual growth of 6%, even in crisis years. With 76% of its output exported, it is highly dependent on open global markets. Yet shifting trade dynamics with countries like China and the U.S. present challenges. While 45% of exports go to the stable EU, accessing new markets remains difficult.

In this tense climate, political leaders in Berlin and Brussels must support rather than burden the sector. A flood of new regulations – material bans, excessive reporting, slow export procedures – is hitting photonics hard. SMEs are especially vulnerable: 60% have fewer than 50 employees, 92% fewer than 500. Most cannot maintain large compliance teams. Rising bureaucracy not only adds costs but signals mistrust in business integrity.

Yet, resignation isn't an option. If policymakers act boldly and keep promises, industry will rise to the occasion. The photonics sector must use its strengths and gain more political visibility. German firms invest around 10% in R&D – leading in Europe, but still behind the 16–30% seen in the U.S., China, and Japan, where photonics is already viewed as a key driver of innovation. Subject to market dynamics, the global photonics market could generate a turnover of up to one trillion US dollars by 2025.

A February 2025 study by the Future Management Group confirms this potential, citing major opportunities in AI, health, sustainability, and the data boom. Photonics is among Germany's top 6 future industries, enabling breakthrough applications and significant growth. While companies innovate and build new supply and sales structures, industry associations like SPECTARIS provide crucial support: policy advocacy, funding guidance, and cross-industry coordination. Associations aren't service providers – they actively shape the sector, secure research funding, and lead impactful campaigns.

SPECTARIS represents Germany's photonics sector through a strong volunteer network focused on regulation and trade. We analyze markets, push for smart innovation funding, and promote technological sovereignty in Germany and the EU. Photonics powers key systems – from lasers to data networks, autonomous vehicles to medical devices – and depends on materials and subsystems often sourced from related fields like microelectronics. Germany must maintain and expand its capacity to develop and produce these components, including secure access to raw materials and production of optical glass, crystals, light guides, and electronics. While the EU Chip Act acknowledges the electronics sector, photonics still awaits similar recognition. We call for political action to ensure its technological sovereignty. European research programs must become more effective. Photonic innovations are complex and require international collaboration, yet many SMEs lack the resources to find partners or navigate funding. Only one in seven proposals gets funded – discouraging even promising projects. We urge a more efficient application system and prioritization based on innovation potential.

Through our research organization F.O.M. (www.forschung-fom.de), SPECTARIS drives pre-competitive innovation in about 20 publicly funded projects, enabling cooperation between research and industry. We also help mature technologies enter new markets – currently with a focus on quantum tech, robotics, and defense. Our training initiative promotes photonics careers, securing future talent.

Following the recent European and German elections, we clearly voice our demands. After Germany's 2025 government formation, we call for:

1. Less regulatory burden via stronger EU advocacy
2. Faster export processes and global competitiveness
3. Targeted support for digitization and AI
4. Restoration of innovation leadership
5. Recognition of photonics and medtech as lead industries

What makes SPECTARIS unique?
We send photons into politics – and fight for the foundation of tomorrow's business. If you think beyond today and value collective intelligence, SPECTARIS is your platform.

Fasten your seat belts, please!

Science and innovation for Europe's technological sovereignty

Prof. Dr. Thomas Schroeder
Scientific Director,
Leibniz-Institut für Kristallzüchtung (IKZ), Berlin

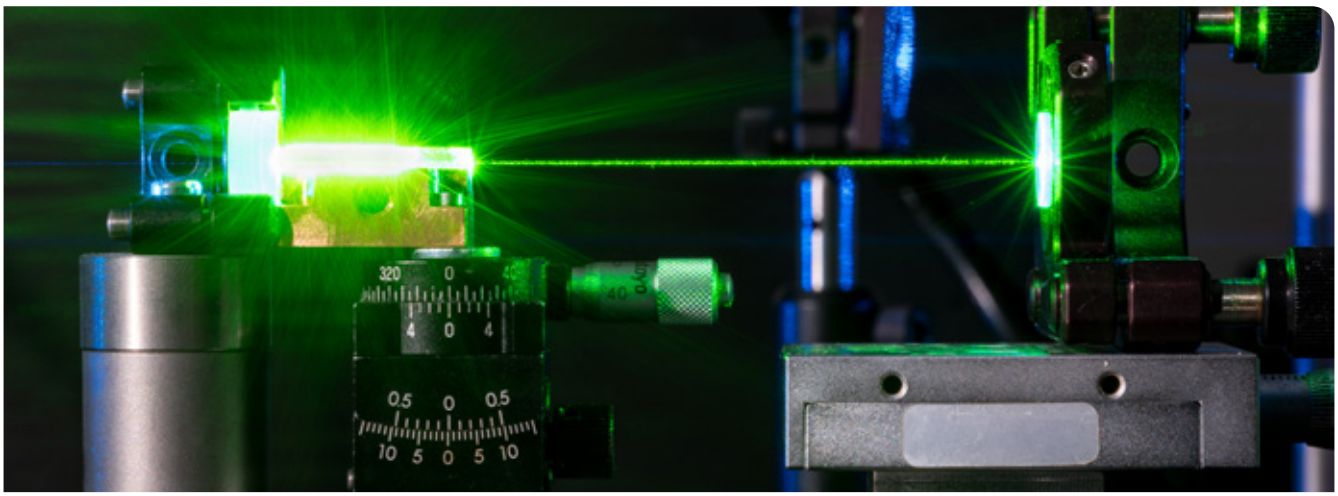
www.ikz-berlin.de

Geopolitics with increasing risks of unpredictable trade wars and harmful tariffs put in question free trade and globalization, based on the international division of labor with reliable material supply chains for industry. Risky and difficult turbulences are ahead and put at stake EU´s political and economic stability. The EU wishes to offer a third political system as alternative to US and China, rooted in European democratic values and technological competitiveness. EU science and technology certainly play a crucial role to (re)gain economic grounds by modern product innovations. Technology transfer between academic and industrial collaborations is thus of increasing importance. The Leibniz-Association with its 96 institutes wishes to strengthen technology transfer activities by coordinated action. Leibniz-research institutes are very active on a broad range of transfer activities, ranging from socio-economical expertise over natural and engineering sciences to digitalization and artificial intelligence. Taking the "Leibniz-Institut für Kristallzüchtung" as an example, we strongly improve our technology infrastructure, administrative processes and staff expertise to serve the needs of EU industrial partners in the field of crystals and components for the electronics and photonics of today and tomorrow.

Oxide & fluoride crystals are grown at IKZ for basic and applied research and technology transfer.

World population is approaching in the next decades a number of 10 billion people on earth. In consequence, societies will face worldwide enormous challenges with respect to climate, biodiversity, global health, migration, social cohesion, sustainability and economy. Globalization and digitalization increased worldwide wealth for many decades by a highly diversified and specialized and cost-effective distribution of work and production over the whole planet. However, the Corona pandemic put into a spotlight that, after decades of globalization, supply chains are fragile and the world faces an erosion of free trade. Even more worrisome, political system rivalry and global scarcity of resources result in severe nationalism, protectionism and even trade wars among leading industry nations. Shockwaves are sent through societies and economies. To create resilient societies, we witness in international politics the upcoming of a "diplomacy of things": the capability and expertise of a nation to produce high technology – which is of central importance for modern knowledge-based societies – becomes an element of political power and influence. Examples are given by the Chinese "Made in China 2025" strategy from 2015 and the US inflation act published in 2022. The European Union (EU) wishes to actively define and pursue a European way in alternative to the US and Chinese systems, based on EU historical, political and cultural values. The Draghi paper "The future of European Competitiveness" (2024) addresses these future challenges with respect to EU science, technology and innovation by "closing the innovation gap, decarbonization and competitiveness plan, increasing security and decreasing dependencies, financing investments and strengthening governance". In Germany, the framework program "Forschung and Innovation für Technologische Souveränität (FITS) 2030" emphasizes the need for digital and industrial key technologies. The BMBF research security paper (2024) explores dual use cooperations between civilian and military stake holders.

The Leibniz-Association confirmed its strong commitment to technology transfer towards the "Gemeinsame Wissenschaftskonferenz (GWK)" for the soon starting second half of the "Pakt für Forschung und Innovation" (2026-2030). The "Transfer



1000" study, published in 2024 by TU Berlin and Fraunhofer Institute for Industrial Engineering (IAO), points out that transfer today is based on a holistic approach: In addition to technology and knowledge transfer, sustainability, acceptance, and digitalization are now key factors for successful transfer. The Leibniz-Association with its multitude of scientific and technology expertise is well-suited to create a modern and holistic Leibniz technology transfer "branding" in the EU. The Leibniz president supported the Leibniz-Strategy Forum "Technology Sovereignty" from 2021 to 2025 to internally coordinated and externally communicate the Leibniz tech transfer activities; IKZ acted four years as speaker.

EU and national bodies request for a given key technology an EU status analysis to establish a pre-defined technology sovereignty level; the goal is to define and fill the innovation gaps without doubling infrastructure within EU. IKZ took for crystal science and technology the responsibility to carry out a complex EU status analysis. IKZ used its leading positions on the national (Deutsche Gesellschaft für Kristallzüchtung, DGKK) and European (European Networks on Crystal Growth, ENCG) steering committees to request and gather the requested input from all national crystal growth communities in EU. After two years, IKZ published with EU partners in 2024 a status analysis on science and technology of strategic crystals in the EU. The interactive map of academic and industrial activities on crystalline materials for electronics and photonics is continuously further developed and openly accessible on the IKZ website (dashboard.encg.ikz-berlin.de/encg-app). It provides important information as a knowledge brokerage database to identify EU partners for R&D projects or identify innovation gaps for the recovery of strategic competitiveness in the EU. In general, the past decades of globalization resulted in a strong loss of industry companies and industrial expertise in the crystal sector in EU. IKZ wishes to push two important action points in future to close innovation gaps in Germany and EU in crystal R&D to improve technology sovereignty:

1) The missing "Crystal R&D Innovation Hub of Industrial Relevance" in EU: The status analysis demonstrates that IKZ is today the EU flagship of the crystal growth R&D community with all important expertise united under one roof: Nanostructures and Thin Films, Volume Crystals, Materials Science and Characterization, Simulation and Plant Engineering. IKZ built up in the past years its 2-inch prototyping capability as an important step to evaluate and benchmark innovative crystals in partnership with technology makers with sufficient statistics. IKZ is the only place in EU with 2-inch prototyping technologies for the highly efficient, ultra-wide band gap power electronics semiconductors Aluminum Nitride and Gallium Oxide; a prototyping example in photonics is given by the optical Faraday rotator material Potassium Terbium Fluoride. However, 2-inch crystals are often too small to achieve a market entry in electronics and photonics. Therefore, IKZ needs to extend its R&D programs to the corridor of 4-inch and 8-inch crystal dimensions for selected innovative crystals of technological relevance in electronics and photonics; only in a few mass markets higher crystal dimensions are needed. Companies address IKZ with increasing needs for crystals in the photonic markets (laser fusion technologies, quantum technologies, non-linear optics, photonic integrated circuits, high power laser technologies etc.). In general, the supply of laser crystals (active laser gain materials, nonlinear optical "Technology Sovereignty" crystals, optical Faraday rotators and saturable absorbers) is critical in EU. IKZ is in close contact with the Fraunhofer network "Light and surfaces" to promote R&D solutions in EU. With such a "Crystal EU Innovation-Hub", we could support existing companies to further develop strategic materials in the markets as well as develop new materials for future disruptive technologies towards a mature technology level for commercialization.

2) Missing EU staff to push crystal R&D innovations by academia and industry: Crystal growth, in particular on a scale relevant for prototyping and industrial R&D, is today by far too expensive for most universities in EU. Many universities closed down the activities on crystal growth so that less and less students get in touch during their education with crystal growth. A fact in clear contradiction to the increasing importance of the field with respect to EU competitiveness goals! IKZ will thus broaden in future its service mission to training and education activities for the next generation of researchers.

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Photonics is the Future – Be a Part of it

Dr. Oliver Lischtschenko
CEO & Founder
Coher Sense

The photonics industry drives innovation, shapes daily life and pushes technological boundaries. In this rapidly growing and collaborative environment, we are at the beginning of our journey with Coher Sense – working to enable new applications and make photonics more accessible for broader adoption. As a key force behind Germany's thriving photonics ecosystem, SPECTARIS connects visionaries, pioneers, and industry leaders, fostering a strong network, creating opportunities and providing valuable market intelligence. By joining the association, we aim to strengthen an environment where groundbreaking ideas flourish, technological progress accelerates and new possibilities emerge for industries and society alike.

Dr. Christian Korth
Managing Director
Carl Zeiss Spectroscopy GmbH

At ZEISS Spectroscopy, we advance photonics in the field of spectroscopy with innovative solutions in agriculture, food safety, and water analytics. Our commitment to research and development keeps us at the forefront of technology, providing real-time insights that enhance processes and improve outcomes. By collaborating with industry partners, we foster knowledge exchange that drives efficiency and sustainability. In today's world, ecological and political regulations, alongside economic influences, play a crucial role in shaping our industry. SPECTARIS as German industry association for photonics provides us with a platform for knowledge exchange on these matters, enabling us to present our collective impact to national and EU institutions with a unified voice.

Dr.-Ing. Oliver Pust
Sales Director
Delta Optical Thin Film A/S

As a company specializing in the development and manufacture of customized optical filters, we at Delta Optical Thin Film A see the photonics industry as a key driver for innovation and progress. By working closely with our customers and continuously developing our coating technologies, we are helping to push the boundaries of optics and photonics. We are convinced that the networking of experts and the promotion of research and development are crucial to shaping the future of optics and photonics and further expanding their diverse applications. As a new SPECTARIS member, we look forward to working with SPECTARIS and the entire industry to develop and promote the possibilities of optics and photonics.

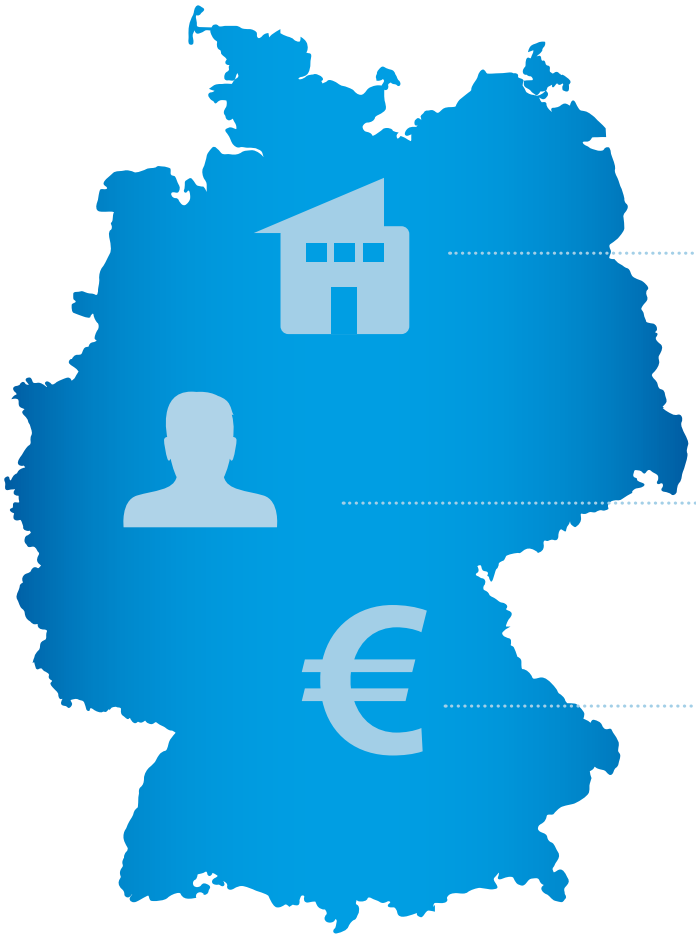
The German Photonics Industry in Figures

Even if the economic development of photonics in Germany was subdued in 2024 due to the general economic conditions, photonics is following a strong growth path in the medium and long term. Between 2015 and 2022, the global photonics industry recorded steady growth with a compound annual growth rate (CAGR) of around 7% in revenue. A similarly high increase is expected for the following decade. In 2024, Germany's roughly 1,000 photonics manufacturers and their nearly 188,000 employees generated sales of €50 billion. Foreign business plays a key role for manufacturers, with the export ratio at 76% – and rising.

Solutions in the core areas of production technology, Industry 4.0, healthcare and optical components and parts, in which Germany has a strong global market position, account for around 60% of production value.

The high R&D ratio of more than 10% is proof of the industry's above-average innovative strength. New application fields of photonics, such as quantum technologies or solutions for precision agriculture, offer a lot of potential in addition to the already established areas. The security and defense sector is becoming increasingly important due to the geopolitical situation.

In addition to the weak development of the economy worldwide and particularly in Germany, important challenges for companies include an excess of bureaucracy, rising costs, trade barriers and a shortage of skilled workers. SPECTARIS supports its member companies in finding skilled workers through various activities. An example of this is the apprentices platform www.photonik-ausbildung.de.



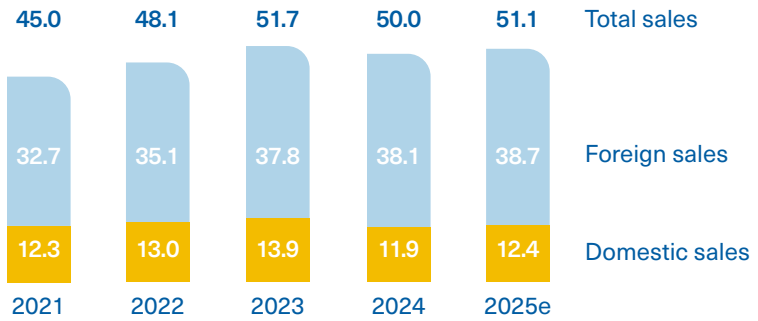
ca. 1,000
Photonics manufacturers

188,000
Employees

€50.0 billion
Sales

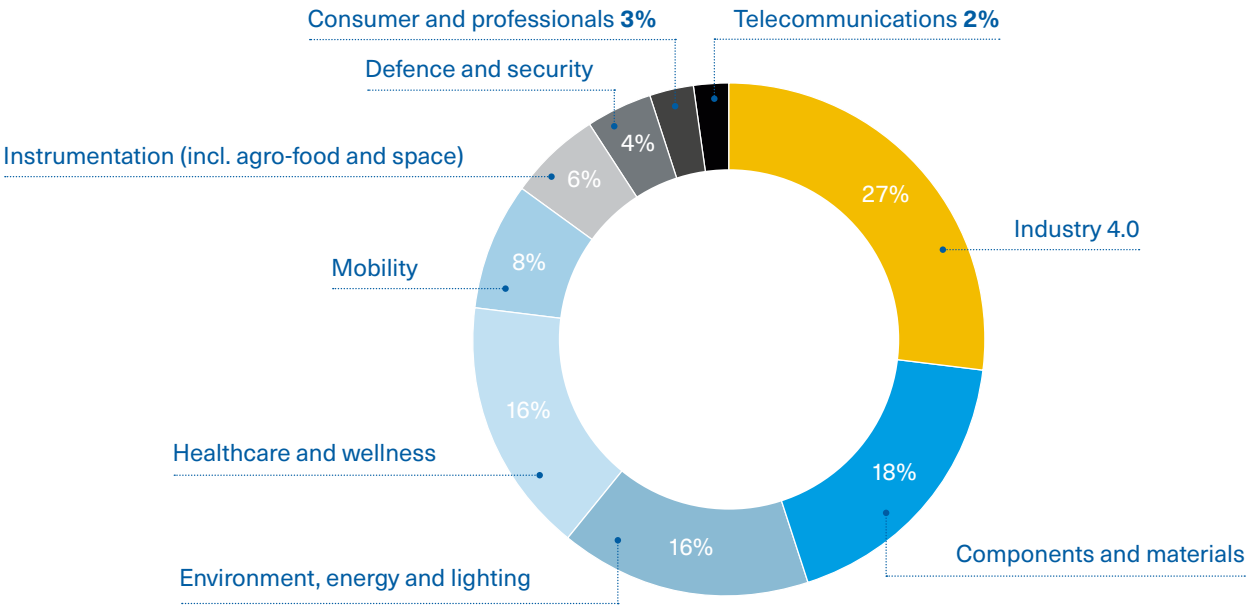
» Source: TEMATYS, SPECTARIS extrapolation

Total sales, domestic / international (bn €)



» Source: TEMATYS, SPECTARIS extrapolation » e: Forecast

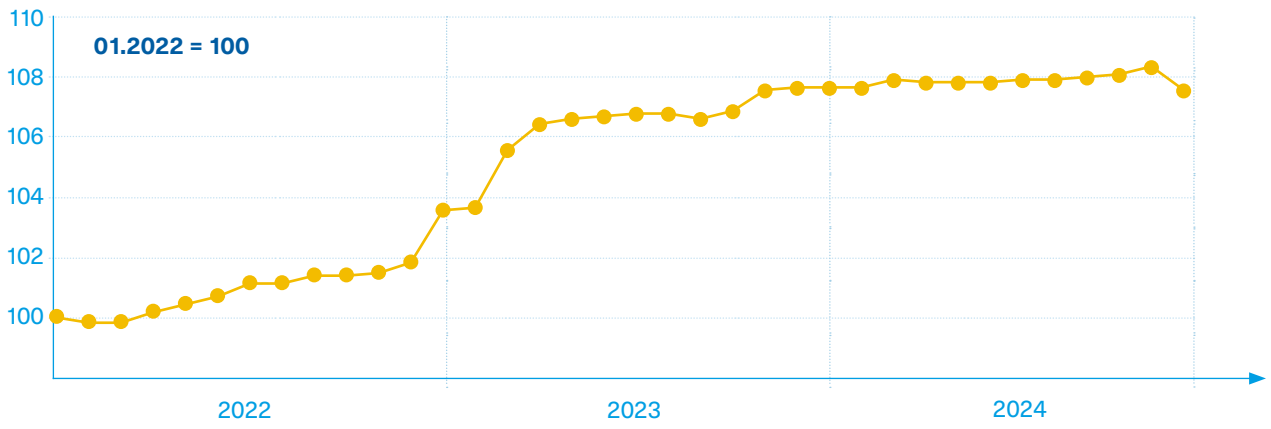
German photonics production by segment



» Source: TEMATYS/Photonics21

Producer price index for optical and photographic instruments and devices

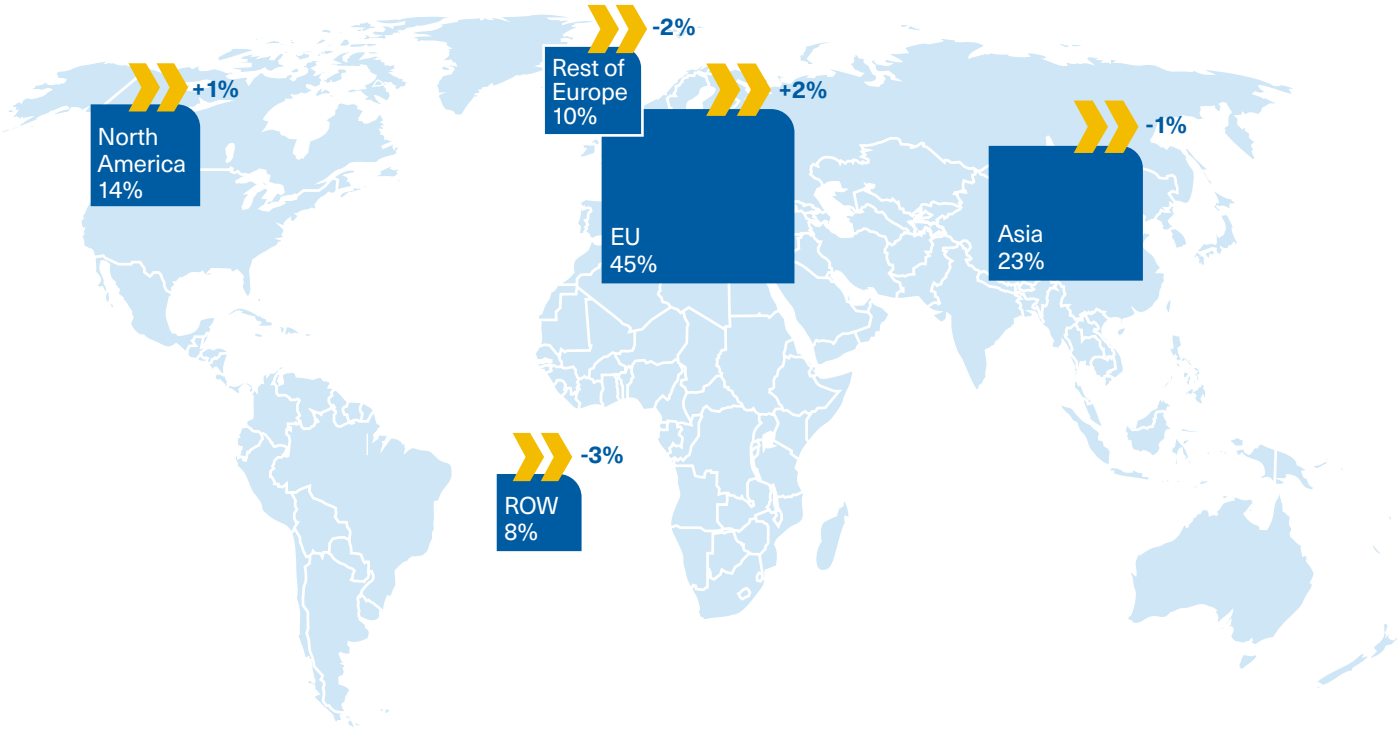
Increased costs are a challenge for many companies. Fortunately, the rise in producer prices has slowed significantly in 2024.



» Source: SPECTARIS, Federal Statistical Office

German photonics export by target region

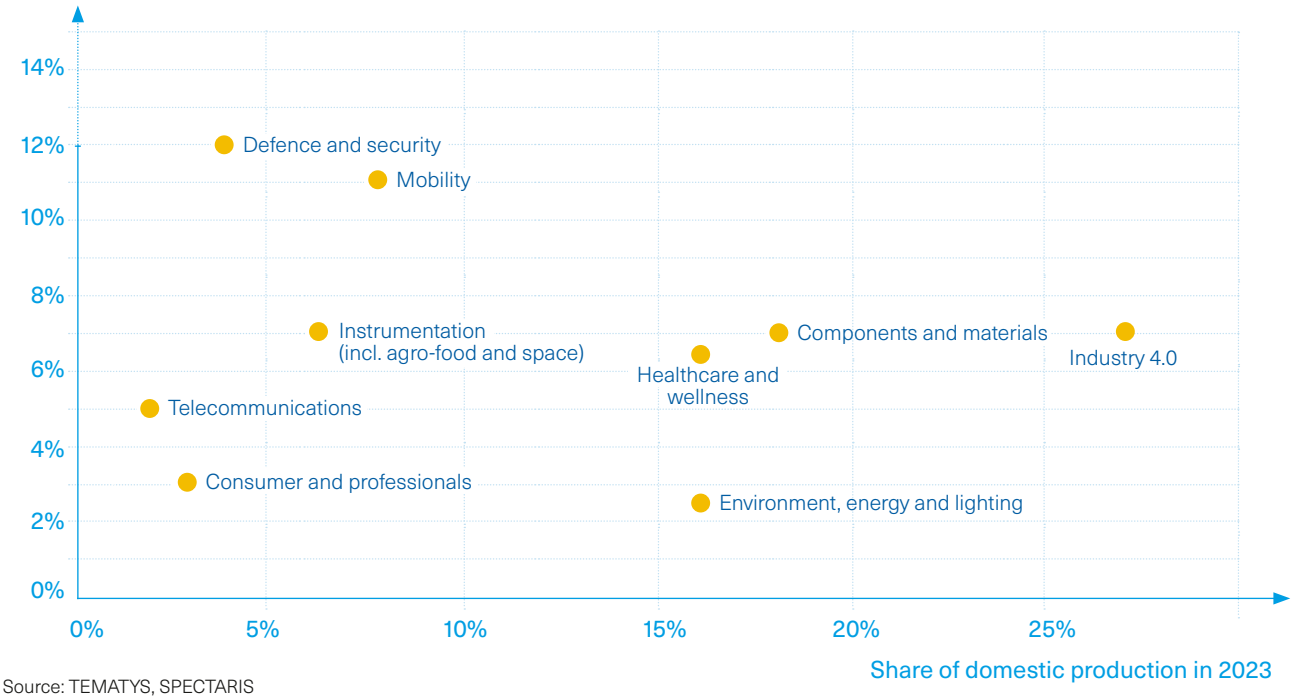
Export share 2024 and growth rate 2023-2024



» Source: SPECTARIS, Federal Statistical Office

Sales of German photonics by product segments

CAGR 2021-2027e



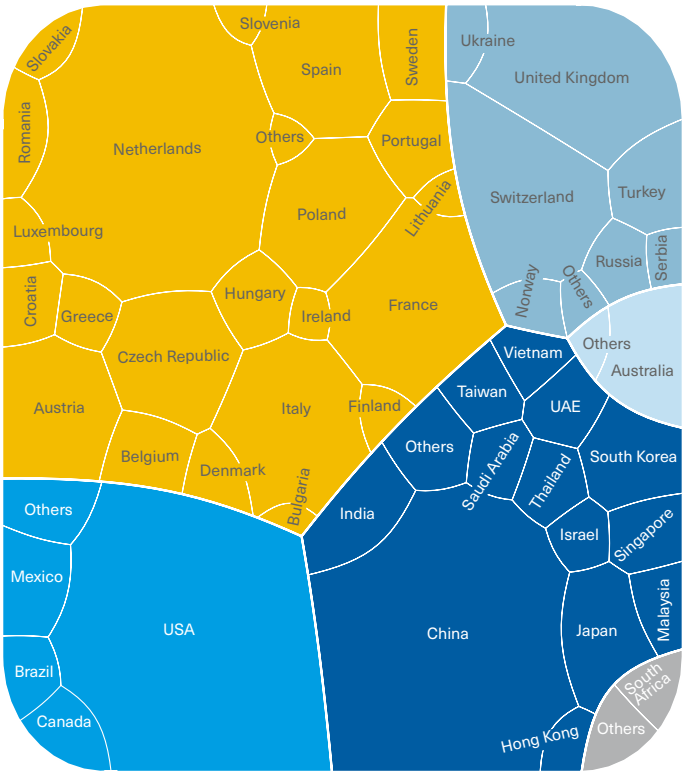
» Source: TEMATYS, SPECTARIS

German photonics exports by target region and country

The European Union is the No. 1 export region for the German photonics industry.

The USA and China are the two most important individual countries.

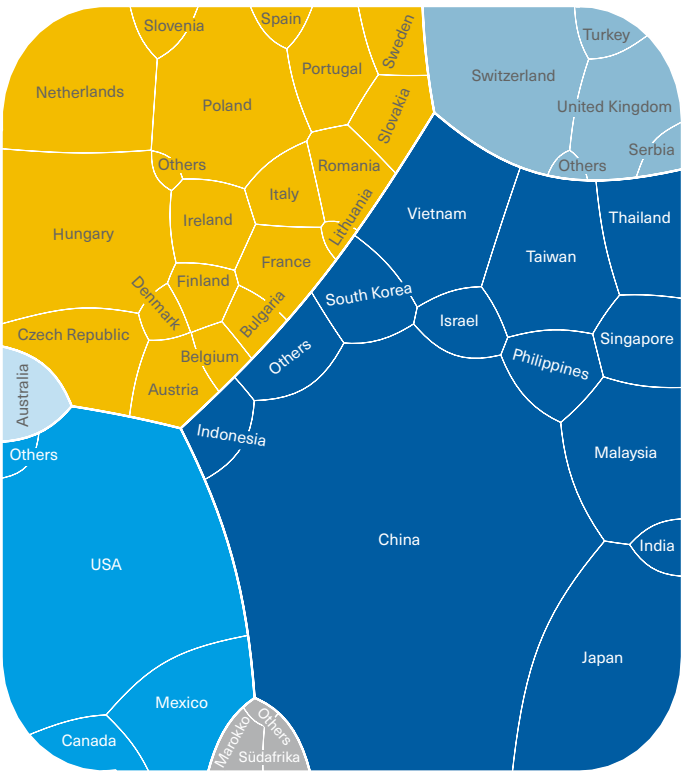
- EU
- Americas
- Asia
- Rest of Europe
- Australia
- Africa



German photonics imports by region and country of origin

Most of the German photonics industry's imports come from Asia, with China being by far the most important importing country.

- EU
- Americas
- Asia
- Rest of Europe
- Australia
- Africa

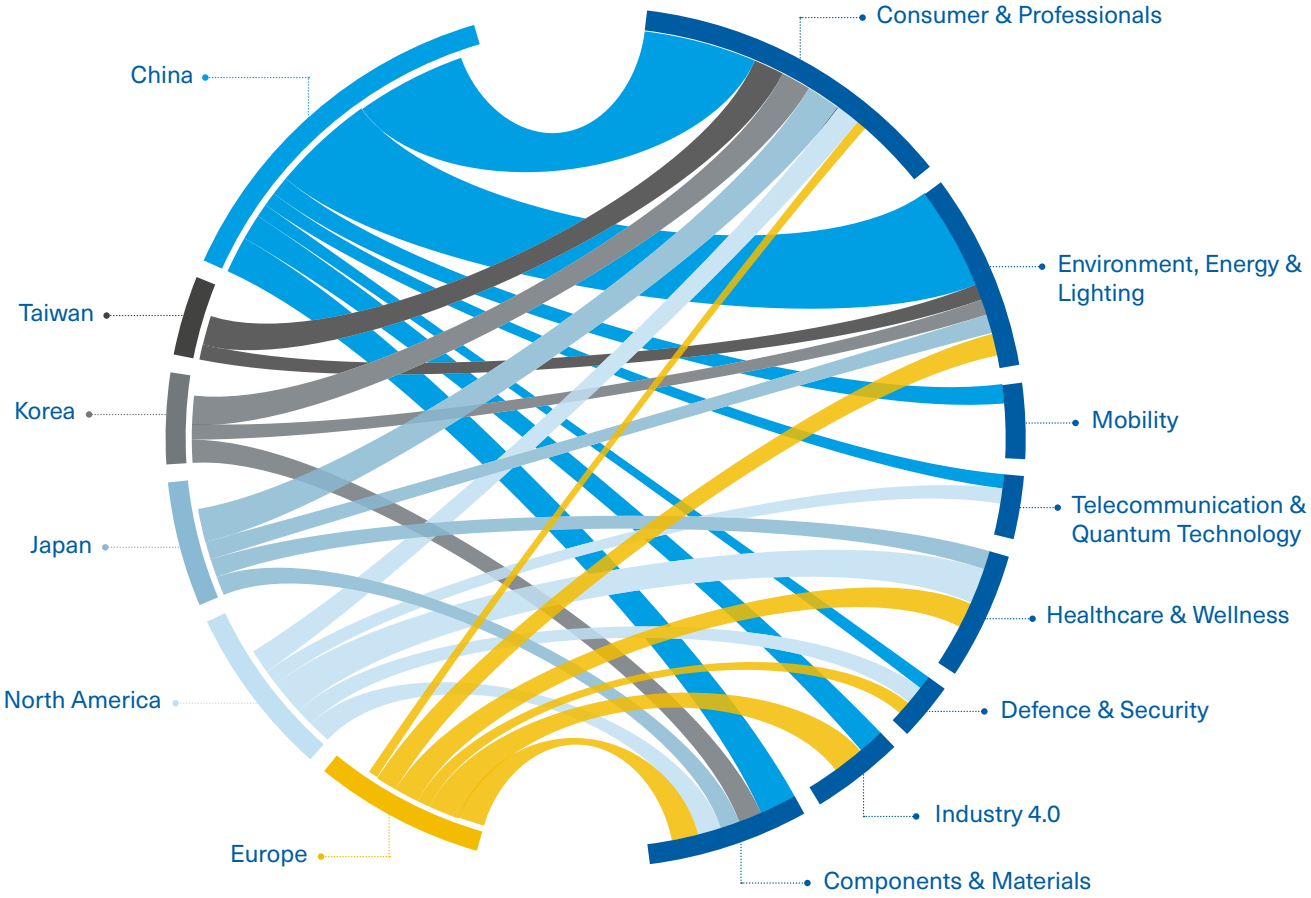


» Source: SPECTARIS, Federal Statistical Office

Photonics Worldwide

According to calculations by TEMATYS in the Market Research Study Photonics 2024 by Photonics21, the global market for photonics was worth USD 865 billion in 2022. Between 2015 and 2019, the average annual growth rate was 7.3%; in the period from 2019 to 2022, it was 6.8%. For the following years, most current forecasts by various market research companies assume similarly high annual growth in the region of 6 to 7%. China accounts for 32% of global photonics production, followed by Europe and the USA with 15% each. Japan, Korea and Taiwan follow with shares of 11 to 7%. Germany accounts for 39% of European and therefore around 6% of global production of photonics goods. More than 60% of the market is accounted for by the three largest photonics segments: consumer and professionals (29%), environment, energy and lighting (17%) and components and materials (14%).

Market shares of the leading geographical areas in the main photonics segments.
The size of the ribbons is proportional to the production value in the segments.

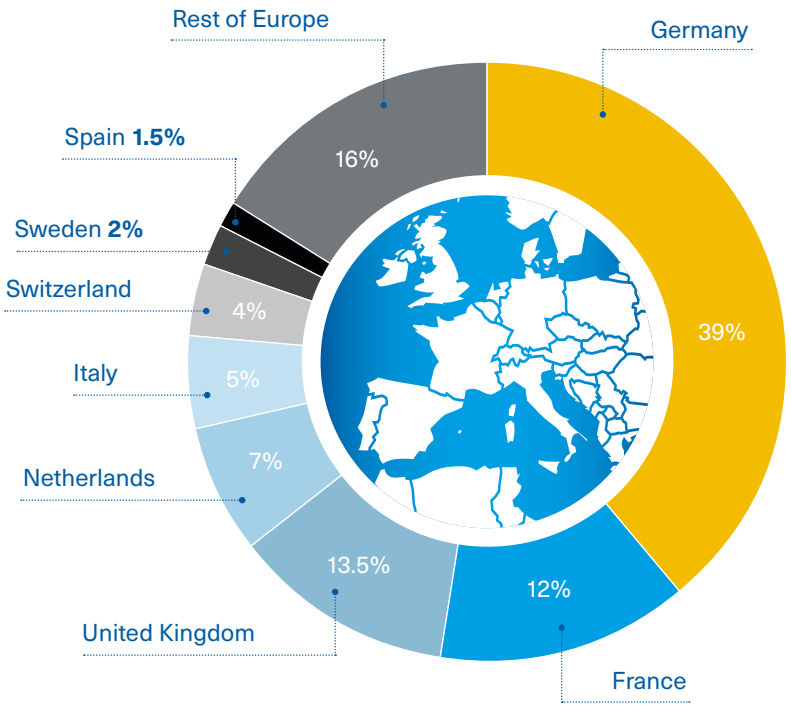


Smaller parts of the region-market links are not shown for better clarity.

» Source: TEMATYS/Photonics21, SPECTARIS

European photonics market

Market share by country, 2023



Key figures, 2023

Photonics production
€124.6 billion

Number of employees
> 430,000

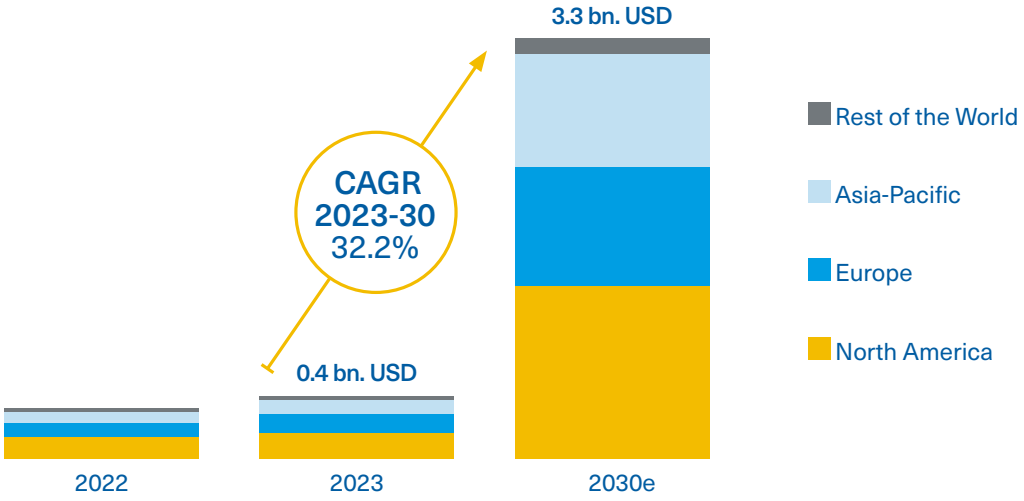
Growth 2019-2022
6.4% / year

» Source: TEMATYS/Photonics21

Global quantum photonics market 2023-2030e

2023: 0.4 bn. USD, 2030: 3.3 bn. USD, CAGR 2023-2030: 32.2%

The global quantum photonics market is expected to expand significantly, increasing from USD 0.4 billion in 2023 to approximately USD 3.3 billion by 2030, with a compound annual growth rate (CAGR) of 32.2% over the forecast period. This growth is primarily driven by the rising demand for secure and reliable communication systems amid increasing cyber threats and increasing investments in quantum photonics computing. Additionally, ongoing R&D efforts and financial investments in the field present significant opportunities for market expansion.



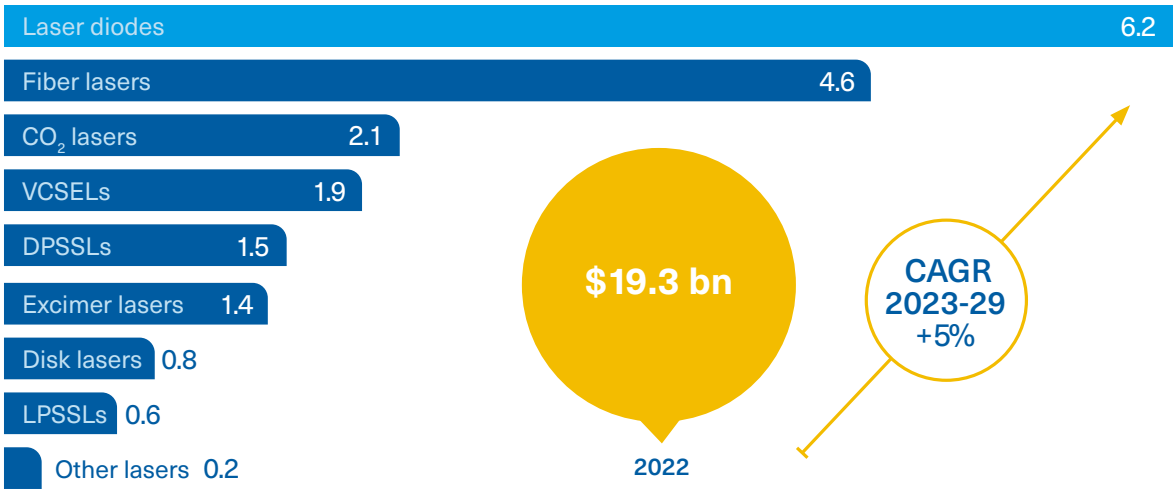
» Source: MarketsandMarkets » e: Forecast

Global Laser Market

The global market for laser beam sources will grow at a compound annual growth rate (CAGR) of 7% to $19.3 billion by 2022. Despite the moderate overall growth in global production, the laser industry proved to be resilient until 2023. Especially in 2021 and 2022, the leading manufacturers benefited from the strong recovery of the manufacturing and high-tech sectors after the pandemic. In 2024, some key sectors did not perform as strongly as expected due to the difficult economic conditions, so the previous growth forecasts were lowered. Bases on TEMATYS average annual market growth of 5% is currently forecast for the period 2023-2029.

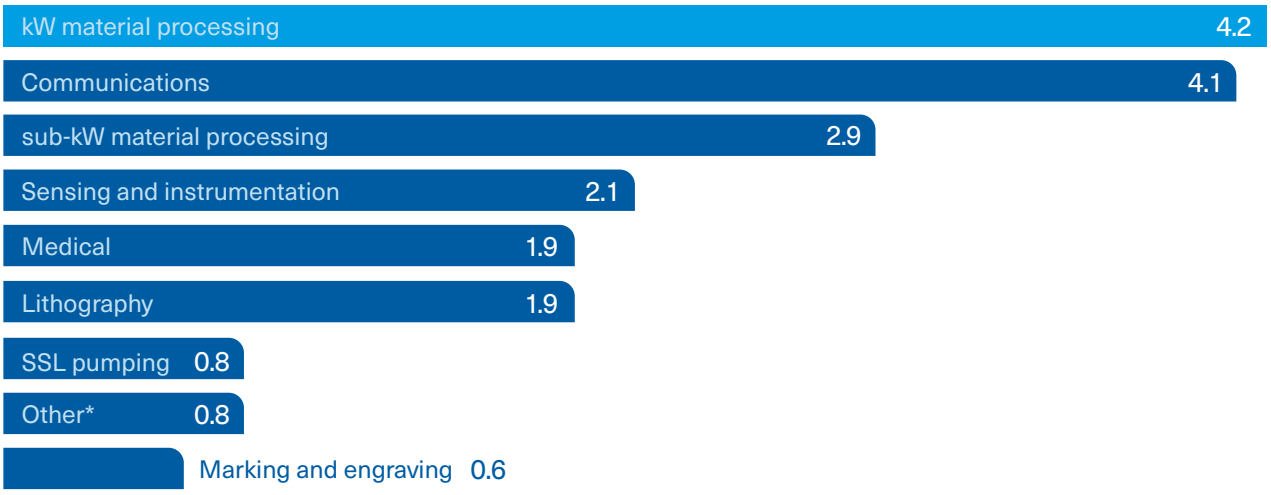
The global market for laser sources by technology

(bn. USD, 2022)



The global market for laser sources by field of application

(bn. USD, 2022)



*Displays, Optical storage, Printing, Lighting, Aerospace and defense, R&D

» Source: TEMATYS, Laser sources: Market, Players and Trends (12/2023)

Strategic autonomy of photonics in Germany: stocktaking and recommendations for action

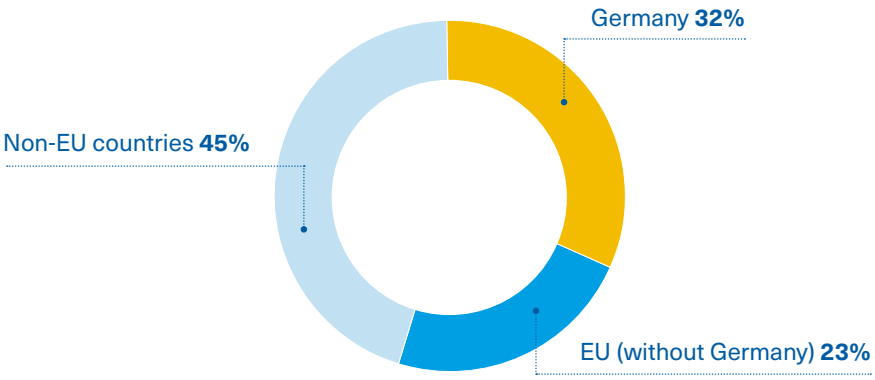
» *www.spectaris.de/photonics-downloads*

The SPECTARIS study "Strategic autonomy of photonics in Germany" examines the current situation of the industry and derives initial possible options for action. While Germany has a comparatively high level of autonomy in international comparison, there are considerable dependencies in the upstream supply chain – particularly for raw materials and microelectronics.

Degree of autonomy in the procurement of raw materials, components, modules, subsystems or production technologies (company assessment)

» Source: SPECTARIS survey

Origin of goods procured for production in Germany: raw materials, components, modules, subsystems, and technologies (company assessment)



» Source: SPECTARIS survey

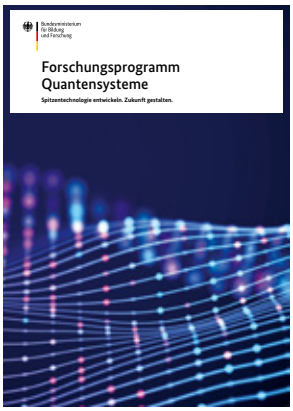
Recommended strategic measures to strengthen photonics:

- » Resilient photonics ecosystem through public funding and targeted initiatives.
- » Raw material independence via diversification and strategic sourcing.
- » Secure photonics value chain to reduce critical dependencies.
- » European strategy for key photonic materials and components.
- » Incentives for R&D and prototyping of strategic components in Europe.
- » International partnerships with trusted countries for robust supply chains.
- » Strategic R&D alliances with key industries and EU initiatives.

Current research trends in the field of photonics and quantum technologies –

„Forschungsprogramm Quantensysteme – Spitzentechnologie entwickeln. Zukunft gestalten.“ of the German Federal Ministry of Education and Research

From novel quantum computers to large scale materials processing – photonics and quantum technologies cover a wide range of applications and are indispensable for our advanced society. They are a driver of innovation in many economic and societal areas. In the research program „Forschungsprogramm Quantensysteme – Spitzentechnologie entwickeln. Zukunft gestalten.“, the German Federal Ministry of Education and Research is bringing photonics and quantum technologies together.



The program seeks to foster innovation in these technology fields in Germany and thus expand the country's competitiveness. Beyond that, it aims to safeguard Germany's and Europe's technological sovereignty in quantum systems, harnessing these technologies to unlock new opportunities for economic and societal progress.

» *www.spectaris.de/photonics-downloads*

Building a robust innovation ecosystem is crucial to this effort. While photonics has already evolved from a research domain into a thriving industry in Germany, quantum technologies still have a significant journey ahead. Specifically, this involves not only funding individual technology projects but also supporting initiatives that strengthen the ecosystem both conceptually and structurally.

The funding program implements these broader goals in concrete mission structures. To achieve the formulated goals, relevant topics will be published in funding announcements. Designed as an adaptable, learning framework, the Quantum Systems research program will span a decade, running through 2031.

A key objective of the research program is to position Germany together with its European partners at the forefront in quantum computing within the next ten years. Unlike conventional computers, quantum computers operate on fundamentally different principles, unlocking entirely new opportunities. Many of today's challenges in complex computations – such as intricate molecular simulations or optimization problems in traffic systems – push traditional computers to their breaking point. By design, quantum computers hold a distinct edge in tackling such intricate issues. Yet, building a functional quantum computer is far from straightforward: the quantum bits, or qubits, that drive these operations are far less stable than conventional bits, and current computing processes remain susceptible to errors.

Lars Unnebrink
Head of Economics and Market Research

www.vdi-tz.de

VDI Technologiezentrum

Current funding measures aim to research and implement demonstration quantum computers on different platforms such as neutral atoms, superconducting quantum bits or stored ions. At least 100 individually addressable Qbits are expected by 2026. In future measures, the scaling of the most promising platforms will be addressed based on the results achieved here. The long-term goal is to develop a universal error-corrected quantum computer that can actually solve complex computational problems.

Beyond developing hardware for quantum computing, advancing the computational capabilities of quantum computers is a key focus of this effort. The funding guideline “Application-Oriented Quantum Informatics” seeks to demonstrate tangible, practical benefits for users from quantum computing, or at the very least, to lay the groundwork for such benefits while assessing the resources needed. Key areas of exploration include the

development of analog or digital algorithms for quantum simulation, quantum machine learning, and hybrid algorithms designed for co-processing within high-performance computing ecosystems. Simultaneous progress in both hardware and software accelerates the potential for delivering direct, meaningful advantages to industrial users.

Another important goal of the funding is to support the transfer of the technological approaches out of the laboratories and into real application environments. In addition to technological performance – which is a basic requirement for future applications – it is essential to improve the practicality and economic viability of quantum systems.

This is where the funding measure “Enabling Technologies for Resilient R&D Supply Chains in Quantum Technologies” steps in. It aims to address the current limitations in device technology for quantum computers and quantum measurement systems. Furthermore, it tackles the emerging geopolitical challenges related to the access and availability of essential technological components within the German and European quantum technology ecosystem.

Photonics serves as a vital enabling technology for quantum advancements while also playing a key role within photonic quantum systems. Beyond its contributions to the quantum realm, it stands as a distinct and forward-looking technology, driving innovative solutions and products across various fields. For years, it has consistently delivered a steady flow of disruptive and new innovations, proving its reliability and versatility.

Innovative developments in photonics will continue to be pursued under dedicated funding frameworks to strengthen and enhance the global competitive edge of Germany’s photonics industry. A key trend driving this progress is the shift toward increasingly powerful, compact, and cost-efficient photonic systems, particularly through advancements in integrated optics. This evolution is essential for enabling useful applications across diverse technological domains, including sensor technology, consumer electronics, medical engineering, and automotive industries. A prime example of this integration is the development of photonic integrated circuits (PICs) – miniature components that consolidate entire optical systems, such as laser light sources, waveguides, modulators, and detectors, onto a single chip. These miniaturized systems are already proving their value in targeted applications, such as data center interfaces, LiDAR sensors in vehicles, and monitoring systems for industrial facilities. Looking ahead, they could also form the basis for optical systems for information processing.

But photonics also addresses other extremes. With high-energy laser radiation, high-energy (particle) radiation can be generated with comparatively little technical effort. This can significantly improve cost efficiency, paving the way for widespread use. High-energy radiation is needed for many applications, for example in medicine, metrology, materials research or chip production. Particle and beam sources, ranging from the terahertz (THz) to the X-ray range and including neutron beam generation, are versatile tools in science, technology, and industry.

Photonics is also an important enabler for new diagnostic and therapeutic methods in medicine. The areas of application range from in-vitro diagnostics and optical systems for minimally invasive procedures to theragnostic methods. In the future, quantum technologies will join photonic methods as a basis for customized diagnostic and therapeutic concepts.

One of the key strengths of photonics and quantum technologies lies in their ability to enable highly precise and powerful measuring instruments and sensors. Fields such as autonomous vehicles, networked production facilities, and precision medicine – cornerstones of modern high-tech societies – rely heavily on extremely accurate measurements and rapid data processing. Photonic sensors already serve as the "sensory organs" for manufacturing processes and autonomous mobility. Yet, as data volumes continue to grow, processing this information and isolating what’s truly relevant is becoming an increasingly complex task. To meet these demands, photonic and quantum sensors need to evolve beyond merely becoming smaller and more cost-effective for widespread use. Ideally, they should also play a role in data evaluation and reduction. Progress in this area opens up exciting new opportunities, not only for automation, robotics, and autonomous mobility but also for assistance systems in general.

Last but not least, a successful and productive innovation ecosystem needs the bright minds behind innovation and implementation. Photonics and quantum technologies are highly interdisciplinary topics. Know-how from physics, mathematics, chemistry, computer science and engineering need to be combined. At the same time, the different approaches of science and industry have to be brought together – concepts should become devices and products. Overall, a targeted approach to addressing young talent and recruiting them is necessary in all target and age groups, from schoolchildren and students to excellent young scientists. Specific measures are necessary to spark enthusiasm for quantum systems while also opening up promising career opportunities in the professional landscape.

For example, the “Quantum Future” funding program enables excellent young scientists to advance the transfer of knowledge from basic research to new technological and economic applications in their own junior research group. The groups are designed for long-term continuity, thus leading to sustainable research structures. At the same time, they serve as multipliers in the training of future quantum scientists. The groups cover a wide range of topics, including all areas of quantum technology and related fields.

Details of the research program and current funding measures can be found at www.quantentechnologien.de and www.photonikforschung.de.

Innovations in Photonics need Open-topic Pre-competitive Research Funding

The Joint Industrial Research Program of the German Federal Ministry for Economic Affairs and Energy

The present weakness in Germany's economic development demands strong and – most of all – open-topic incentives to trigger innovations. Only a small percentage of the photonics industrial sector will benefit from "mission-oriented" research funding. Even ingenious innovation ideas will not get funded if they take an interdisciplinary approach that does not fit in a defined mission box.

Dr. Markus Safaricz
Managing Director

www.forschung-fom.de

F.O.M.
Research Association Precision Mechanics, Optics and Medical Technology

However, optical technologies comprise so much more than quantum technology. Nowadays, photonics is one of the most important enabling technologies utilized in a particularly wide field of manufacturing processes and applications. There is probably only a small percentage of companies not using any lasers in their businesses at all. Often the next development steps of products or further improvements of product qualities can only be reached with the utilization of laser technologies.

Thus, it is utterly important, that open-topic research programs are nourished and scaled up. Particularly the most effective innovation research program involving 20-25,000 companies to active research projects each year – more than any other program – needs to be much better equipped, namely the SME-focused Joint Industrial Research Program (Industrielle Gemeinschaftsforschung, IGF) of the German Federal Ministry for Economic Affairs and Energy (BMWE).

Eligible for funding are two- to three-year projects whose aim is to assess the industrial feasibility of innovation ideas with technological risks. If the requested funding is approved, BMWE finances the entire compensable research costs, i.e. €275,000 to €750,000 for each project. The research of IGF projects is always conducted by one to three research institutions receiving hundred percent of the public funding. Industrial advisory committees are established for each project and generally comprise representatives of 10 to 20 interested companies, at least half of which have to fulfil the EU criterion for SMEs (less than 250 employees, including those of affiliated companies, and annual turnover less than €50 million). Nevertheless, participation by large companies is also well received. The industrial advisory committees generate a multiplier effect for each euro of funding. A detailed technology transfer to the companies of the industrial advisory committees during the entire project duration and a dissemination of the results after project completion with the aid of cooperating industrial associations is guaranteed by program-immanent and IGF-approved non-profit research associations.

They are the only eligible applicants for IGF-funding, bear the total project responsibility and shoulder the largest portion of the administrative burden associated with the funded project.

The Association for Research in Precision Mechanics, Optics and Medical Technology (Forschungsvereinigung Feinmechanik, Optik und Medizintechnik e. V., F.O.M.) develops innovation-oriented research ideas into eligible project proposals, together with its network partners from science and industry.

Being a cooperation partner of SPECTARIS for more than 60 years, the F.O.M. submits funding applications in the technological fields of precision mechanics, optics, metrology, sensor technology, surface functionalization, additive manufacturing, analytical and medical technology. It runs publicly funded preparatory research projects to support and strengthen the innovative potential of the mentioned industry sectors. Like all IGF research associations the F.O.M. is borne entirely by the

industry. The individual business contributions are provided as membership fees or donations on a voluntary basis, due to the association's preconditional non-profit status.

The Role of Industrial Advisory Committees of IGF research projects

The members of an industrial advisory committee of an IGF project have two major functions:

1) The company representatives are to expound the project-related interests and requirements of the industry to enable the involved academic scientists to sharpen their research plan. This is especially intended to ensure the practical relevance of the research and to increase the benefits for industry.

2) Bringing together academic and industry expertise is intended to facilitate the achievement of the project objectives and to improve the quality of the results.

There are no obligatory costs associated with membership in an industrial advisory committee, however, a small contribution is requested from each enterprise involved to collectively cover the administration costs of the IGF-research conducted by the F.O.M.

Today, the F.O.M. channels €2.0 to 2.3 million of IGF funding annually into the industry sectors supported by it and SPECTARIS. To this end, it cooperates with 25 to 30 research teams in 10 to 20 ongoing projects. In 2025, the F.O.M. will provide more than 150 different companies joining its industrial advisory committees with detailed technological know-how related to innovation ideas.

At present, the F.O.M. prepares more than 10 research proposals. The following innovation ideas form the basis of a selection of currently planned projects that are open to participation by all interested companies with their registered office in Germany or another country in the European Economic Area.

Examples of planned F.O.M. projects

SelektLas

Selective and low-damage laser removal of layer systems on optical components

Spot or surface defects in the coating of high-quality optics must be removed and the coating repaired or replaced. However, the wet-chemical removal methods used to date are often based on the use of toxic chemicals and often require complete layer removal, while mechanical methods can usually only be used on flat surfaces. The aim of the project is to develop a process for low-damage, location-optimized ablation using ultrashort pulse lasers. To this end, simulative approaches, experimental investigations and in situ measurement technology will be used to optimize parameters.

Executing research groups: Forschungsgruppe Dynamik ultraschneller selektiver Laserprozesse, Laserinstitut Hochschule Mittweida; AG Fertigungstechnik und Fertigungsautomatisierung, Ernst-Abbe-Hochschule Jena
Envisaged start of project: 07/2025; duration: 30 months; funding requested: approx. €525,000

FAMOS

Fiber endoscopic temperature sensor for harsh environmental conditions

Due to the increasing complexity and miniaturization of technical processes and devices, conventional sensor systems for temperature measurement are reaching their limits. The aim of the project is to develop innovative, precise and reliable, yet ultra-thin and flexible temperature sensors that can also be used in areas that are difficult to access and in harsh environmental conditions. The sensor concept is based on temperature-dependent light emission. Chemically inert and biocompatible material systems are to be used and the sensors are to be applied to the facet of an optical glass fiber.

Executing institutes: Institut für Quantenoptik, Leibniz Universität Hannover; Zentrum für angewandte Nanotechnologie, Fraunhofer IAP, Hamburg
Envisaged start of project: 12/2025; duration: 30 months; f unding requested: approx. €350,000

Q.Scanner

Quantum dot-based micro scanner for dynamic emission and detection of light for in vivo medical diagnostics

Fluorescence microscopy, an important imaging technique in medical diagnostics, currently requires complex and costly components that are associated with a considerable adjustment and maintenance effort. The aim of the project is to develop a cost-effective, low-maintenance and space-saving alternative that exceeds the efficiency of existing systems. To this end, a miniaturized scanning device will be created using a silicon micro actuator coated with quantum dots for light emission and detection, allowing all necessary components to be integrated on a single chip.

Executing institutes: Fraunhofer ENAS, Chemnitz; Technische Universität Chemnitz; Institut für Angewandte Physik, Friedrich-Schiller Universität Jena
Envisaged start of project: 12/2025; duration: 30 months; funding requested: approx. €750,000

Standardization – seizing global opportunities

How active participation drives innovation, market access and strategic success for companies

The economic benefit of standardization for Germany is estimated at 17 billion euros per year[1]. However, companies not only benefit from the application of standards, active participation in the standardization process is always also a strategic decision. By participating in standardization, companies can contribute their own technologies or ideas, but also help shape specifications.

» Success through standardization

Standards promote global trade and serve rationalization, quality assurance, protection of society, as well as safety and understanding. They ensure that one thing fits with another: as a market-regulating instrument for removing barriers to trade, for relieving the burden of routine tasks or for ensuring safety and health by defining the state of the art.

» Global market access and trade

Standards are the language of world trade. International standards serve as a common technical language for trading partners in the global market. For companies with worldwide operations, international standards are an important criterion for assessing the potential for a partnership with a supplier and for assuring compatibility and quality for customers .

» Innovation and standardization

Standards are a knowledge base and a catalyst for innovation. Timely standardization is crucial for the establishment of high technologies on world markets. Standardization is the instrument for implementing innovations in marketable products and services.

DIN
the German Institute for Standardization

DIN- Standards Committee for Precision Mechanics and Optics (NAFuO)
www.din.de/en

» Corporate Strategy

Successful companies influence the future framework conditions of their field of activity.
Standardization is a strategic instrument in competition. Active participation in the standardization process offers a variety of advantages:
Strategic marketing: The opportunity to successfully establish technologies and innovations on the market at an early stage.
Competitive advantage: Direct influence on the content of standards at national, European and international level.
Information advantage: Direct contacts with competitors and market partners on a neutral platform; early recognition of development trends and market opportunities as well as risk reduction in research and development activities; knowledge of the contents of future standards even before their publication.

» Help shape the future, secure markets

The development of standards is a service that DIN, the German Institute for Standardization, provides for interested parties. The technical bodies of the DIN standards committees, i.e. the experts from industry, science, testing laboratories and administration, are responsible for the content of the standards.

The process of developing a standard is transparent, democratic and based on established rules. DIN takes on the role of organizer and coordinator at the national, European and international level in this process.

» Standardization for optics and photonics

From general optical measurement methods, the representation of optical components and systems in technical drawings, the characterization of optical materials, thin layers or laser beam parameters, and even requirements and associated test procedures for entire devices such as microscopes, endoscopes, ophthalmological examination devices or electro-optical systems – the topics for standardization in the field of optics and photonics are diverse and anchored in the area of responsibility of various committees at DIN.

» How do I find the standardization projects that interest me?

The International Organization for Standardization's (ISO) Technical Committee ISO/TC 172 Optics and photonics, which is under DIN's leadership, maintains its own LinkedIn group and provides a comprehensive overview of the current activities and work results in its various fields: www.linkedin.com/groups/8910793/

In addition, the DIN Standards Committee for Precision Mechanics and Optics (NAFuO) provides brief information on published standards, drafts and projects in progress in individual topics in the field of optics and photonics on its website www.din.de/go/nafuo. Since standardization in this area is primarily international, the work of the relevant international technical committees is also included. For each topic, contact persons are indicated who are available to answer questions and to whom you can turn at any time if you are interested in getting involved.

» Interested in working with us?

DIN is always happy to welcome new dedicated members to its technical committees. The following requirements apply for participation:

- Acceptance of the rules of standardization work;
- Authorization of the member by their sending body;
- Participation in the costs of standardization work.

[1] Prof. Dr. Knut Blind, Prof. Dr. Andre Jungmittag, Dr. Axel Mangelsdorf, The macroeconomic benefits of standardization – An update of the 2000 DIN study, DIN Deutsches Institut für Normung e. V., Berlin, 2011, ISBN 978-3-410-21957-6.

The **DIN Standards Committee Optics and Precision Mechanics** and its international counterparts

DIN e. V.	European Committee for Standardization	International Organization for Standardization
National	European	International
DIN Standards Committee Optics and Precision Mechanics	**CEN/TC 79** Respiratory protective devices	**ISO/TC 150** Implants for surgery
Management of the secretariats of the listed European and international technical committees. Monitoring and national mirroring of the activities of all other European and international committees within the area of responsibility.	**CEN/TC 123** Lasers and photonics	**ISO/TC 168** Prosthetics and orthotics
	CEN/TC 170 Ophthalmic optics	**ISO/TC 170** Surgical instruments
	CEN/TC 206 Biological and clinical evaluation of medical devices	**ISO/TC 172** Optics and photonics
	CEN/TC 285 Non-active surgical implants	**ISO/TC 174** Jewellery and precious metals
		ISO/TC 194 Biological and clinical evaluation of medical devices

» Source: NAFuO

Powering progress.

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ZEISS

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Research & Development at ZEISS

“At that moment, it really became clear that our years of work had paid off. And we recognized what we could achieve by equipping surgeons with these high-tech solutions.” That’s how Philipp felt when he first saw the operation system he helped develop being used to treat cataracts. Philipp works in medical technology at ZEISS. He and his team generate innovative solutions for the diagnosis and treatment of eye diseases.

Learn more about Philipp and jobs that shape the future: **zeiss.com/career**

SPECTARIS Members in Photonics

5micron GmbH
5micron offers intelligent non-contact solutions for measurement and communication applications. Measurements are preferably based on optical or acoustic methods that detect shape disturbances on a wide range of materials and "invisible" parameters. Software algorithms analyze complex constellations of sensor inputs to drive real-time digital twins and monitoring systems. The end-to-end systems are retrofittable and modular, confirmed for aerospace or mobility, and ATEX certified.
» www.5micron.de

art photonics GmbH
art photonics GmbH stands since 1998 as a global pioneer in the development and production of specialty fiber products spanning a broad spectrum from 300nm to 16m. Renowned for its unique, cutting-edge technologies in Polycrystalline Mid InfraRed (PIR-) fibers and Metal coated fibers, art photonics excels in creating and manufacturing diverse spectroscopy probes for medical diagnostics, industrial process control, and mass production of fibers for lasers in both medical and industrial sectors
» www.artphotonics.com

asphericon GmbH
asphericon is the technology leader in the development and production of aspheric components and systems, with a particular focus on customer-specific solutions and high-quality standard elements for a wide range of applications.
» www.asphericon.com

BeamXpert GmbH
Founded in 2017 as a spin-off of the Ferdinand-Braun-Institut, BeamXpert develops and distributes its software BeamXpertDESIGNER. This easy-to-learn software simulates the propagation of laser radiation through optical systems in real time. It is tailored to the needs of laser system developers and laser users. Leading companies worldwide use it to simulate laser systems in various application fields such as materials processing, EUV generation, ophthalmology, metrology and communications.
» www.beamxpert.com

Berthold Technologies GmbH & Co. KG
Berthold Technologies is a privately held technology leader in life sciences, process control and radiation protection with sales and distribution operations worldwide. Our mission is to enable our customers to create a healthier world, a safer environment and more efficient manufacturing processes. Whether our customers are solving complex analytical challenges, accelerating life science research or ensuring the quality, authenticity and safety of their products, we are here to help.
» www.berthold.com

Robert Bosch GmbH
Bosch Quantum Sensing is a start-up of the Bosch Group, which was founded at the beginning of 2022. After more than ten years of research in quantum sensing technology at Bosch, the start-up is becoming the global leader in the commercialization of quantum sensing solutions that improve the quality of life for all people worldwide. Bosch Quantum Sensing develops magnetic field quantum sensors for a diverse range of potential application fields, such as mobility, healthcare and consumer goods. The start-up is located at Bosch's start-up hub in Ludwigsburg, Germany and is part of the Bosch Mobility Electronics division.
» www.bosch-quantumsensing.com

Coher Sense UG (haftungsbeschränkt)
Coher Sense is a small manufacturer for compact integrated optical sensors. Our partners use our 3-in-1 sensors for characterizing the center wavelength, bandwidth and intensity of narrow band sources like lasers, plasma lines or Fiber-Bragg-Gratings. We are looking for partners to provide feedback to our pre-release units, support the transformation into a real product to be launched to the general market in summer 2025. Wavelength range at the moment: 400-1100nm; resolution ~1pm.
» www.cohersense.de

Coherent Corp.
Coherent Corp. is a global leader in materials, networking, and lasers for the industrial, communications, electronics, and instrumentation markets. Coherent is focused on delivering innovations that fuel market megatrends while pursuing our mission of enabling the world to be safer, healthier, closer, and more efficient. Coherent empowers market innovators to define the future through breakthrough technologies, from materials to systems.
» www.coherent.com

CryLaS GmbH
CryLaS GmbH develops, produces and markets diode-pumped solid-state lasers in the UV, VIS and IR range for a wide variety of applications in science, research and industry (OEM use). Products of CryLas are used, for example, in biotechnology, analytics, imaging, spectroscopy, medical diagnostics and micromachining.
» www.crylas.de

CRYSTAL GmbH
Founded more than 30 years ago in Berlin, Germany, CRYSTAL is a manufacturer of optical components for applications in the VUV to IR spectral range. Our focus is on crystalline materials and we offer services from single piece to series production for a wide variety of applications in industry and science.
» www.crystal-gmbh.com

Delta Optical Thin Film A/S
Delta Optical Thin Film A/S is a privately owned manufacturer of advanced optical thin film components. We focus entirely on designing and manufacturing custom parts for our global OEM customers. Being one of the pioneers in the Optical Thin Film coating industry, we use our extensive knowledge to interact with our customers and find the right solution for their volume applications at the right price.
» www.deltaopticalthinfilm.com

Dr. Mach GmbH & Co. KG
Doctors worldwide operate, diagnose and treat patients with medical lights from Dr. Mach. No other company offers such a detailed portfolio and long experience in the production of medical lights. Dr. Mach was founded 75 years ago and is still what it always has been: a specialized family business with unique know-how, ultramodern machinery and a well-trained and skilled workforce. All the lights are designed, produced and dispatched from our headquarters near Munich in Germany.
» www.dr-mach.com

Edmund Optics GmbH
Edmund Optics® (EO) is a global leader in optical technology solutions, serving markets like Life Sciences, Industrial Inspection, and R&D since 1942. With over 1.250 employees across 18 locations, EO supports customers through its Marketplace and Advanced Manufacturing Divisions. EO Advanced Manufacturing offers custom design, prototyping, and volume production of high-quality optical components and assemblies. EO's Marketplace offers over 34,000 optics and photonics products from 40+ top brands, with immediate shipping and expert engineering support.
» www.edmundoptics.de

engionic Fiber Optics GmbH
engionic Fiber Optics GmbH designs and manufactures customized fiber optic light guide solutions and components, as well as fiber optic sensors. These customized products are used in power plant monitoring, medical technology, and industrial process monitoring, among other applications. The company pursues a holistic approach, beginning with prototype development and continuing through to series production, as well as the continuous optimization of products and manufacturing costs. Thanks to our many years of experience, we are optimally positioned to meet the needs of industrial customers who integrate fiber optic components into their complete solutions. Product traceability, quality management, and on-time delivery are part of the company's DNA.
» www.engionic-fiber-optics.de

EPIGAP OSA Photonics GmbH
EPIGAP OSA Photonics GmbH stands for excellent know-how in the field of semiconductor technology and production of LED chips with a wide wavelength range. This is complemented by the production of various SMDs for high power and standard configurations as well as THT-LEDs. The wavelength ranges from 225 to 2300 nm. Multi-chip and customized solutions alongside monolithic displays and photodiodes complete our offering. We consistently focus on the special requirements of our customers and meet their complex demands by manufacturing series in small and medium quantities.
» www.epigap-osa.de

Excelitas Noblelight GmbH
Noblelight® counts itself among the market and technology leaders worldwide for specialty light sources with wavelengths from ultraviolet to infrared for industrial, scientific, and medical applications. With operations located across Europe, Asia and the United States, Noblelight designs and manufactures ir, flash and uv emitters, systems and solutions for applications in industrial manufacturing, environmental protection, medicine and cosmetics, research, development and analytical measurement techniques.
» www.excelitas.com

ficonTEC Service GmbH
ficonTEC provides device micro-assembly and testing solutions for the photonics industry. These solutions are realized as cutting-edge, high-precision production systems utilizing advanced automation approaches, regardless of the device material and target application. Our modular system architecture is additionally scalable, so that exploratory, proof-of-process development as well as high-volume manufacturing requirements are addressable – and anything in between!
» www.ficontec.com

FISBA AG
FISBA is a global company group headquartered in Switzerland that is committed to customized solutions from concept to serial production. Our range includes microlenses as small as 0.3mm, intricate flat optics, complex optical assemblies, imaging systems, laser modules, and advanced optical coatings. In everything we do, we are dedicated to pushing the boundaries of optical technology to make visible what might otherwise remain hidden.
» www.fisba.com

FOS Inon Optics GmbH
FOS Inon Optics is an owner-managed, mid-sized company that has been producing sophisticated fiber optic cables designed to meet customer requirements for areas such as power plants, fiber optic flame detection, spectroscopy and microscopy, quality control applications, UV curing, and other lighting and laser applications.
» www.fosoptics.de

FPM Holding GmbH
FPM Holding (Freiberger Präzisionsmechanik) develops and manufactures surveying instruments that are available with multiple categories of precision, used in civil engineering, the erection of high-rise buildings, land surveying, monitoring of large buildings and structures, water dams and specific project-based measuring solutions in high-tech industries.
» www.fpm.de

Fraunhofer Institute for Applied Optics and Precision Engineering IOF
The Fraunhofer Institute for Applied Optics and Precision Engineering IOF in Jena conducts applied research in the field of photonics and develops innovative optical systems to control light – from its generation and manipulation to its application. The services offered by the institute cover the entire photonic process chain ranging from opto-mechanical and opto-electronical system design to the manufacturing of customer-specific solutions and prototypes..
» www.iof.fraunhofer.de

Fraunhofer Institute for Laser Technology ILT
With over 480 employees and more than 40 spin-offs, the Fraunhofer Institute for Laser Technology ILT in Aachen is one of the leading contract research and development institutes in its field. For more than 35 years, the Fraunhofer ILT experts have been developing and optimizing laser beam sources and laser processes for production and metrology, energy and mobility, medical and environmental technology, as well as quantum technology.
» www.ilt.fraunhofer.de

Fraunhofer Institute for Microstructure of Materials and Systems IMWS
The Fraunhofer IMWS offers microstructure-based diagnostics and technology development for innovative materials, components and systems. Building on its core competencies in high-performance microstructure analysis and microstructure-based materials design, the Institute investigates questions of functionality and application performance as well as the reliability, safety and service life of materials used in various market and business areas of major importance for social and economic development.
» www.imws.fraunhofer.de

Fraunhofer Institute for Production Technology IPT
The Fraunhofer IPT offers research and development with implementable results for production technologies – especially for networked, adaptive production. The business unit Optics bundles competences around the production of complex optical components and systems. In the Aachen Center for Optics Production ACOP scientists are conducting practical research together with industry partners in order to tackle the challenges of future optics production and make manufacturing processes more efficient.
» www.ipt.fraunhofer.de

Fraunhofer Institute for Surface Engineering and Thin Films IST
The Fraunhofer IST is an innovative partner for research and development with expertise in the associated product and production systems. In the application field of optical systems, we make use of simulation to develop production technology for the manufacturing of sophisticated optical and opto-electronic film systems. Optical measuring systems allow both the control of optical fi lm deposition and the ex-situ measurement of surfaces. We use our proprietary coating technology to manufacture optical filters.
» www.ist.fraunhofer.de

GD Optical Competence GmbH
GD Optics produces precision-molded glass optics for high-end applications. The focus is on customized solutions for a wide range of applications. From the optical design of the lens to the design of the tools, the high-precision grinding of all necessary molding tools to the molding and thin-film coating of the glass components – all production steps are carried out in-house. The molding technology allows for both the economical production of very large as well as rather small quantities.
» www.gdoptics.de

Hamamatsu Photonics Deutschland GmbH
Hamamatsu Photonics is one of the leading manufacturer of optoelectronic detectors, light sources and systems. These include photomultipliers, photodiodes, infrared detectors, highly sensitive cameras, laser diodes, discharge lamps, X-ray detectors and sources as well as special systems for semiconductor manufacturing, pharmaceutical development, environmental measurements, automotive applications, non-destructive testing and academic research.
» www.hamamatsu.de

HighFinesse GmbH
HighFinesse is a leading global manufacturer of measuring instruments for the frequency, phase noise and linewidth of lasers. Our mission is to provide innovative laser systems, precision electronics and high-precision optical measurement equipment for scientific and industrial applications.
» www.highfinesse.de

HiperScan GmbH
HiperScan is a German technology company based in Dresden and a specialist for near infrared (NIR) analysis systems. On the basis of a new microscanner technology, HiperScan develops and markets high-performance near-infrared spectrometers and analysis systems based on them.
» www.hiperscan.com

HORIBA Jobin Yvon GmbH
HORIBA Scientific, a world leader in the design and manufacture of optical components and analytical instrumentation in the fields of Material Science and Bio Life Science for laboratory analysis and quality control for research and development. These instruments and components are supporting the sustainable transformation of industries in various domains, whether it is connected to H2 economy or base material in Batteries, FuelCells, Electrolyseurs or other related topics.
» www.horiba.com

HOYA CORPORATION OPTICS SECTION Europe Branch
Hoya Optics manufactures color glass filters and coated filters of the highest quality. The focus is on the development and implementation of customer-specific solutions. From glass melting to shipping of the finished filter, we offer comprehensive service from a single source. Optical raw glass, ingots, compacts, finished lenses and prisms as well as UV light sources for the printing industry are also part of the product range.
» www.horiba.com

IMT Masken und Teilungen AG
IMT is specialized in the development and microstructuring of metallic and optical coatings on planar substrates up to size 609 mm x 812 mm. The glass components are used in life sciences, biophotonics, microfluidics as well as semiconductor industry, medical technology, sports optics, optical metrology and automotive.
» www.imtag.ch

INGENERIC GmbH
INGENERIC is a leading global supplier of micro-optics and optical components, offering the complete process chain of precision glass molding for prototyping, small-batch production and automated series production of FAC, SAC, collimation modules, beam transformation optics, MLA, aspheres and acylinders, and freeform optics. INGENERIC provides high-quality, reliable optical solutions for a wide range of industries such as laser and sensor technology, optical data communication, healthcare, and VR / AR applications.
» www.ingeneric.com

Instrument Systems GmbH
Instrument Systems offers absolutely calibrated light measurement technology and is one of the world`s leading suppliers in LED/SSL, laser/VSEL and display measurement, as well as spectro-radiometry and photometry. Main areas of R&D are spectrally enhanced 2D measurements, goni-ometric measurement of AR/VR displays, characterization of VCSELs and optical wafer testing for MicroLEDs. Target markets are consumer electronics, displays, VCSEL/laser, automotive, aerospace and lighting.
» www.instrumentsystems.com

J&M Analytik AG
Founded in 1987, J&M is an award-winning pioneer in the field of fiber-optic solutions using UV/VIS, NIR spectroscopy. Since 2016, J&M is a member of the PHARMA TEST GROUP offering innovative, reliable solutions and analytical systems made in Germany for lab and OEM customers.
The TIDAS® series of spectrometers are used with suitable accessories in the chemical, pharmaceu-tical and food industry. Innovative products are constantly developed by working closely with both customers and partners.
» www.j-m.de

JENOPTIK Optical Systems GmbH
Optical technologies are the very basis of our business with the majority of our products and services being provided to the photonics market. Our key target markets primarily include the semiconductor equipment manufacturing and electronics industry, life science and medical technology.
» www.jenoptik.com

Jüke Systemtechnik GmbH
JÜKE is experienced service provider for product development, contract manufacturing and regula-tory affairs. We work for companies in the fields of medical technology, analytical, bio and laboratory technology as well as photonics. Our experts have many years of experience with complex mecha-tronic assemblies and devices, firmware and software programming, system integration and docu-mentation according to current standards and guidelines. JÜKE is certified according to ISO 13485.
» www.jueke.de

KARL STORZ SE & Co. KG
The medical technology company KARL STORZ was founded in 1945 in Tuttlingen, Germany, and is an international leader in the world of endoscopy. Now in its third generation, the family-owned company employs 9,400 people in more than 40 countries worldwide. The company portfolio in-cludes 13,000 products for human and veterinary medicine. KARL STORZ stands for visionary design, precision craftsmanship and clinical effectiveness.
» www.karlstorz.com

Kendrion Kuhnke Automation GmbH
Kendrion develops, manufactures, and markets high-quality electromagnetic systems and complex components for a broad range of Industrial applications. We are committed to the engineering challenges of tomorrow, and take responsibility for how we source, manufacture and conduct busi-ness. Headquartered in the Netherlands and listed on the Amsterdam stock exchange, Kendrion's expertise extends across Europe, the Americas, and Asia. Created with passion and engineered with precision.
» www.kendrion.com

Laser 2000 GmbH
Since 1986, Laser 2000 has been a leading provider of solutions and distribution services in the field of photonics across Europe. Our team of experts empowers customers to unite technologies from across the entire photonics spectrum and to apply them to the industries and research of tomor-row. We maintain a global network of manufacturers of cutting-edge technologies, including both established companies and startups, and support our international partners in entering the European market.
» www.laser2000.de

Laser Components Germany GmbH
LASER COMPONENTS specializes in the development, manufacture and distribution of components and services for laser technology and optoelectronics. Founded in 1982, the company serves its customers with sales offices in five countries and a worldwide distributor network. In-house production at various locations in Germany, Canada and the USA has been pursued since 1986 and accounts for about half of sales. Currently, the family-owned company employs more than 230 worldwide.
» www.lasercomponents.com

LASERVISION GmbH & Co. KG
laservision, as one of the world's leading manufacturers of laser protection products, develops, produces and distributes standard-compliant laser protection for all laser types and laser applications worldwide.
» www.uvex-laservision.de

LASOS Lasertechnik GmbH
LASOS designs, develops and manufactures high quality gas, diode and diode-pumped solid-state lasers from the ultraviolet to the near-infrared with special focus on OEM applications in Biophotonics, Microscopy, Spectroscopy and Holography. Besides original equipment manufacturing LASOS is also a reliable partner and supplier for research and educational institutes.
» www.lasos.com

LayTec AG
LayTec provides in-situ optical metrology for thin-film processes to academia and industry. The metrology tools are used in thin-film applications, e.g. in production of LED, laser, power devices, transistors or thin-film solar cells. LayTec's integrated metrology provides access to key thin-film parameters during epitaxal growth and plasma etching. Beyond these integrated solutions, we offer wafer mapper which complement the in-situ measurements by providing uniformity analysis on wafer level.
» www.laytec.de

Leica Camera AG
Leica Camera is an international, premium manufacturer of cameras and sports optics. The legendary reputation of the Leica brand is based on a long tradition of excellent quality, German craftsmanship and German industrial design, combined with innovative technologies. An integral part of the brand's culture is the diversity of activities the company undertakes for the advancement of photography.
» www.leica-camera.com

Leica Microsystems GmbH
Leica Microsystems is one of the market leaders in the fields of microscopy, imaging, and AI-based image analysis. We reveal the invisible and empower our customers to create a better and healthier world. Together with our customers, we transform scientific discovery. We empower surgeons to take well-informed decisions in life-changing procedures. We enable users to gain insights which help answer key questions concerning development and engineering.
» www.leica-microsystems.com

LIMO GmbH – A Focuslight Company
LIMO is a part of the Focuslight Group and is one of the world's leading manufacturers of optics and beam shaping solutions and a pioneer of forward-looking photonic manufacturing processes. The company develops and produces high-precision micro-optics for diode lasers, industrial laser systems for innovative material processing, and complete optical systems for efficient production processes with linear laser beam profiles. In the field of optical components, LIMO is today one of the world's most important suppliers of cylindrical glass lenses thanks to its highly productive wafer-based manufacturing technology. The company serves international customers from a wide range of industries such as laser industry, display production, semiconductor manufacturing, automotive, metrology, plastics processing and medical technology with its pioneering optical and laser system solutions.
» www.focuslight.com

LLS Rowiak LaserLabSolutions GmbH
Solutions for laser-based and image-guided tissue and material preparation and cell manipulation - from laser based microtomy for histology, especially of hard tissues and implant-containing tissues, to damage-free trimming of tissue, e.g. pericardium, to intracellular nanodissection. The portfolio comprises laser cutting and imaging systems and related services, including customized technology and application development.
» www.lls-rowiak.de

Optics Balzers Jena GmbH
Materion Balzers Optics is a global leader in optical thin film coating solutions. We have been the preferred partner for providing innovative optical coatings and solutions for over 70 years. We custom manufacturer and supply precision optical filters and coatings from the UV through the Far IR range. As a high-tech company with 5 production sites worldwide, we focus on a variety of markets such as life science, industry, consumer, lighting, space, defense and automotive.
» www.materionbalzersoptics.com

MERSEN Deutschland Holding GmbH & Co. KG / Division optoSiC
optoSiC, a division of the MERSEN Group, develops and produces innovative laser galvo scanning mirrors as well as Fast Steering Mirrors (FSM) of the High-End Material SiC (Silicon carbide). Our products of optoSiC are one of the most important components for optical systems in order to position the laser beam in a fast, precise and reliable way, which is possible due to our high quality mirrors which are optimized by stiffness and light weight. These include ultra-high dynamic for security, sensing and targeting applications.
» www.optosic.com

Mikrop AG
Mikrop is a globally operating technology leader in the area of micro-optics. We manufacture smallest, high-quality micro-optics and micro-camera modules for use in medical devices. We support our customers in developing and building smaller, more flexible and more powerful photonic products.
» www.mikrop.com

Möller-Wedel Optical GmbH
Development, production, distribution, calibration of optical measuring and testing instruments, e.g. autocollimators, electronic autocollimators, collimators, testing telescopes, interferometers, semi- and fully automatic goniometers.
» www.moeller-wedel-optical.com

m-u-t GmbH
m-u-t is based in Wedel near Hamburg. The core competence of high-tech company lies in photonics, a combination of optics, electronics and complementary technologies for customized solutions. Main markets of m-u-t are spectroscopy, sensor technology, laboratory automation and medical technology.
» www.mut-group.com

Newport Spectra-Physics GmbH
Spectra-Physics®, Ophir® and Newport™ are brands within the MKS Instruments Photonics Solutions Division. MKS PSD solutions enhance our customers' capabilities and productivity in the semiconductor, industrial technologies, life and health sciences, research and defense markets.
» www.mksinst.com

NOBLEX E-Optics GmbH
NOBLEX E-Optics GmbH specializes in the development and production of optoelectronic consumer products in the high-performance optics sector. These include binoculars, reflex sights, riflescopes, lighting technology and thermal imaging technology for the premium segment.
» www.noblex-e-optics.com

Nova Industrial Analytics GmbH
Nova ITX presents a globally unique PHOENIX process analyzer platform. This enables in real time at-line, in-line and in-situ control of production processes. The use of spectroscopic Technologies in wavelength ranges from UV to IR enable detection various ingredients and quality-relevant product parameters. Integrated signal processing and calculation enables output of product related process parameters to the PLC/SPS. Solutions for hazardous and non-hazardous applications are available.
» www.novaitx.com

Nynomic AG
Nynomic AG is an internationally leading manufacturer of products for permanent, non-contact and non-destructive optical measurement technology. The products and services of the Nynomic Group are based on a wide range of intelligent sensors for measuring optical radiation combined with smart technologies for data acquisition, processing and evaluation. The Nynomic Group has a clear marketing concept as a full-service provider from component to solution and is globally positioned with independent brands and subsidiaries and around 550 employees.
» www.nynomic.com

OASYS GmbH
OASYS Optics and Systems is a supplier of standard and special optics for the wavelength range UV to IR including coating. Plastic lenses and Fresnel lenses as well as diamond-turned optics including aspherical lenses are part of the product portfolio.
» www.oasys-optics.de

OBERON GmbH Fiber Technologies
OBERON Fiber Technologies is one of global leading manufacturers of laser surgery fibers as well as special optic components for medical diagnostics and produces exclusively in Germany. As a certified medical device manufacturer according to ISO 13485, OBERON holds all needed certificates for the distribution in the EU, USA, Australia, Brazil as well as Israel and is continuously extending the global sales structure.
» www.oberonfiber.com

OHARA GmbH
For more than 80 years. OHARA has been regarded as one of the world's leading glass manufacturers of optical and technical components. Due to excellent product quality and service-orientation, the OHARA Group has positioned itself as a major supplier of optical glass at the top level.
» www.ohara-gmbh.com

Olympus Deutschland GmbH
Olympus Europe is the European headquarters of the Japanese Olympus Group. As a leading manufacturer of optical and digital precision technology, Olympus develops and markets innovative medical technology, digital cameras, microscopes and industrial measurement technology. The products are irreplaceable in the diagnosis, prevention and cure of diseases, they support research and development and capture the diversity of life in its most varied facets.
» www.olympus.de

Optomech GmbH
We support you in all product development and manufacturing tasks in the fields of optics, optomechanics, optoelectronics, medical technology, precision engineering and metrology. Our range of services covers the entire development process – from product definition with statement of work (SoW), through conception and design, to prototype production and series transition. We would also like to take on the series production of your components and products for you.
» www.optomech.de

OptoTech Optikmaschinen GmbH
OptoTech is part of the Schunk Group and is regarded as one of the world market leaders among optical machine manufacturers. The comprehensive product range serves all production areas from super-micro, micro and macro to plano optics and ophthalmic optics. OptoTech offers the complete production line from grinding, centering and polishing to measuring.
» www.optotech.net

OPTROVISION GmbH
OPTROVISION GmbH offers a wide range of precision optical components, from individual items to series production. We are a manufacturer, supplier, distributor for companies in the growing photonics market. Based on our 40 years of professional experience, we are the ideal partner between developers, manufacturers and end users. Fields of activity are customized optical components, processing test and sample production, consulting, engineering and project support.
» www.optrovision.de

POG Präzisionsoptik Gera GmbH
At POG Präzisionsoptik Gera, we develop and produce customized optical systems, components and microstructures for the entire spectral range. With a dedicated team of over 240 employees, we emphasize precision, flexibility and customer satisfaction. Our development expertise is central to our operations. Thanks to our own manufacturing capacities, extensive process experience and a broad, high-tech technology portfolio, we provide tailored solutions for the specific applications of our customers
» www.pog.eu

Polytec GmbH
Polytec, based in Waldbronn, Germany, supplies optical metrology for use in R&D, quality assurance and production. The product range includes optical vibration measurement, topography measurement, fiber optics, image processing components and related services. These might also include measurement services and equipment rental.
» www.polytec.de

PROTECT-Laserschutz GmbH
PROTECT-Laserschutz GmbH – your reliable and qualified partner for everything related to laser, shielding and occupational safety since 2005. Due to our many years of experience, we have in-depth knowledge of laser technology and the necessary protective equipment. As a manufacturer certified according to DIN ISO 9001:2015, we are particularly familiar with the technical and European standards (EN) as well as the legal requirements in order to guarantee you the best possible safety.
» www.protect-laserschutz.de

Qioptiq Photonics GmbH & Co. KG
Qioptiq, an Excelitas Technologies Company, designs and manufactures photonic components, assemblies and integrated systems serving the biomedical, semiconductor, consumer products, industrial manufacturing, defense, security, aerospace, and scientific markets. We offer an expanding breadth of illumination, optical and light detection technologies with the collective photonic expertise of our Axsun, Cermax, iFLEX, LINOS, OmniCure, Optem, PCO, Phoseon, Pilkington, REO, Rodenstock, and X-Cite brand heritage.
» www.excelitas.com

Reichmann Feinoptik GmbH
Reichmann Feinoptik manufactures optical components according to customer specifications, which are used worldwide in all areas of equipment manufacturing, industry and science.
» www.reichmann-feinoptik.de

REUTER TECHNOLOGIE GmbH
REUTER TECHNOLOGIE is a leading manufacturer of high and ultra-high vacuum components, specializing in development, manufacturing, vacuum brazing, and welding. Our water-cooled cooling plates and bodies, made from high-quality materials, optimize cooling in fields such as semiconductor and laser technology. With a strong focus on quality and innovation, we deliver customized, reliable, and top-tier solutions.
» www.reichmann-feinoptik.de

Richard Wolf GmbH
Richard Wolf is a mid-sized medical technology company based in Germany. It supplies a broad spectrum of products and solutions for endoscopy and extracorporeal shock-wave treatment.
» www.richard-wolf.com

Satisloh GmbH
Satisloh is a leading global supplier in the development and manufacture of machines and production solutions for the precision optics and ophthalmic industries. As a global innovation leader, we see our mission as providing world-class technology and customized services. The product portfolio includes machines for grinding, polishing, centering, coating, and edging of optical components, as well as individual software solutions and automation concepts, consumables, tools, and services.
» www.satisloh.com

SaxonQ GmbH
SaxonQ offers a diamond-based (NV-based), freely programmable quantum computer operating at room temperature, which makes it possible to perform various arithmetic operations.
Small. Mobile. Energy Efficient. We bring quantum computing to the desktop.
» www.saxonq.com

Schäfter+Kirchhoff GmbH
Schäfter+Kirchhoff was founded almost 70 years ago. Today's product lines include polarization-maintaining fiber optics, lasers for machine vision as well as line scan cameras and scanner systems. The focus is set on the winning combination of high optical and mechanical precision. Our high-quality optical products are developed, manufactured and shipped to customers all over the world from our headquarters in Hamburg, Germany.
» www.sukhamburg.com

Schmidt & Bender GmbH & Co. KG
The company Schmidt & Bender was founded in 1957 by Helmut Schmidt and Helmut Bender in Biebertal-Fellingshausen. What once began in a laundry room with the most modest of means developed within a few years into one of the world's leading manufacturers of precision riflescopes for hunting, competition shooting, police and military.
» www.schmidtundbender.de

Jos. Schneider Optische Werke GmbH
The Schneider Group specializes in the development and production of high-performance lenses, filters and components for industry, movie production and photography. Our core competencies in the field of industrial optics include optical and mechanical, hard-coated filters, advanced optical manufacturing as well as development and production of optical systems.
» www.schneiderkreuznach.com

SCHOTT AG
SCHOTT Advanced Optics, with its deep technological expertise, is a valuable partner for its customers in developing products and customized solutions for applications in optics, lithography, astronomy and space, opto-electronics, augmented reality, life sciences, and research. With a product portfolio of more than 120 optical glasses, special materials and components, we master the value chain from customized glass development to high-precision optical product finishing and metrology.
» www.schott.com

Sensortherm GmbH
Sensortherm, based in Steinbach am Taunus, has been developing, producing, and selling high-precision infrared measuring devices for non-contact temperature measurement in virtually all industries worldwide for over 30 years. Complementary products such as pyrometer-optimized PID program controllers, temperature line scanners, and calibration systems are opening up additional demanding markets.
» www.schott.com

Shimadzu Europa GmbH
The types of optical devices offered by Shimadzu are wide-ranging, and include not only high precision optical devices essential for spectroscopic techniques, such as diffraction gratings, aspherical mirrors, special lenses and polarizers, but also extend to optical instruments such as compact spectroscopes. Having accumulated technological expertise over many years in all aspects of spectroscopic techniques, Shimadzu responds to the customer's requests and answer them rapidly.
» www.shimadzu.eu

Sill Optics GmbH
Sill Optics is a leading specialist in precision optics. We have established ourselves internationally as a premier provider of custom solutions and standard products. We are recognized for our quality, innovation, and customer service.
» www.silloptics.de

SWAROTEC by Swarovski Optik KG
SWAROTEC, a division of SWAROVSKI OPTIK, produces customer specific industrial applications in the field of optics. SWAROVSKI OPTIK is a global leader of renowned heritage based in Austria. Since 1949 long-range optic devices of highest quality are produced in Absam, Tyrol, setting new standards for nature observation and hunting.
» www.swarotec.com

SwissOptic AG
SwissOptic is a company of the JENOPTIK Group and stands for globally recognized quality and the highest precision in the world of optics. SwissOptic develops and produces a broad range of coated precision-optical components, assemblies and systems – from concept to volume production.
» www.swissoptic.com

tec5 AG Sensorik und Systemtechnik
tec5 develops and manufactures industrial-grade spectrometer systems and components for process analytics. Our clients appreciate the contribution we thereby accomplish to optimize both their products and process. Our technology is used in countless production processes around the world. We are well-versed in the real-world management of industry- or application-specific requirements, thereby setting new benchmarks in the adaption of our established portfolio to the individual needs of our OEM partners and users.
» www.tec5.com

TOPTICA Photonics AG
Founded in 1998 near Munich (Germany), TOPTICA became one of the leading laser photonics companies by aiming for and consistently delivering products with high-end specifications. TOPTICA develops and manufactures laser systems for scientific and industrial applications. The portfolio includes (tunable) diode lasers, ultrafast fiber lasers, terahertz systems and optical frequency combs. TOPTICA today has 490 employees in 6 commercial entities with a consolidated group revenue of 130 Mio €.
» www.toptica.com

Eagleyard Photonics GmbH
TOPTICA EAGLEYARD is a global leading provider of high-power laser diodes with wavelengths from 630 nm – 1120 nm based on GaAs (Gallium Arsenide). Their products combine maximum power, great durability and excellent beam quality – a perfect match for high-end applications in life-science, quantum technologies, space and industry. Their unique products are clustered into five different product families sorted by chip design that differentiate themselves by power and beam quality among other features. A key focus is the transformation of research-based know-how into market-ready products especially for highly integrated components.
» www.toptica-eagleyard.com

TOPTICA Projects GmbH
TOPTICA Projects, a subsidiary of TOPTICA Photonics, was founded in 2016. TOPTICA Projects focuses on customized laser solutions, innovation and technology development. This includes all activities related to the award-winning sodium guide star lasers used worldwide by several major astronomy facilities and recently selected for ESO's next generation Extremely Large Telescope (ELT).
» www.toptica-projects.com

VITRON Spezialwerkstoffe GmbH
Development, Production, Application and Sale of products and equipment, primarily vitreous and crystalline materials, components, as well as the provision of scientific and technical consulting services. Optical materials for infrared technology like CVD ZnS and Chalcogenide Glasses; Machinable Glass-Ceramics for technical and medical applications; Small crucible glass melting on customer order.
» www.vitron.de

Volpi Group
At Volpi, we are experts in the emission transmission and detection of light to create insights. With the goal of improving patients' lives, we deliver innovative solutions that enhance the performance of diagnostic instruments, so healthcare professionals can better research and diagnose diseases and make more informed treatment decisions.
» www.volpi-group.com

WILD Holding GmbH
The WILD Group is a leading contract developer and -manufacturer and technology partner for customers in optical technologies as well as industrial- and medical-technology sectors. WILD is in demand when precision is required and innovations take place for opto-mechatronic products. International market leaders and start-ups appreciate the know-how combination of optics, precision mechanics, electronics, software, and plastics technology. More than 500 employees work at four locations in Austria and Slovakia.
» www.wild.at

Carl Zeiss AG
ZEISS is an internationally leading technology enterprise operating in the fields of optics and optoelectronics. In the previous fiscal year, the ZEISS Group generated annual revenue totaling 10 billion euros (prior year: 8.8 billion euros, up 15%) in its four segments Semiconductor Manufacturing Technology, Industrial Quality & Research, Medical Technology and Consumer Markets (status: 30 September 2023). Expenditure in research and development amounted to 15% of revenue.
» www.zeiss.com

Product Groups

The top-selling product fields of the SPECTARIS members in photonics.

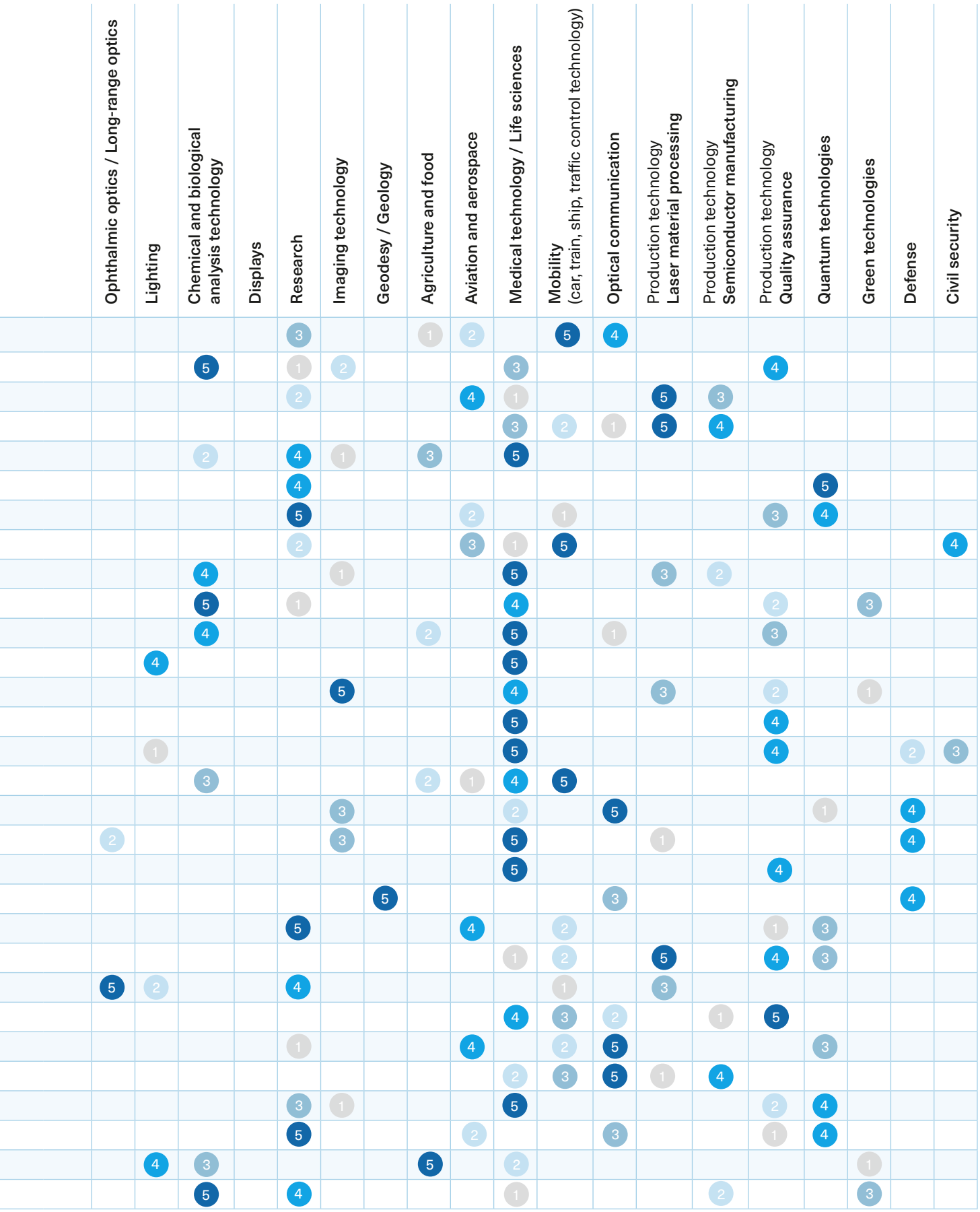
5 4 3 2 1

IMPORTANCE
most important (5) > less important (1)

	Lighting (LED, OLED, special lights)	**Imaging systems** (cameras, lenses, image processing, microscopes, endoscopes)	**Development and consulting as a service**	**Integrated photonic circuits, MEMS**	**Laser technology** (lasers, systems, laser protection)	**Optical materials** (components, coatings, systems)	**Optical fibers** (components, systems)	**Optical metrology** (sensors, measuring and test systems)	**Production and assembly systems for photonics companies**	**Software**
5micron	1	3	2					5		4
art photonics			2		3		5	4		
asphericon		1	3		4	5			2	
BeamXpert										5
Berthold		1	4			2		5		3
Bosch Quantum Sensing					4			5		3
Coher Sense			3		4		2	5	1	
Coherent				1	4	5	3		2	
CryLaS					5					
Crystal						5				
Delta Optical Thin Film						5				
Dr. Mach	5	4								
Edmund Optics		4			1	5		2	3	
engionic Fiber Optics							5	4		
EPIGAP OSA	5									
Excelitas	5		2		3				4	
ficonTEC			2		1		3	4	5	
FISBA		4	1		2	5			3	
FOS Inon Optics							5	4		
FPM Holding					4			3	5	2
Fraunhofer IOF		2	1		4	5	3			
Fraunhofer ILT			4		5			2	3	1
Fraunhofer IMWS	3	4	5		1	2				
Fraunhofer IPT		2		1		5		3	4	
Fraunhofer IST			1			2		3	5	4
GD Optics		4				5	3			
Hamamatsu Photonics		4		2	3	5	1			
HighFinesse			3		4		2	5	1	
HiperScan		5		4				3	1	2
HORIBA Scientific						4		5		

Fields of Application

The top-selling application fields of the SPECTARIS members in photonics.



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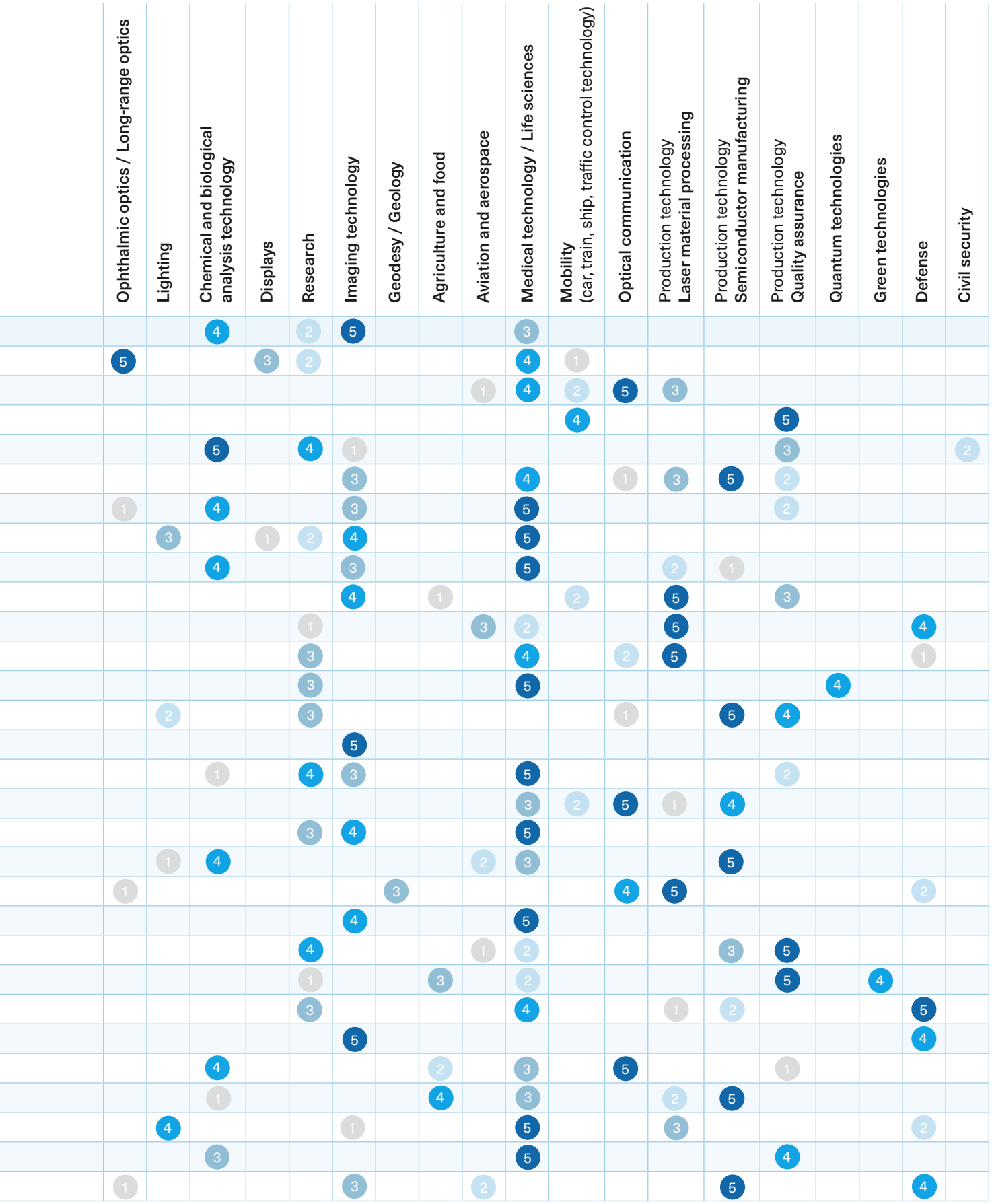
HOYA Optics Europe						5				
IMT Masken und Teilungen						5				
INGENERIC		4			3	5				
Instrument Systems		4	2					5		3
J&M			2				1	5	4	3
JENOPTIK		4			2	5		3	1	
JÜKE		3	4	5		1		2		
KARL STORZ	4	5								3
Kendrion			4		5					
Laser 2000		3	5		4		1	2		
LASER COMPONENTS			1		5	4	2	3		
laservision			3		5	4				2
LASOS					5		4			
LayTec					1	4	2	5		3
Leica Camera		5								
Leica Microsystems		5	2			1		3		4
LIMO		3			4	5				
LLS		5	4		3				1	2
Materion Balzers Optics						5				
MERSEN / optoSiC						5				
Mikrop		5	3			4			2	
Möller-Wedel Optical			4			3		5		
m-u-t								5		
Newport Spectra-Physics		5			1	2		3	4	
NOBLEX E-Optics		5				4				
Nova ITX			4				5	2	1	3
Nynomic	4			2			3	5		1
OASYS	4	3			2	1			5	
OBERON							5			
OHARA	1	5			4		2	3		

Fields of Application

The top-selling application fields of the SPECTARIS members in photonics.



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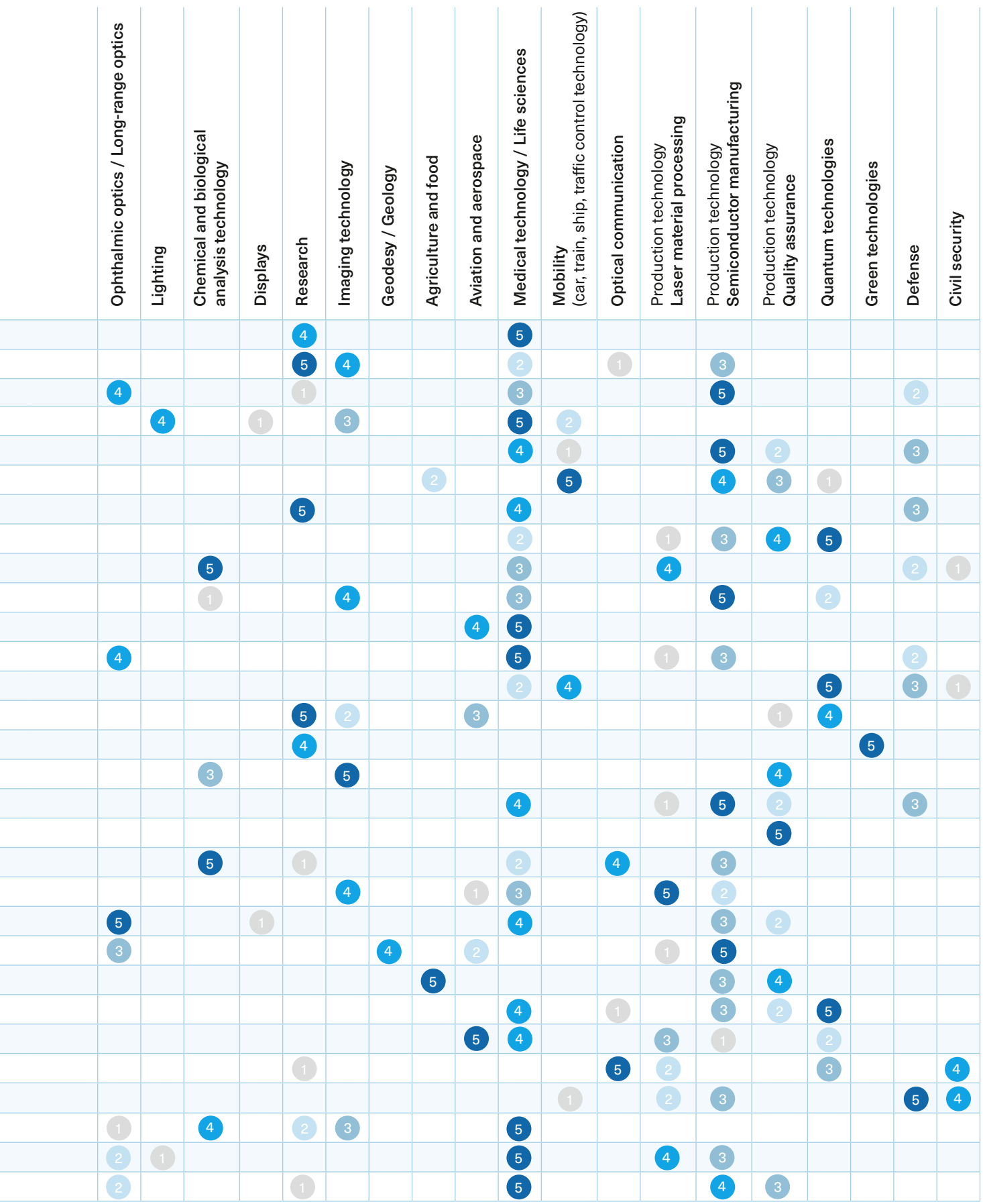
Olympus		5						4		
Optomech		3	5		1			2	4	
OptoTech								4	5	
OPTROVISION		3	2			5			4	
POG	2		4			5	1	3		
Polytec			1		2		4	5	3	
PROTECT-Laserschutz			4		5					
Qioptiq	2	3			1	5		4		
Reichmann Feinoptik		4				5			3	
REUTER									5	
Richard Wolf		5				4				
Satisloh		4	1			2			5	3
SaxonQ		5		3				4		2
Schäfter+Kirchhoff		2			3		5	4		1
Schmidt & Bender	4				5					
Schneider-Kreuznach		5				4				
SCHOTT	3	4			2	5		1		
Sensortherm								5		
Shimadzu		2			3	5		4		
Sill Optics		4	3		2	5			1	
SWAROTEC	2	5	3			4		1		
SwissOptic	2	5				3		1	4	
tec5								5		
TOPTICA					5					
TOPTICA EAGLEYARD					5					
TOPTICA Projects					5	4	3	2	1	
VITRON		4	2	1	3	5				
Volpi			4				3	5	2	1
WILD	1	2	3		4			5		
ZEISS Group		5				2		3	4	1

Fields of Application

The top-selling application fields of the SPECTARIS members in photonics.



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