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Press Release

Photonics

Key technology in climate and environmental protection

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- **Sustainable high-tech solutions at LASER World of PHOTONICS 2023**
- **Photonic technologies are an enabler for decarbonization**
- **Concrete solutions for many industries**

Photonic processes are already unlocking their great potential for climate and environmental protection. Whether it's photovoltaics or LED lighting, single-origin recycling or camera-based inspection for fully automated and error-free production: Wherever light is used as a tool, efficiency increases and the impact on the environment shrinks. This far from covers the full potential of photonics. Lasers drive nuclear fusion, battery and fuel cell production, precision farming in agriculture and other solutions for the post-fossil future. The leading providers of sustainable, high-tech solutions will meet at LASER World of PHOTONICS in Munich from June 27 to 30, 2023.

“Breakthrough in nuclear fusion!” This announcement from the Lawrence Livermore National Laboratory spread around the world like wildfire in December 2022. There, for the first time, a research team created an energy surplus by fusing a pair of hydrogen isotopes. The most important tool they used to achieve this technological milestone was UV light from the world's largest and most powerful laser system, assembled from thousands of special optics. If the fusion process is able to make it out of the high-end lab and into automated fusion reactors, humanity would have access to nearly unlimited emission-free energy.

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Photonics offer a great variety of “enabling technologies”

Without a doubt, photonics plays a key role on the path to the post-fossil era. If companies, authorities and private households take climate protection measures today, LED lighting and photovoltaic systems are among the first steps. Likewise, photonic measuring and manufacturing processes are needed to build and operate ever larger and more powerful wind power plants. LiDAR (Light Detection and Ranging) sensors show wind potentials and make wind forecasts more accurate, from reconnaissance satellites and from the earth. And when it comes to storing green energy, lasers and optical measuring methods are also among the key technologies. Whether it's in battery production for electric vehicles and stationary storage or in the production of bipolar plates for fuel cells and electrolyzers that convert green energy into hydrogen.

Light as a tool is needed because it can weld, drill, cut, structure and remove material contactlessly, flexibly and extremely quickly. When it comes to heat-sensitive materials, ultra-short pulse lasers ensure “cold” processes. Optical measurement technology also uses the advantages of light to achieve accuracies in the sub-nanometer range. This makes it an enabler in the efficiency revolution occurring in the semiconductor industry and in research centers, which are increasingly succeeding in decoupling energy consumption from exponentially increasing computing power and data volumes. The latest processors with conducting paths in the single-digit nanometer range and PICs (photonic integrated circuits) are only possible thanks to laser technology and optical measuring methods; they are driving progress in efficiency, as optical data transfer and signal processing minimizes heat losses and cooling requirements.

Error-free manufacturing – resource-saving agriculture

In a joint [study](#), the German industry association SPECTARIS and Messe München looked into the sustainability potential of photonics. In the areas considered alone, which at best only hint at the potential of photonics for climate and environmental protection, the CO₂ savings potential adds up to

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around three billion tons by 2030. The spectrum ranges from the early detection of forest fires to laser-based spectroscopic identification of metals and plastics in waste recycling, to optical communication in 5G mobile communications networks or energy-efficient displays. The variety of photonic solutions is as large as their leverage. Inspection systems that monitor camera-based production processes minimize the production of rejects, which saves energy and resources. And sensors enable farmers to determine precisely where on their fields seeds are not coming up, where grains are withering or weeds are growing, and to document acreage yields punctually at the harvest. This helps to precisely dose expensive fertilizers exactly and combat weeds in a targeted way. In the future, robots equipped with lasers will do the latter by killing the weeds with light pulses. Hanover laser researchers are working to make this vision a reality and to enable farmers in future to do away with pesticides.

Leading players will meet at LASER World of PHOTONICS

From laser production to measuring technology, sensors to efficient display and lighting technology – the leading players will come together on the Munich exhibition grounds from June 27 to 30, 2023. There, LASER World of PHOTONICS, the world's leading trade fair for the laser and photonics industry, will take place together with the second edition of the quantum technology platform World of QUANTUM and the World of Photonics Congress (June 25 to 30, 2023). At its five sub-conferences with around 3,000 lectures, several thousand scientists from all over the world will discuss the latest research findings and application-oriented developments for the photonic future. That is not all: for the first time automatica, the leading trade fair for intelligent automation and robotics, will also take place at the same time. The synergies are obvious: in automated processes light as a tool can make the best use of its precision and its green potential.

You can find this press release including images for download at [LASER newsroom](#). Further topics and interviews about photonics can also be found in the [photonics industry portal](#).

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About the LASER World of PHOTONICS

The LASER World of PHOTONICS is the world's leading platform for the laser and photonics industry. Europe's largest World of Photonics Congress is part of the trade fair. The program comprises a number of scientific conferences held by globally leading organizations. In addition, Messe München offers practical presentations on photonics applications ("Application panels"). The LASER World of PHOTONICS has been held every two years since 1973; the next edition will be held from June 27 to 30, 2023, in Munich, the next World of Photonics Congress parallelly from June 25 to 30, 2023 at the ICM - Internationales Congress Center München.

world-of-photonics.com/en

About the global network of LASER World of PHOTONICS

The LASER World of PHOTONICS has established an international network. The LASER World of PHOTONICS CHINA and the LASER World of PHOTONICS INDIA are regional leading trade fairs for lasers and optical technologies, and are organized annually in China (Shanghai) and India (switching between Bengaluru, Mumbai and New Delhi) respectively. With the trade fairs in Munich, China and India, Messe München is the world's leading trade fair organizer for lasers and photonics.

About Messe München

Messe München is one of the leading exhibition organizers worldwide with more than 50 of its own trade shows for capital goods, consumer goods and new technologies. Every year, a total of over 50,000 exhibitors and around three million visitors take part in more than 200 events at the exhibition center in Munich, at the ICM – Internationales Congress Center München, the Conference Center Nord and the MOC Veranstaltungszentrum München as well as abroad. Together with its subsidiary companies, Messe München organizes trade shows in China, India, Brazil, South Africa and Turkey. With a network of associated companies in Europe, Asia, Africa and South America as well as around 70 representations abroad for over 100 countries, Messe München has a global presence.