

Munich, December 3, 2020

Press Release

LASER World of PHOTONICS 2021

A trade fair platform for quantum technology

- “World of QUANTUM” specialist area reflects the dynamic development of quantum technology
- LASER World of PHOTONICS 2021 offers a new platform for specialist exchange and networking for key players

Quantum technology opens up new dimensions. Imaging, sensors, communication or computing: Wherever quantum physical phenomena can be translated into products and applications, their precision and performance push the limits of imagination. Photonics often act as an enabler. Governments all over the world recognize the potential of the technology and are pouring billions into research programs. With its new “World of QUANTUM” specialist area and a specifically expanded directory of products and exhibitors, the LASER World of PHOTONICS is seizing this development. From June 21 to 24, 2021, it will offer exhibitors a platform to present their quantum-based systems and enabling solutions from the field of photonics. The accompanying specialist presentations and networking area also offer the opportunity to learn about the leading actors in quantum technology firsthand and establish important contacts.

Quantum technology is literally setting standards. In the future, a new, optical single-ion clock will contribute to Coordinated Universal Time (UTC). This ultra-precise clock based on a single, laser-cooled ytterbium ion caught in an ion trap is so precise that, measured against the age of the universe, it deviates by only one second. This precision can help to navigate satellites, synchronize data networks for faster operation or establish space-based exploration of gravitational waves.

Fascination – worth billions

In another application, a French high-tech start-up is using a quantum gravimeter to measure gravity fields at the Etna volcano in Sicily. The long-term measurements, with a resolution of a billionth of the Earth’s gravitational acceleration, are to serve as the basis for an early warning system for eruptions. Similar to Isaac Newton’s historic experiment, instead of an apple the team is letting laser-cooled

Stephanie Bender
PR Manager
Tel. +49 89 949-21415
Stephanie.Bender@messe-
muenchen.de

Messe München GmbH
Messegelände
81823 München
Germany
messe-muenchen.de



Press Release | December 3, 2020 | 2/2

atoms fall in a vacuum chamber in order to determine the gravitational forces at work with minimal lateral acceleration.

From ultra-precise sensors and measurement technology to innovative imaging that makes the invisible visible based on the phenomenon of entangled photons, and the intrinsically secure quantum communication that physically encrypts data packets with entangled photon pairs: Quantum technology amazes novices and experts alike. Einstein himself talked about “spooky” phenomena. Meanwhile, more and more companies and governments around the world are recognizing the technology’s game-changing potential. Large-scale research programs such as the EU’s “Quantum Flagship” initiative, the National Quantum Initiative Act in the U.S. and similar programs in China, Russia, South Korea, Japan, Israel and several countries in the EU are putting billions towards the quantum technological leap. Germany alone is investing €650 million in “shaping the second quantum revolution.”

Quantum technology at the LASER World of PHOTONICS 2021

The LASER World of PHOTONICS 2021 is seizing this sense of excitement and offering international players from industry and research the “**World of QUANTUM**” **specialist area**, a new platform for presenting their solutions, networking and specialist exchange. “We have also specifically expanded our directory of products and exhibitors to orient providers and users in the dynamically growing range of quantum technological systems and their key photonics components,” explains Anke Odouli, Exhibition Director of the LASER World of PHOTONICS. For these plans, her team drew upon the advice of leading users, suppliers and scientists from various areas of quantum technology.

One of those is Dr. Wilhelm Kaenders, joint founder and director of TOPTICA Photonics AG. Since its foundation in 1998, TOPTICA has specialized in the development of the ultra-precise diode lasers that are considered the key components in commercially viable quantum systems. Over the years, mode-locked fiber lasers, wavelength and mode measurement technology, optical frequency combs and their integration in laser solutions have emerged. “We are currently experiencing a technological leap that can be just as important for complex space travel missions as it already is for the definition of physical constants,” he explains. The International Prototype of the Kilogram in Paris was recently replaced with the definition of the quantum metrically determined weight of a specified number of silicon atoms. This resulted in a weight measurement that applies anywhere in the universe. The same goes for time and frequency measurements. Quantum mechanics are the key to highly precise and objective measurement methods that could become a driver of innovation in many industries, right up to highly complex simulations in the financial sector.

Press Release | December 3, 2020 | 3/3

With an eye to the “World of QUANTUM” in June, Dr. Kaenders is hoping for even closer contacts to users and system integrators. “There are leading providers of key quantum photonics technologies in Germany and Europe. But so far, there is a lack of system integrators that assemble photonic building blocks into quantum mechanical system solutions,” he says. The European Flagship initiative and the national programs are the first step towards changing this. “It’s now a matter of fleshing out our approach. A platform bringing together important actors in the community is very helpful in this regard,” says Dr. Kaenders.

Seizing opportunities to expand the portfolio

Dr. Peter Soldan is head of the Quantum Systems Division at the VDI Technology Center, one of the leading project management agencies of the German Federal Ministry of Education and Research. Hence, he has deep insight into the current state funding. In Germany, most of the money is currently flowing to research institutions, which are using it to build up institutes and research infrastructure and to advance their international networking. “In addition, there are project-related calls in the application fields of computer science, sensor technology, imaging and communications, for which we are registering great demand,” he reports. The federal government recently provided a further €300 million to advance the complex topic of quantum computing. In all funding calls, there has been encouraging feedback from industrial users, including automotive and chemical companies. “But yet, there is a lack of system integrators with a large-scale industrial perspective,” Dr. Soldan concedes. Therefore, the funding strategy aims to establish an ecosystem in which more and more start-ups position themselves as system integrators and use the wide range of photonic enabler technologies in Germany and Europe. There are already some promising spin-offs from universities and research institutes.

Dr. Soldan is one of those experts who advise Messe München with regard to the “World of QUANTUM.” “The LASER World of PHOTONICS is the right setting for such a platform,” he says. On the one hand, many LASER exhibitors are active in the photonics area of quantum technology and now have the opportunity to expand their portfolios and generate new business in this up-and-coming field of technology. On the other hand, non-photonic players in quantum technology also lack a trade show platform where they can network with users and suppliers. “This opens up a new business field for exhibitors and an opportunity for Messe München,” the expert assumes.

From science fiction to science fact: quantum computing

As a technology pioneer from the very beginning, IBM is driving the development of quantum computers. In 2016, the company became the world’s first provider

Press Release | December 3, 2020 | 4/4

to make a 5-qubit quantum computer publicly available via the cloud; today, over 130 organizations belong to the IBM Q Network - and more than 20 systems, including one with 65 qubits, are available now. By 2023, according to the IBM Quantum Roadmap, this figure is expected to exceed 1,000 qubits. For Dr. Walter Riess, head of the Quantum Technology department at IBM Research in Zurich, the main focus is on exploiting the potential and significance of quantum computing for the future competitiveness of Germany as an industrial location and for Europe. This is why quantum computers are not only being made accessible to everyone via the cloud, but also to important partners. In the spring of 2021, the Fraunhofer-Gesellschaft will put the "IBM Q System One" into operation, the first system of its kind in Europe.

Despite great progress, there are still challenges to be overcome in quantum computing. In contrast to conventional computing systems, system performance does not depend solely on the number of "qubits;" more important is the quantum volume, which measures qubit interconnection, the temporal availability of the quantum state for computing operations, error rates of the operations and the speed with which logical operations can be performed in the quantum state. "Technological development is making excellent progress," says Dr. Riess. Therefore, he is very optimistic about the future despite some hurdles that still have to be overcome.

"For us, it is crucial to tackle relevant and industry-specific problems together with our partners and to develop appropriate solutions, including algorithms," he says. Europe, with its broad scientific base and highly innovative industry, is important for this. This is also because there are numerous photonics players here, whose products are relevant for quantum technology as a whole as well as for sub-areas of quantum computing. "This applies to the optically based ion trap systems on the market as well as to our superconductor-based approach," says Dr. Riess. Photonics is not only of central importance for information processing, he says, but in the future also for optical information transmission under quantum computers. He is therefore looking forward to the "World of QUANTUM" in the course of LASER World of PHOTONICS - and the opportunity to make new, exciting contacts there.

The next LASER World of PHOTONICS will be held from June 21 to 24, 2021 at the Messe München Exhibition Center, and the next World of Photonics Congress from June 20 to 24, 2021

Press Release | December 3, 2020 | 5/5

About 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 will be taking place in parallel with the trade fair. The program comprises a variety of scientific conferences of leading global organizations. Supplementing this Messe München GmbH will be offering practical lectures on the applications of photonics ("Application Panels"). In 2019 the trade fair set an exhibitor record with 1,325 exhibitors from 40 countries. More than 33,999 trade visitors from 82 countries entered the Messe München site. The World of Photonics Congress registered around 4,675 participants, with around 3,600 lectures and presentations including poster presentations on offer. The LASER World of PHOTONICS has been organized by Messe München International every two years since 1973; the next event will take place in Munich from June 21–24, 2021, the next World of Photonics Congress will take place in parallel from June 20–24, 2021 in the ICM -International Congress Center Munich. www.world-of-photonics.com

About the LASER World of PHOTONICS global network

The LASER World of PHOTONICS has developed an international trade fair network. The LASER World of PHOTONICS in Munich is the world's leading laser and photonics trade fair and as the innovation pacemaker is where the global photonics industry gathers every two years. The LASER World of PHOTONICS CHINA and the LASER World of PHOTONICS INDIA are leading regional trade fairs for laser and optical technologies and are staged annually in China (Shanghai) and in India (alternating between Bengaluru, Mumbai, Bangalore and New Delhi). With these trade fairs in Munich, China and India, Messe München is the world's leading trade fair organizer for lasers and photonics.

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 and the MOC Veranstaltungszentrum München as well as abroad. Together with its subsidiary companies, Messe München organizes trade shows in China, India, Brazil, Russia, Turkey, South Africa, Nigeria, Vietnam and Iran. 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