TOPTICA Wins 2026 Prism Award

SPIE honors TOPTICLOCK – a groundbreaking optical quantum clock – for unmatched precision and commercial usability

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TOPTICA Photonics is proud to announce that its latest innovation, TOPTICLOCK, has been awarded the 2026 SPIE Prism Award. The award in the Quantum Tech category was presented during a ceremony at Photonics West 2026 in San Francisco, recognizing outstanding achievements in photonics innovation.

World's First Commercial Optical Quantum Clock Using a Single Trapped Yb^+ Ion / TOPTICA

TOPTICLOCK is the first fully integrated, commercially available optical quantum clock based on a laser-cooled, single trapped Yb^+ ion. Housed in two robust 19" industrial rack units, it delivers a new benchmark in transportable frequency standards with relative frequency instability and accuracy at the 10^{-17} level. Designed for remote operation, it provides a stable optical frequency standard output at 871 nm, enabling seamless integration with optical frequency combs to realize rf or pulse per second outputs for timekeeping and advanced synchronization.

"The transition from scientific instruments to be operated by expert personnel in academic laboratories into an industrial product for real-world environments has long been a goal for optical quantum clocks," said Dr. Wilhelm Kaenders, President and founder of TOPTICA. "With TOPTICLOCK, we are closing this gap – making the world's most precise commercial time and frequency reference. We have already deployed

About TOPTICA

TOPTICA has been developing, producing, and marketing high-end lasers and laser systems for science, research, and industry for over 25 years. The portfolio includes tunable diode lasers, ultrafast fiber lasers, terahertz systems, and optical frequency combs.
Worldwide, TOPTICA has 600 employees, organized in seven business entities with a consolidated group revenue of more than €140 million.

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first units at customer sites for high-end applications in navigation, metrology, and fundamental science."

"We thank all people at TOPTICA who have been contributing to master this challenging endeavor and are grateful for the of the ongoing support from German national metrology institute PTB. A special thanks goes to our first lead customer for his trust in our capabilities to build the first version of TOPTICLOCK and the German ministry of science, technology and space (formerly named ministry for education and research) and the collaboration partners for funding and working on a predecessor research project "opticlock", in which a first demonstrator of a single Yb+ ion clock was successfully realized." adds Dr. Jürgen Stuhler, Vice President of Quantum Technologies and former coordinator of opticlock.

Unlike microwave-based cesium or optical rubidium clocks, TOPTICLOCK significantly outperforms hydrogen masers and other commercial frequency standards in both stability and accuracy. It was developed as a turnkey solution for users who demand cutting-edge performance without needing deep quantum technology expertise – combining push-button operation, auto-calibration, and user-definable sequences.

Applications include:

- National and international time services (UTC) and contributions to TAI (Temps Atomique International)
- Network synchronization and long-term holdover in GNSS-denied environments (Global Navigation Satellite System)
- Satellite navigation and space-based infrastructure
- Fundamental quantum metrology and highest precision physics

TOPTICLOCK marks TOPTICA's first complete commercial quantum technology solution, building on the company's 30 years of expertise in narrow linewidth laser systems and optical frequency control.

About TOPTICA
TOPTICA has been developing, manufacturing, and marketing high-end laser systems for scientific and industrial applications for over 25 years. Its product portfolio includes tunable diode lasers, ultrafast fiber lasers, terahertz systems, and optical frequency combs. TOPTICA employs over 600 people worldwide across seven business units and achieved a consolidated group revenue of more than €140 million.

Learn more about TOPTICLOCK: www.toptica.com/TOPTICLOCK