

Solutions for

QUANTUM TECHNOLOGIES

exail



**Exail, a European
leader in photonics
and quantum
technologies**

With over a decade of pioneering work in quantum technologies, Exail transforms complex optical setups into compact, reliable systems ready for real-world deployment. From gravity sensing and quantum communication to quantum computing, Exail masters the complete value chain—developing specialty components, integrated laser systems, and optical sub-systems tailored to the most demanding quantum platforms. Whether working with photons, neutral atoms, trapped ions, or NV centers, our technologies support precision functions such as atom cooling, frequency stabilization, and entanglement distribution. Trusted by both researchers and industry, Exail's solutions are engineered for long-term stability, scalability, and performance, even in the harshest environments.



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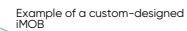
Your challenge, our dedicated and custom solutions.

Visit our website to learn more about our products, technology and applications.



Our sales and technical team is ready to assist you. For any request, feel free to contact us:
contact.photonics@exail.com

At the heart of the success of Exail's solutions for quantum technologies, there is the Intelligent Laser System (ILS). It integrates a range of in-house components and sub-systems (iMOB), offering innovative and reliable solutions for the most challenging quantum technology platforms.



MASTERING A COMPLETE VALUE CHAIN FOR QUANTUM TECHNOLOGIES

Exail's optical components, sub-systems and integrated lasers enable to develop mature applications in the fields of quantum sensing, quantum communication, quantum computing and quantum simulation.

Laser systems

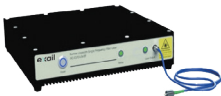
Intelligent Laser systems (ILS) Series



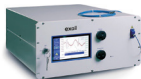
ILS

Integrated laser

Ultra-Stable Master Laser (USML) Series



Narrow linewidth single frequency fiber laser



USML

Sub-systems

iMOB Series and modulator unit



iMOB



ModBox

Components

Fibers, modulation solutions



Doped and polarizing optical fibers



LiNbO₃ and PPLN



Hybrid coherent demodulator

FIELD-PROVEN SOLUTIONS COVERING A WIDE RANGE OF QUANTUM APPLICATIONS, FROM THE DEEP SEA TO OUTER SPACE

A flagship instrument for quantum sensing

The Quantum Sensors division of Exail (formerly Muquans), founded in 2011 in the very footsteps of Alain Aspect, was the first company to commercialize quantum sensors based on laser-cooled atoms for field applications. Exail's Absolute Quantum Gravimeters are now operated worldwide by non-specialists, from the top of Mount Etna to Antarctica. They rely on atom interferometry with laser-cooled Rubidium atom and feature a state-of-the-art measurement performance at the level of 10^{-9} g stable over years.

Exail's developments now benefit the area of Quantum Sensing: Field-proven solutions covering a wide range of quantum applications, from the deep sea to outer space are commercially available to precisely control and convey the frequency, phase and amplitude of laser light regardless of the environment.



Exail's Absolute Quantum Gravimeter performed the world's first detection of gravity changes induced by volcanic processes (at a level of 10^{-8} m/s²)

Towards quantum inertial navigation

Exail's R&D teams nurture fruitful collaborations with leading research labs. The iXAtom joint laboratory brings together Exail and researchers from the Laboratoire Photonique Numérique & Nanosciences - LP2N lab (CNRS / Institut d'Optique Graduate School / Université de Bordeaux) to develop quantum technologies for high end Inertial Sensors.

The iXAtom research team has realized the first 3-axis quantum inertial sensor that allows to continuously measure the acceleration in 3 dimensions and for any orientation of the sensor. This is an important step towards the development of a drift-free inertial navigation system exploiting the quantum advantage.



The 3-axis quantum inertial sensor developed by iXAtom joint laboratory is an important step towards drift-free navigation systems.

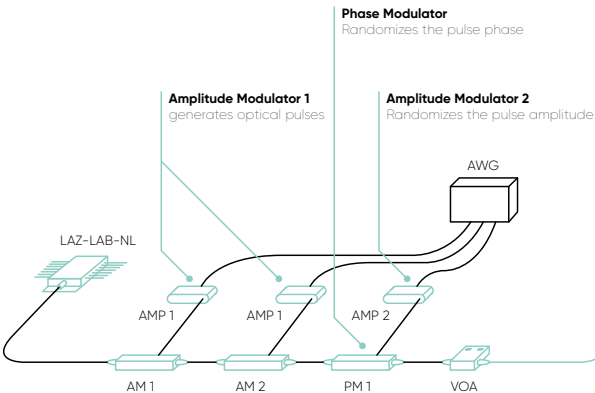
Reliable components and systems for quantum communication

A key topic of quantum technologies regards the ability to share quantum information between distinct parties – either locally or remotely – for which Exail's photonics solution provides strong technological advantage.

Enabling long-distance quantum communication, quantum repeaters are being developed using Exail's Intelligent Laser Systems and integrated Micro-optical Benches (iMOBs) for reliable field-compatible entanglement distribution.

Exail is also a key player in the field of Quantum Key Distribution (QKD), and more specifically continuous-Variable QKD (CV-QKD). The company LiNbO₃ Modulators and their matching components dedicated to the communication transmitter side (Alice) and the COH 90° optical hybrids demodulators enable to extract phase, amplitude and polarization on the receiver side (Bob).

Emitter (Alice)



Exail provides reliable components (modulators, VOA, COH) and sub-systems (LAZ-LAB-NL) to implement CV-QKD, both for the transmitter side and the receiver side.

Ensuring faster developments in quantum computing and simulation

Efforts deployed by academic laboratories and companies worldwide to develop quantum processors are tremendous. Exail's innovative and reliable photonics components and systems are there to ensure faster development, from fundamental research to commercially available machines, and allows increasingly complex set-ups to be developed and run.

Whether you rely on photons, neutral atoms, trapped ions, NV-centers to implement quantum computing or quantum simulation, our iMOBs and modulation solutions will help reach the most ambitious goals.

Receiver (Bob)

