



exail

**SPECIALTY FIBERS
& COMPONENTS**

exail at a glance

80

YEARS OF
EXPERIENCE

250+

MILLION EUROS
OF TURNOVER

80%

OF TURNOVER
ACHIEVED ABROAD

1500+

EMPLOYEES

15+

YEARS OF EXPERIENCE
IN RADIATION RESISTANT
DOPED FIBER

20%

OF TURNOVER
REINVESTED
EACH YEAR IN R&D

250+

FIBER REFERENCES
IN STOCK

10K+

KILOMETERS
OF DELIVERED FIBER
IN 2022

8000+

FBGS DELIVERED
PER YEAR

SPECIALTY FIBERS AND COMPONENTS FOR HIGH REQUIREMENT APPLICATIONS

Exail is a leading high-tech industrial group specializing in cutting-edge robotics, maritime, navigation, aerospace and photonics technologies. With a strong entrepreneurial culture, Exail delivers unrivaled performance, reliability and safety to its civil and defense clients operating in severe environments. From the deep sea to outer space, Exail expands their capabilities with a full range of robust in-house manufactured components, products and systems.

Our specialty fibers and components are produced in environmentally controlled production areas to ensure high proof strength, tight tolerances and a high-quality level. Exail's specialty fibers facility is located in Lannion, France. It has over 25 years of experience in designing and manufacturing high performance products,

with recently upgraded new facilities and an expanded technical team.

Exail is developing new fibers and components in close collaboration with customers, we operate worldwide with sales, support and technical teams on all continents.

Our Photonics experts will construct the best solution to precisely fit your application, through intensive and constructive collaboration from initial design to production scale in world class ISO 9001 manufacturing facilities.

Exail develops and manufactures a wide range of specialty optical fibers, fiber optic components and subassemblies for diverse industrial applications such as Telecom, Sensing, Defense, Space, Fiber Laser and Harsh Environment.



Sensors



Harsh Environment



Fiber Lasers



Telecom



Automotive Lidar



Spacecom

LASER & AMPLIFIER FIBERS

Exail develops a full range of doped optical fibers dedicated to a wide range of fiber laser designs and applications.

Main specifications

Number of Claddings	Single, Double, Triple Clad
Active Doping	Er, Yb, Er/Yb, Tm, Ho, Tm/Ho, Nd P-doped for Raman Amplifier
Core Diameter	up to 30 μm , LMA
Polarization Maintaining	Panda design available



Applications

- Lidar
- High power continuous and pulsed lasers or amplifiers
- 0.9 μm femtoseconds laser sources
- 1 μm industrial lasers
- 1.5 and 2 μm Eye-safe lasers
- CATV and telecom amplifiers
- Space grade amplifiers and lasers

Key features

- Highest efficiency Er/Yb fibers on the market
- High temperature coating
- WW distance record for coherent Lidar for wind measurement
- First PM Neodymium LMA fiber
- More than 15 years experience in Radiation Resistant Doped fiber
- TRL9 Erbium doped fiber
- E-store for fast delivery from stock

Focus on







The need for new Earth and universe observation satellites is becoming more and more important, with new challenges in this very hostile space environment where components are exposed to ionizing radiation. Longer missions, very distant satellite for deep space sensing, and new telecommunication demands necessitate stronger photonic devices and components to withstand ionizing radiation.

Exail has produced more than 20 flying navigation systems that are equipped with our fibers and components. We have developed a strong experience in the qualification of such devices in collaboration with end users as well as National Space and Nuclear agency for the last 15 years.

• Learn more on photonics.ixblue.com

OPTICAL FIBER SENSORS

For more than 15 years, Exail has developed a large experience in the use of optical fibers in extreme conditions from undersea to space environments including medical to aerospace applications. Exail is now offering a large variety of beyond standards fiber for various applications.

Fibers Type	Cladding diameter (μm)	Wavelength range (nm)	PM designs	Key features
PM Gyro Fibers 	40-80	820 to 1550	Tiger Panda	<ul style="list-style-type: none"> • Reduced coating available • Space Grade available • No twist for easy coil winding • Low PER fluctuation over wide temperature range • Acrylate and Silicon coating available
Polarizing Fibers 	80-125	780 to 1550	Tiger	<ul style="list-style-type: none"> • > 100 nm polarizing window • > 30 dB extinction ratio • Available as bare fiber, polarizer, full assembly
Spun Fibers 	8-125	1310 to 1550	Tiger Elliptical Core	<ul style="list-style-type: none"> • Matched PM fiber for current sensors available • EC for low temperature dependence application
Harsh Environments 	125-400	350 to 1600	Optional	<ul style="list-style-type: none"> • Radiation resistant • High Energy physics • High temperature operation • Acrylate, acrylate HT, polyimide, aluminium and carbon coating available

Focus on



Since its inception, Exail has been manufacturing fibers for its own fiber-optic gyroscopes (FOG). Today, Exail is a globally recognized manufacturer of FOG-based inertial navigation systems and equips systems in various markets

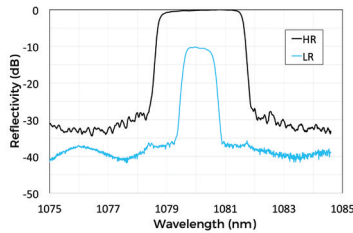
and environments: space, energy, naval and land defense or volcanology. Exail's products are operating from the deepest oceans to outer space (-6 km up to 1,600,000 km).

FIBER BRAGG GRATINGS

Whether you need to select a particular wavelength, flatten the gain on a WDM or shape a spectrum to your particular requirements, Exail's components are suited for the most advanced needs. In addition, Exail provides on demand athermal or dissipative packages.

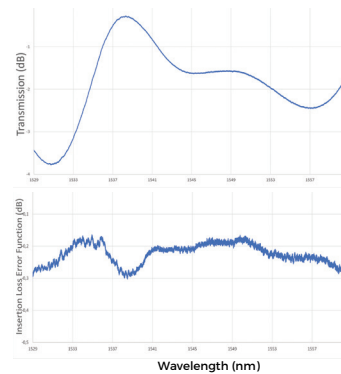
FBG laser mirrors pairs

- All fiber types: single, double or triple clads; PM
- From 600 to 2100 nm
- HR reflectivity up to 99.9%
- HR FWHM from 0.5 to 1.5 nm



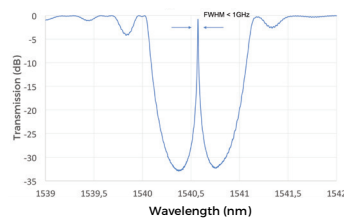
Gain flattening filters

- Low reflection slanted GFF for Terrestrial and Submarine grades
- Available in recoat, athermal or non-athermal package
- C&L bands
- PM version available



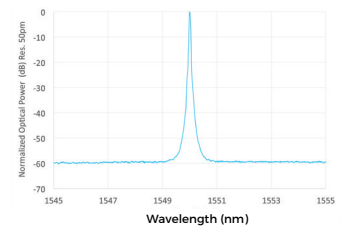
Ultra-narrow bandwidth filters

- Narrow band: < 1 GHz bandwidth filter
- Low Insertion Loss
- Fine adjustment of central wavelength
- Athermal packaging available



Low linewidth single frequency lasers (DFB)

- Combination of Exail doped fibers and FBG technologies
- 1.5 and 2 μm available
- 1 kHz linewidth
- Up to 10 mW output power



Focus on

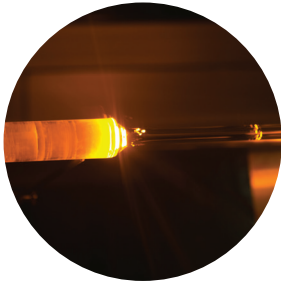


- High Power Mirror Laser cavity @ 1, 1.5 and 2 μm
- Improved thermal slope by a factor of ten
- Handling pump power up to 3 kW

CUSTOM SOLUTIONS

Exail, as a recognized manufacturer of high-end specialty fibers and components, can accommodate various customization requirements. In addition, our production processes and capacities allow us to address large volume requests.

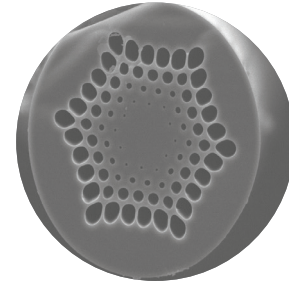
Custom fibers



Mastering of the entire production process, from the preform to the fiber characterization

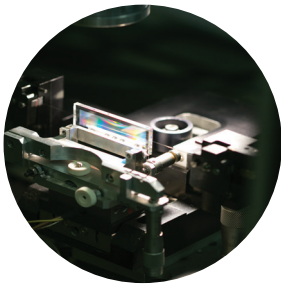


Custom Fiber Coils



Multicore fibers, hollow Core fibers and Photonics Crystal fibers

Custom components



FBG from 400 to 2,100 nm
Apodized profile, High SLSR
All fiber types



Fiber Based Dosimeter



Narrow linewidth single frequency laser

Custom systems

Key figures

20

OEM customers including GAFA

20

Scientific papers published every year

1,000+

Kilometers of space qualified fibers flying

150

Fiber references available for immediate delivery on shop



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exail

Your challenge, our dedicated and custom solutions.

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

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