

Spectroscopy and Sensing Applications with smart CW Mid-IR Laser

Advancing Spectroscopy and Sensing Applications
with TOPTICA's TOPO smart CW Mid-IR Laser

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In the fast-changing scientific landscape, the need for precise, efficient, and cost-effective spectroscopic tools is increasingly critical. The TOPO smart, a continuous wave (CW) mid-infrared (mid-IR) laser, represents a significant advancement in molecular spectroscopy.

This laser presents a robust alternative to traditional interband and quantum cascade lasers. The **TOPO smart** is an advanced CW optical parametric oscillator (OPO) that leverages a unique pumping scheme to boost performance while minimizing size and operational costs. Positioned strategically, the TOPO smart bridges the gap between lower power, narrowly tunable interband and quantum cascade lasers, and more powerful, broadly tunable CW OPOs, such as the TOPO series.



Application Spectrum of TOPO smart

The TOPO smart is a versatile tool designed for a range of specialized applications across diverse fields, providing precise and insightful analysis capabilities, like Fundamental Physical Chemistry, Combustion Diagnostics, Gas Sensing, and Astronomical Spectra Interpretation.

Economic and Operational Benefits

The TOPO smart provides significant economic and operational advantages, making it essential in research environments. It is designed with budget constraints in mind, offering cost-effective access to advanced spectroscopic analysis and improving both the scope and precision of research without a substantial financial impact. Its user-friendly design features advanced control interfaces, including a touchscreen and multiple connectivity options, ensuring easy integration into existing setups.

About TOPTICA

TOPTICA has been developing, producing, and marketing high-end lasers and laser systems for science, research, and industry for 25 years. The portfolio includes diode lasers, ultrafast fiber lasers, terahertz systems, and optical frequency combs. Worldwide, TOPTICA has 490 employees in six business units with a consolidated group revenue of €130 million.

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[High Res image TOPO smart](#)

Options and Enhancements

Additionally, the TOPO smart includes several enhancements such as the optional FiberDock fiber coupler and polarization maintaining (PM) fiber, which optimize fiber delivery and boast high fiber coupling efficiency and stability. For applications requiring precise frequency control, electronic locking modules are available, providing enhanced frequency stabilization and greater experimental accuracy and reliability.

Key Features TOPO smart:

- Tuning range: 3100 - 3500 nm ($3230 - 2855 \text{ cm}^{-1}$)
- Mode Hop Free Tuning Range: $> 15 \text{ GHz}$ (0.5 cm^{-1})
- Linewidth: $< 500 \text{ kHz}$ ($< 2 \times 10^{-5} \text{ cm}^{-1}$)
- Output power: $> 30 \text{ mW}$, free space
- Beam quality factor M^2 : < 2