



K2-OPO-mini

Compact and powerful ultralow-noise laser

Any wavelength*

1 GHz repetition rate

High power operation

Ultrashort pulses

Dual-comb option



Compact solution for spectroscopy



Wide range of wavelengths



Ultra-low RIN and timing noise

DESCRIPTION

K2-OPO-mini is a powerful low noise turn-key fixed-wavelength optical parametric oscillator. The output wavelength is defined at the factory allowing it to serve a wide range of applications throughout the infrared. K2-OPO-mini emits femtosecond pulses at 1 GHz repetition rate with a dual-comb option. This light source is ideal for optical frequency comb applications, precision ranging, gas sensing, time-resolved spectroscopy, nonlinear microscopy and reaction kinetics studies.

CUSTOM OPTIONS

- Fiber coupled output
- Integrated pump laser output
- Signal & Idler pair output
- Tunable configuration

APPLICATIONS

- Time-resolved spectroscopy
- Multi-species gas sensing
- Reaction kinetics
- Nonlinear microscopy

Related publications

THz Power Scaling up to 1.6 mW in Fiber-Coupled ASOPS THz TDS with a 1 GHz Dual-Comb Laser

Dohms et al., *IEEE Transactions on Terahertz Science and Technology* (2026)

Ultrafast 1-GHz repetition rate dual-comb optical parametric oscillator

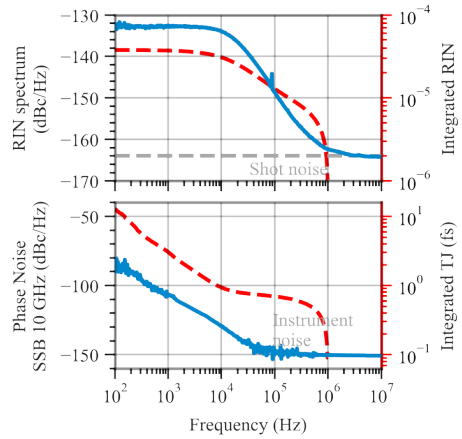
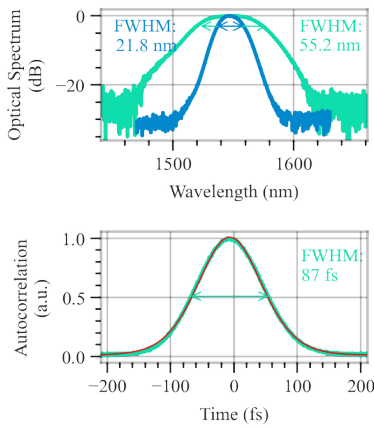
Bauer et al., *Optics Express* 33, 39130 (2025)

High-sensitivity dual-comb and cross-comb spectroscopy across the infrared using a widely tunable and free-running optical parametric oscillator

Bauer et al., *Nature Communications* 15, 7211 (2024)



EXAMPLE CHARACTERIZATION



SPECIFICATIONS

Output wavelength*	1550 nm	1645 nm	1800 nm	2400 nm	3300 nm	4100 nm
Output power per comb	>400 mW	>350 mW	>250 mW	>200 mW	>120 mW	>60 mW
Wavelength tuning	Factory fixed, inquire for tunable options					
Repetition rate	1 GHz +/- 0.1 GHz					
Pulse duration (FWHM)	<250 fs, inquire for <100 fs option					
Individual comb RIN	<-160 dBc/Hz for frequencies above 1 MHz					
Pump laser	Integrated K2-1000-mini					

DUAL-COMB SPECIFICATIONS (OPTION)

Implementation method	spatially-multiplexed single-cavity dual-comb design
Repetition rate difference	tunable between -100 kHz and +100 kHz
Relative timing noise	<10 fs [100 Hz, 100 kHz]

CONTROLS

Repetition rate	f_{rep} actuation via piezo (option)
Wavelength shift control	OPO cavity length control via piezo (option)
Repetition rate difference	Δf_{rep} actuation via piezo and motor (option)

DIMENSIONS

Size (L x W x H)	275 x 210 x 95 mm ³ (all-in-one system)
Output height	60 mm on (W) side

REQUIREMENTS

Operating temperature	15 – 30°C with <25°C baseplate (contact cooling)
Relative humidity	20 – 70% (non-condensing)
Power consumption	<75 W
Electrical requirements	24 VDC, 5 A

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*Wavelength can be customized within the range: 1350 - 4500 nm.



K2-1000

High-power dual-comb laser system

1 GHz repetition rate

>2 W per beam

<100 fs pulse duration

Sub-cycle relative timing jitter



Compact solution for spectroscopy



High-power for nonlinear studies



Ultralow RIN and relative timing noise

DESCRIPTION

K2-1000 is an ideal platform for R&D applications. The system produces a pair of mode-locked femtosecond lasers (optical frequency combs) with a slightly different pulse repetition rate. In the time domain, the optical delay is rapidly swept through a range of 1 nanosecond. In the frequency domain, beat notes between each pair of optical comb lines are generated via heterodyne detection. Through a novel shared-cavity architecture, our system achieve ultra-low noise simply in free-running operation.

CUSTOM OPTIONS

- Repetition rate control
- Integrated second harmonic
- Integrated optical isolation
- Supercontinuum option (SCG)

APPLICATIONS

- Time-resolved spectroscopy
- Multi-species gas sensing
- Precision ranging
- THz-TDS

Related publications

Coherently averaged dual-comb spectroscopy with a low-noise and high-power free-running gigahertz dual-comb laser

Phillips et al., *Optics Express* 31, 7103 (2023)



Ultra-low noise spectral broadening of two combs in a single ANDi fiber

Camenzind et al., *APL Photonics* 10, 036119 (2025)

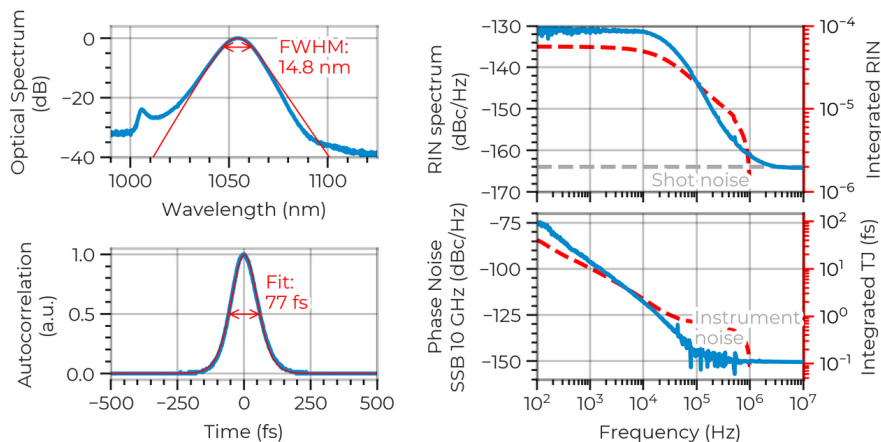


Long-Range and Dead-Zone-Free Dual-Comb Ranging for the Interferometric Tracking of Moving Targets

Camenzind et al., *ACS Photonics* 12, 1829 (2024)



EXAMPLE CHARACTERIZATION



SPECIFICATIONS

	Standard	SHG option	SCG option
Laser wavelength	1050 +/- 10 nm	525 +/- 5 nm	
Power per comb	>2 W	> 100 mW	
Pulse duration (FWHM)	<100 fs, clean sech ² pulses		
Repetition rate	1 GHz +/- 0.1 GHz		
Repetition rate difference	tunable between -100 kHz and +100 kHz		
Relative timing jitter	<10 fs [1 kHz, 100 kHz]		

OUTPUTS

Optical	Two spatially separated pulse trains
Cross-correlation signal	Trigger signal at the repetition rate difference
Digital signals	Δf_{rep} and f_{rep} values, logging and remote control via K2-Link

CONTROLS

Repetition rate	f_{rep} piezo actuation with integrated high-voltage amplifier (option)
Repetition rate difference	Active Δf_{rep} stabilization and digital control
Pump current	Pump diode current modulation capability for f_{CEO} locking

DIMENSIONS

Laser head (L x W x H)	494 x 291 x 179 mm ³
Beam output height	75 mm on (W) side
K2-Link control unit	395 x 436 x 88 mm ³ (19" rack mountable, 2U)

REQUIREMENTS

Operating temperature	15 – 30 °C (Water or air options - hybrid design)
Relative humidity	20 – 70% (non-condensing)
Power consumption	<150 W
Electrical requirements	100-120 VAC, 3 A, 50-60 Hz / 200-240 VAC, 1.5 A, 50-60 Hz

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K2-1000-mini

Compact and powerful ultralow-noise laser

1 GHz repetition rate

High power operation

Ultrashort pulses

Dual-comb option



Compact solution
for spectroscopy



High-power for nonlinear
applications



Ultralow RIN
and timing noise

DESCRIPTION

K2-1000-mini is a powerful ultralow-noise turn-key laser for OEM integration. The laser is available as a mode-locked femtosecond light source with dual-comb mode-locked option, producing two pulse trains from the same cavity. This laser is ideal for optical frequency comb applications, precision ranging, gas sensing, pump-probe as well as traditional laser oscillator applications, such as two-photon microscopy, amplifier seeding, supercontinuum generation and timing distribution.

CUSTOM OPTIONS

- Fiber coupled option
- Passively cooled (low power) version
- Wavelength options via K2-OPO-mini
- Sub-100 fs option

APPLICATIONS

- Time-resolved spectroscopy
- Multi-species gas sensing
- Precision ranging
- Nonlinear microscopy

Related publications

Coherently averaged dual-comb spectroscopy with a low-noise and high-power free-running gigahertz dual-comb laser

Phillips et al., Optics Express 31, 7103 (2023)

Ultra-low noise spectral broadening of two combs in a single ANDi fiber

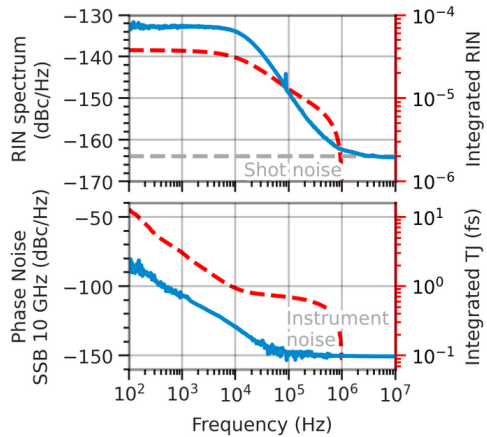
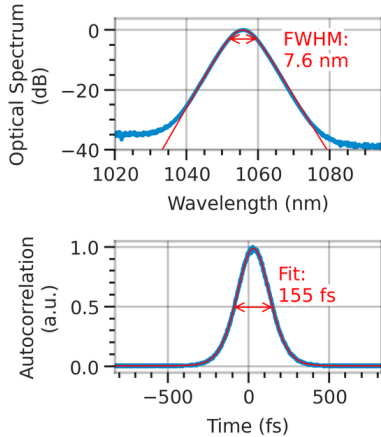
Camenzind et al., APL Photonics 10, 036119 (2025)

Long-Range and Dead-Zone-Free Dual-Comb Ranging for the Interferometric Tracking of Moving Targets

Camenzind et al., ACS Photonics 12, 1829 (2024)



EXAMPLE CHARACTERIZATION



SPECIFICATIONS

Laser wavelength	1050 nm $\pm$ 10 nm
Laser output power	>1.5 W
Repetition rate	1 GHz $\pm$ 0.1 GHz
Pulse duration (FWHM)	<200 fs, clean sech ² pulses, <100 fs option available
Timing-jitter PSD (fs ² /Hz)	<0.01 fs ² /Hz for frequencies above 1 kHz
Individual comb RIN	<-160 dBc/Hz for frequencies above 1 MHz

DUAL-COMB MODELOCKING (OPTION)

Repetition rate difference	Tunable between -100 kHz and +100 kHz
Relative timing noise	<10 fs [100 Hz, 100 kHz]

CONTROLS

Repetition rate	f_{rep} actuation via piezo 0 - 150 V (option)
Power modulation	Pump diode current modulation capability for f_{CEO} locking
Repetition rate difference	Δf_{rep} actuation via piezo 0 - 150 V and coarse via motor (option)

DIMENSIONS

Laser (L x W x H)	240 x 140 x 85 mm ³ (all-in-one system)
Beam output height	60 mm on (W) side

REQUIREMENTS

Operating temperature	15 – 30°C with <25°C baseplate (contact cooling)
Relative humidity	20 – 70% (non-condensing)
Power consumption	<75 W
Electrical requirements	24 VDC, 5 A

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K2-ASOPS

High-power dual-comb laser system

60-80 MHz repetition rate

High power operation

Ultrashort pulses

Sub-cycle relative timing jitter



Compact solution to ASOPS



High-power for nonlinear studies



Ultralow RIN and relative timing noise

DESCRIPTION

The system produces a pair of mode-locked femtosecond lasers (optical frequency combs) with a slightly different pulse repetition rate. In the time domain, the optical delay is rapidly swept through a range of 12.5 nanoseconds at high speeds. In the frequency domain, beat notes between each pair of optical comb lines are generated via heterodyne detection. Through a novel shared-cavity architecture, our system achieve ultra-low noise simply in free-running operation.

CUSTOM OPTIONS

- Integrated second or third harmonic
- Passive (air) or active (water) cooling
- Repetition rate control
- Supercontinuum option (SCG)

APPLICATIONS

- Pump-probe sampling
- Thin film inspection
- Precision ranging
- Nonlinear microscopy

Related publications

Efficient pump-probe sampling with a single-cavity dual-comb laser: Application in ultrafast photoacoustics

Pupeikis et al., Photoacoustics **29**, 100439 (2023)

Rapid-Scan Nonlinear Time-Resolved Spectroscopy over Arbitrary Delay Intervals

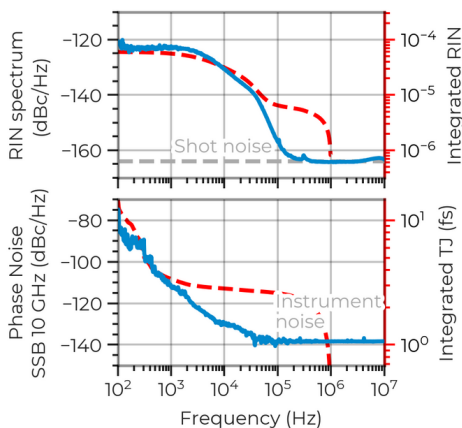
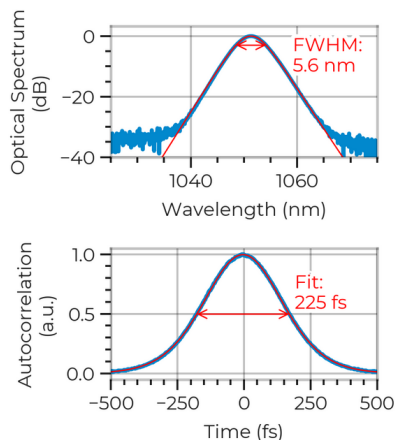
Flöry et al., Ultrafast Science **3**, 0027 (2023)

High-Sensitivity Pump-Probe Spectroscopy with a Dual-Comb Laser and a PM-ANDi Supercontinuum

Gruber et al., Optics Letters **49**, 6445-6448 (2024)



EXAMPLE CHARACTERIZATION



SPECIFICATIONS

	Standard	SHG option	THG option	SCG option
Laser wavelength	1050 +/- 10 nm	525 +/- 5 nm	350 +/- 3 nm	inquire for specific fiber integration
Power per comb				
Pulse duration (FWHM)	>1.5 W	> 500 mW	>80 mW	
Repetition rate	<250 fs, clean sech ² pulses			
Repetition rate difference	80 MHz standard, 60 MHz option available			

OUTPUTS

Optical	Two spatially separated pulse trains
Cross-correlation signal	Trigger signal at the repetition rate difference
Digital signals	Δf_{rep} and f_{rep} values, logging and remote control

CONTROLS

Repetition rate difference	Active Δf_{rep} stabilization and digital control
Power	Power allocation between fundamental and harmonic (if applicable)
Pump current	Pump diode current modulation capability for f_{ceo} locking

DIMENSIONS

Laser head (L x W x H)	540 x 321 x 179 mm
Beam output height	75 mm on (W) side
K2-Link control unit	395 x 436 x 88 mm (19" rack mountable, 2U)

REQUIREMENTS

Operating temperature	15 – 30 °C (Water or air options - hybrid design)
Relative humidity	20 – 70% (non-condensing)
Power consumption	<150 W
Electrical requirements	100-120 VAC, 3 A, 50-60 Hz / 200-240 VAC, 1.5 A, 50-60 Hz

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