

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)

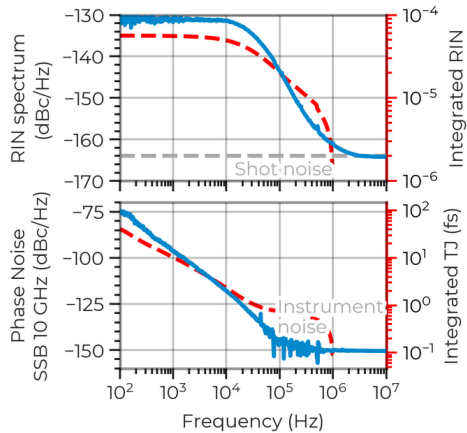
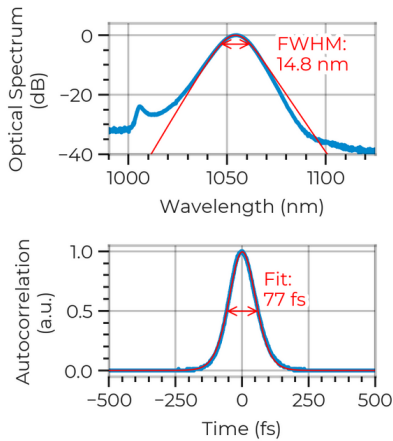


Long-Range and Dead-Zone-Free Dual-Comb Ranging for the Interferometric Tracking of Moving Targets

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



EXAMPLE CHARACTERIZATION



SPECIFICATIONS

	Standard	SHG option	SCG option
Laser wavelength	1050 +/- 10 nm	525 +/- 5 nm	inquire for specific fiber integration
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

Product specifications and descriptions in this document are subject to change without notice.
Specifications are for temperature variations of $\pm 1^\circ\text{C}$ and humidity variations of $\pm 10\%$.

