K2PHOTONICS

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
- Ultra-low RIN and relative timing noise

DESCRIPTION

K2-1000 is an ideal platform for R&D applications. The system produces a pair of modelocked 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 nanoseconds. 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 is able to achieve ultra-low noise simply in free-running operation.

CUSTOM OPTIONS

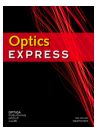
- Wavelength options via OPO (inquire)
- Integrated second harmonic
- OEM version (K2-mini line)
- Broadband configuration

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)



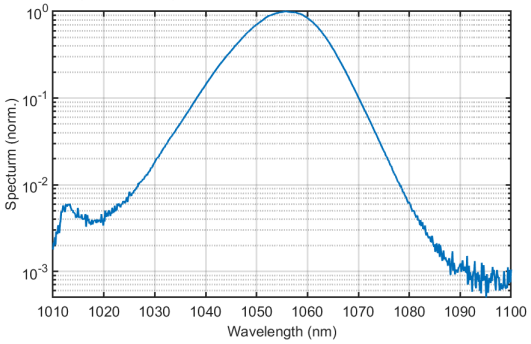
Shot-noise limited dual-comb supercontinuum
Camenzind et al., Optica Open 112418 (2024) (under peer review)

Long-range and dead-zone free dual-comb LiDAR for the interferometric tracking of moving targets
Camenzind et al., Arxiv:2411.05585 (2024)

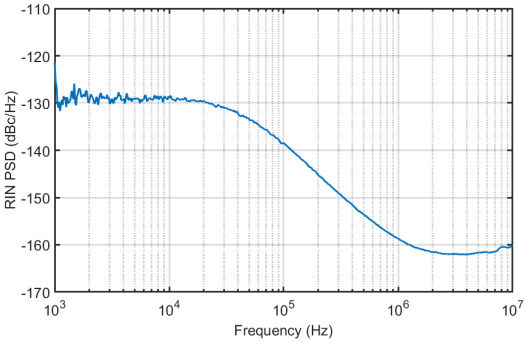
arXiv

EXAMPLE CHARACTERIZATION

Laser pulse spectrum



Relative intensity noise measurement



LASER SPECIFICATIONS

Laser output	1050 +/- 20 nm, >1.5 W per comb
Pulse duration (FWHM)	<100 fs, clean sech^2 pulses
Repetition rate	1 GHz
Beam quality factor M	<1.1
Repetition rate difference	tunable between 0 - 200 kHz
Relative timing noise	<10 fs [1 kHz, 100 kHz]

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 via K2-Link

AVAILABLE INPUTS

Repetition rate	f_{rep} piezo actuation with integrated high-voltage amplifier
Repetition rate difference	Active Δf_{rep} stabilization at Δf_{rep} rate up to 25 kHz
Pump current	Pump diode current modulation capability for f_{CEO} locking
Power	Power allocation between fundamental and harmonic (if applicable)

PHYSICAL 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 88.05 mm^3 (19" rack mountable, 2U)

REQUIREMENTS

Operating temperature	15 – 30 °C (Water or air options - hybrid design)
Relative humidity	Non-condensing environment
Rated power	300 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.

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