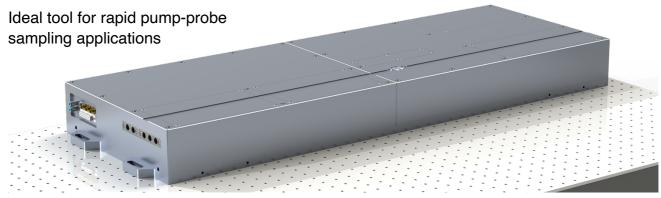
Multi-color pump-probe solution

based on single-cavity dual-comb engine



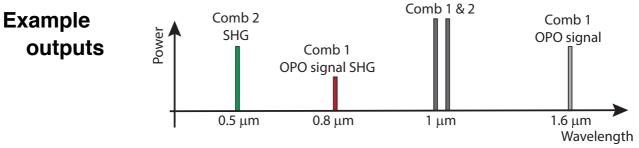


Dual-comb laser combined with OPO

Compact and wavelength agile high-power source

Ultra-low RIN and relative timing noise

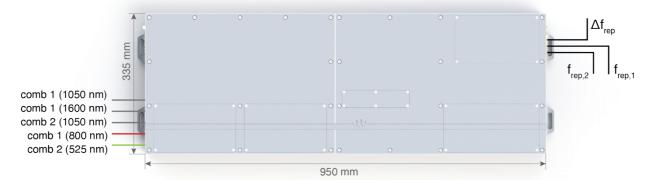
The system is an integrated multi-color optical sampling solution. The core of the system is a pair of femtosecond lasers with a slightly different pulse repetition rate. Both lasers are generated in a novel single shared-cavity architecture. Because of this feature, the noise of the two pulse trains is highly correlated, enabling ultra-low relative timing jitter below an optical cycle without any active feedback. This feature not only improves performance compared to conventional ASOPS systems, but also strongly reduces the complexity of the solution. Efficient wavelength conversion is provided by an optical parametric oscillator (OPO); for stability and alignment-free operation, the OPO is constructed in the same housing as the laser.



Applications

- Picosecond ultrasonics¹
- Pump-probe sampling²
- Transient absorption

- THz time-domain spectroscopy
- Long-distance ranging
- Dual-comb spectroscopy
- ¹ Pupeikis *et al.*, "Picosecond ultrasonics with a free-running dual-comb laser", Optics Express **29**, 35735 (2021)
- ² Nussbaum-Lapping *et al.*, "Absolute SESAM characterization via polarization-resolved non-collinear equivalent time sampling", Applied Physics B **128**, 24 (2022)



Specifications

Wavelength	1050 nm	525 nm	1600 nm	800 nm
Comb number	1 & 2	2	1	1
Power per comb	>1.6 W	> 500 mW	> 500 mW	>200 mW
Pulse duration		<200	fs	
Wavelength tuning	Other waveleng	ths available upo	n request (near-	IR to mid- IR)
Repetition rate	80 MHz	(1 GHz version a	vailable upon red	quest)
Individual comb RIN	<-16	0 dBc/Hz for freq	uencies >300 kH	Ιz

Dual-comb specifications

Repetition rate difference	+/- 500 Hz
Relative timing noise	<-160 dBc/Hz for frequencies >1 kHz

Available outputs

Optical	Two spatially separated pulse trains: see comb 1 and comb 2
Pulse timing signals	$f_{\rm rep,1}$ and $f_{\rm rep,2}$ 5 GHz bandwidth electronic pulses
Analog cross-correlation sig- nal	Δf_{rep} signal pulse with >80 MHz analog bandwidth
Digital signals	Digital Δf_{rep} values with better than 10 ⁻⁶ precision

Controls

Pump power	Digital control (analog available upon request)	
Repetition rate difference		
Repetition rate	Optional digital or analog control	
OPO cavity length control	Digital and analog control including stabilization	

Physical dimensions

Laser head (L x W x H)	1000 x 335 x 90 mm ³	
Power supply (L x W x H)	483 x 343 x 150 mm ³ or smaller	
Chiller	Options available	

Requirements

Operating temperature	15 – 30 °C	
Relative humidity	<70 % (non-condensing)	
Electrical requirements	85 ~ 264 VAC, 47 ~ 63 Hz	
Rated power	150 W	

We strive to excel in performance. Specifications can change - please inquire for the latest model