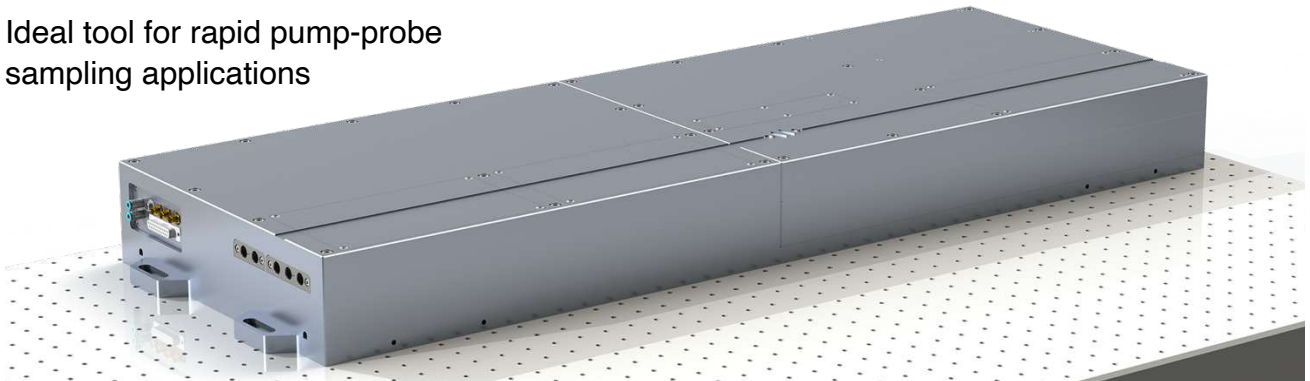


Multi-color pump-probe solution

based on single-cavity dual-comb engine



Ideal tool for rapid pump-probe sampling applications



Dual-comb laser combined with OPO

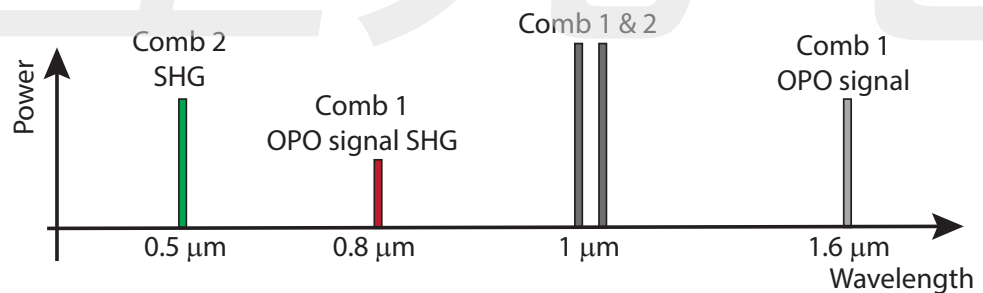
Compact and wavelength agile high-power source

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.

Example outputs

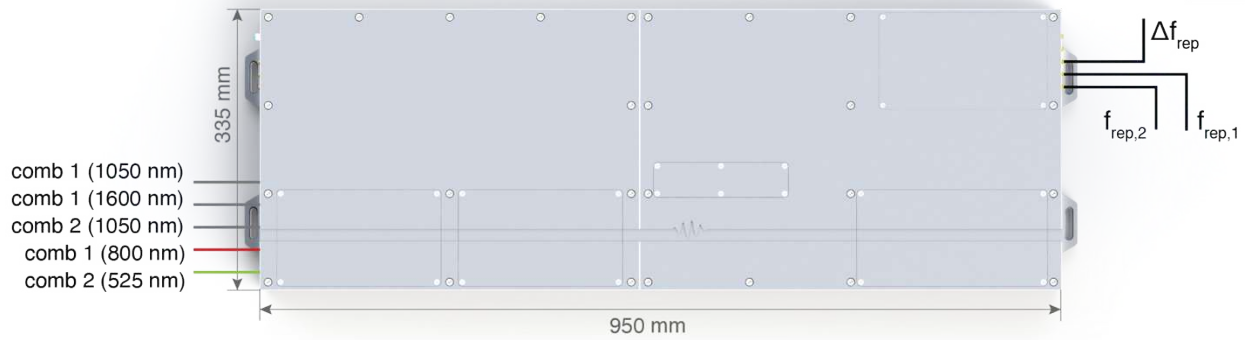


Applications

- 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 wavelengths available upon request (near-IR to mid- IR)			
Repetition rate	80 MHz (1 GHz version available upon request)			
Individual comb RIN	<-160 dBc/Hz for frequencies >300 kHz			

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	$f_{rep,1}$ and $f_{rep,2}$ 5 GHz bandwidth electronic pulses
Analog cross-correlation signal	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