ORS-ULN

Ultra-Low-Noise Ultrastable Laser System

MenloSystems

The ORS-ULN represents the first commercial ultrastable laser system (1542 nm) delivering ultra-narrow linewidth (< 40 mHz) with an unprecedented fractional frequency stability in the 10^{-17} level at 1 s.

The product is the result of the joint development by Menlo Systems and the Physikalisch-Technische Bundesanstalt (PTB). The ORS-ULN centerpiece is an ultra-high-finesse single-crystal silicon cavity serving as the optical reference for the cw laser and it is based on the silicon cavity design (212 mm) first demonstrated by the PTB and Joint Institute for Laboratory Astrophysics (JILA) collaboration.

To achieve such a level of stability, the reference cavity is actively decoupled from vibrations, acoustically isolated, and stabilized at the zero-crossing temperature of silicon at 123 K. Furthermore, the transportation lock mechanism ensures portability without realignment.

Each unit of the ORS-ULN consists of an optical and electronic rack, and it includes a separate closed-cycle cooler. Every system is fully characterized before shipment. The characterization is carried out against a reference system with equal or better performance.

KEY SPECIFICATIONS

- Wavelength: 1542 nm
- Stability (MADEV, 1 s) <9.6×10^{-17}
- Linewidth <40 mHz

FEATURES

- Ultra-high-finesse Single-crystal Silicon Cavity
- Zero-crossing Temperature Stabilization at 123 K
- Ultra-high Vacuum (UHV) System
- Transportation-lock Mechanism
- Fiber Coupling
- All-included Commercial Solution (Optical Setup, Electronics and Fiber Rack, Cooling System)

APPLICATIONS

- Optical Clocks
- Development of Next-generation Timescale Based on Optical Carriers
- Gravitational Waves Detection
- Search for Physics Phenomena Beyond the Standard Model

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SPECIFICATIONS

Central Wavelength	1542 nm		
Stability (MADEV at 1 s)	<9.6 x 10^{-17} (1)	*The stability performance is subject to further improvements (Best effort, MADEV at 1s: <5 x 10^{-17})*	
Linewidth	<40 mHz (2)		
Absolute Linear Drift Rate	<10 mHz/s (3)		
Output Power	>5 mW (FC/APC connector)		
Dimensions and Mass	Optical part: 50 cm (L) x 60 cm (W) x 100 cm (H); Mass: 120 kg	Electronics and Fiber rack: 60 cm (L) x 80 cm (W) x 150 cm (H); Mass: 250 kg	Cooling system: 28 cm (L) x 45 cm (W), x 37 cm (H); Mass: 32 kg

(1) Measured at T_{lab} = 21±0.3 °C.
(2) Linewidth after locking, measurement time t >150 s.
(3) Measured at T_{cavity} = 123 K.

OPERATIONAL REQUIREMENTS

Operating Voltage	100 / 115 / 230 VAC at 50 Hz – 60 Hz	
Operating Temperature	T_{lab} = 22 ± 5 °C	*The lab temperature must be stabilized within ± 0.5 °C*
Power Consumption	<700 W	

ORDERING INFORMATION

Product Code	ORS-ULN

Please call for pricing. Specifications are subject to change without notice.

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