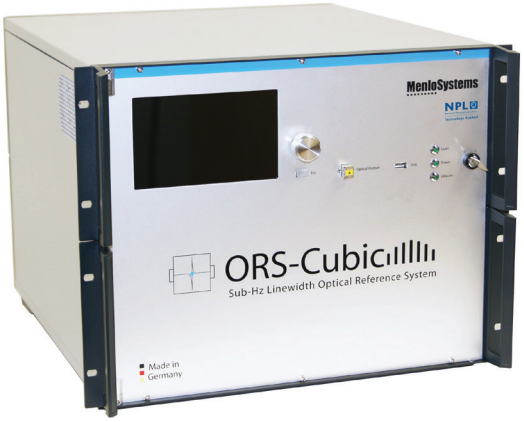
# ORS-Cubic

## Ultrastable Laser




The Optical Reference System (ORS) delivers an optical output with ultra narrow linewidth and outstanding short term stability. It consists of a CW laser locked to a stable high-finesse cavity made of ultra low expansion (ULE) glass. The compact design allows for integration of the vacuum chamber, control electronics, vibration isolation platform and acoustic isolation into a 19" rack system and delivers state-of-the-art laser linewidth and stability. The ORS-Cubic is based on the rigidly mounted 5 cm cubic cavity developed in cooperation with the National Physical Laboratory. The rigid mounting of the cubic cavity allows for transportation of the system without the need to readjust the beam coupling into the cavity. Every system is fully characterized at Menlo Systems before shipment. The characterization is carried out either against a reference system with equal or better performance, or in a three cornered hat comparison.

### KEY SPECIFICATIONS

- Linewidth <1 Hz
- Allan Deviation <0.8-5 x $10^{-15}$
- Wavelength Range: 500-1600 nm
- Finesse ≈ 250 000
- 5 cm Cubic ULE Spacer

### APPLICATIONS

- Ultra High Precision Spectroscopy
- Low Noise Microwave Generation
- Interrogation of Optical Clocks
- Frequency Metrology

### FEATURES

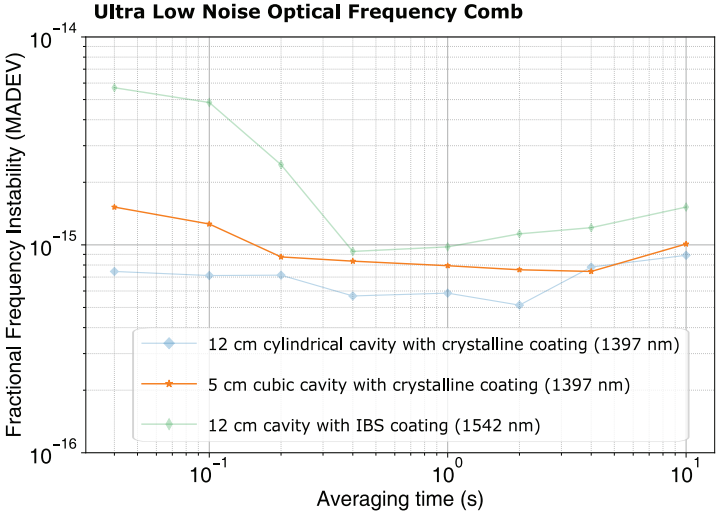
- IBS or Crystalline Mirror Coating
- ULE or Fused Silica Mirror Substrate
- ULE Compensation Rings
- Rigidly Mounted Cavity
- Active Vibration Isolation Platform
- Acoustic Isolation
- Turnkey Metrology System, designed for contiunuous operation

### OPTIONS

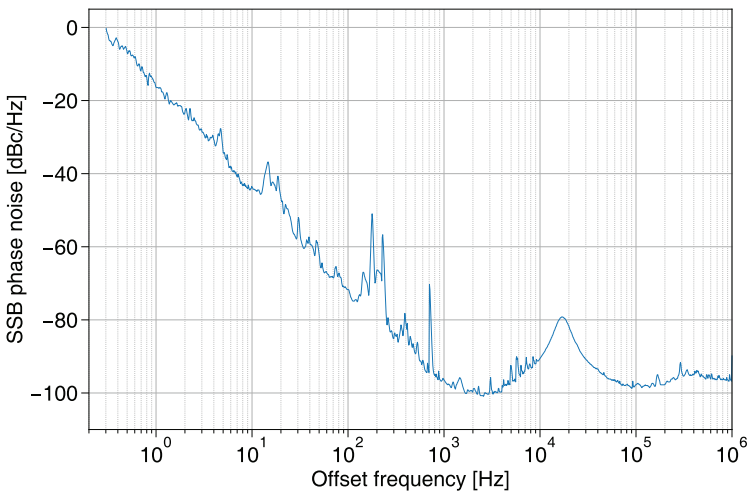
- Doppler cancellation system
- Active RAM cancellation
- Frequency shifting AOM for operation at exact atomic transition (e.g. Sr at 698 nm)
- Frequency doubling

## STABILITY AND PHASE NOISE

**Three cornered hat comparison using a Menlo Systems Ultra Low Noise Optical Frequency Comb**




**Measurement between a 12 cm cylindrical cavity and a 5 cm cubic cavity (both with crystalline coatings at 1397 nm)**



# ORS-Cubic

## Ultrastable Laser

MenloSystems

| SPECIFICATIONS | ORS-CUBIC | ORS-CUBIC HIGH PERFORMANCE | |
|---|---|---|---|
| Wavelength | 1542 and 1064 nm | 1542, 1064, 657, 698, 729, 1156 nm and many others between 500-1600 nm | |
| Temperature of Minimal Thermal Expansion | between 20-35 °C | between 20-35 °C | |
| Stabilized Output Power | >10 mW | >10 mW | |
| Finesse | ≈ 250 000 | ≈ 250 000 | |
| Linewidth | <1 Hz | <1 Hz | |
| Stability (MADEV at 1 s, linear drift removed) | $<5 \times 10^{-15}$ | $<3 \times 10^{-15}$ | $<8 \times 10^{-16}$ (with crystalline coatings) |
| Linear Drift Rate | approx.150 mHz/s | approx.150 mHz/s | |
| System Dimensions | 19" rack mountable, 8HU | 19" rack, with 16 -20 HU (height depends on laser) 16 HU for compact ECDLs at 1550 & 1064 nm and 20 HU for cateye ECDLs. | |
| System Weight | 50 kg | approx. 180 kg | |

### REQUIREMENTS

| | |
|---|---|
| Operating Voltage | 100 / 115 / 230 VAC |
| Line Frequency | 50 to 60 Hz |
| Operating Temperature | 22 ± 5 °C |
| Power Consumption | <150 W |

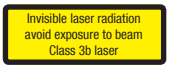
### OPTIONS

- Fiber Doppler noise cancellation
- Active RAM suppression
- Frequency doubling
- Frequency shifting AOMs for operation at exact atomic transition (e.g. Sr at 698 nm)
- Analysis of technical noise floor

### ORDERING INFORMATION

| | |
|---|---|
| **Product Code** | ORS-Cubic |

Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.
This configuration of the NPL cavity is intended for terrestrial use only. For further information on space-customised or space-qualified cavities, please contact NPL.

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