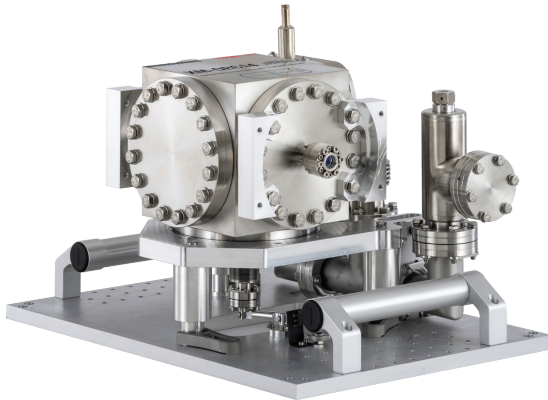


XM-ORC

OPTICAL REFERENCE CAVITY WITH CRYSTALLINE MIRRORS



APPLICATIONS

- Laser Frequency Stabilization
- Quantum Computing
- Laser Cooling and Trapping
- High Resolution Spectroscopy

The High Finesse Optical Reference Cavity with Crystalline Mirrors (XM-ORC) is borne out of the combined expertise of Menlo Systems (ultrastable laser systems and reference cavities) and Thorlabs (high performance optical components) and is the solution when customization and ultimate performance are paramount.

The Menlo Systems supplied Fabry-Pérot-type cavity comprises a cylindrical resonator spacer made out of ultra-low expansion glass (ULE) designed by the Physikalisch Technische Bundesanstalt (PTB) in Germany. The cavity is mounted horizontally on four support points within a sealed stainless steel vacuum housing and is engineered for exceptional temperature stability to enable low frequency drift. The compact design ensures minimal spatial demand and portability is ensured by a mechanical locking mechanism.

Thorlabs provides the cavity mirrors consisting of a substrate-transferred crystalline (xtal stable) coating on a fused silica substrate for maximum reduction in thermal noise and excellent optical performance. Note that each mirror is spatially mapped for optical losses to ensure the target finesse is realized.

Every system is baked-out during the assembly process and a vacuum pump and temperature controller are included. The addition of ULE thermal compensation rings (licensed from PTB) ensures that room temperature operation will roughly correspond to the zero crossing of the thermal expansion coefficient for the assembled cavity.

SPECIFICATIONS	XM-ORC
Wavelength	1550 nm, 1397 nm, or 1064 nm
Finesse	> 300 000 (1550 & 1397 nm) > 100 000 (1064 nm)
Cavity Length (ULE Spacer)	12.1 cm
Cavity Mirrors	Crystalline Coating (xtal stable™) on Fused Silica Substrate
Free Spectral Range	1.24 GHz
Windows	AR Coated, Angled and Wedged
Thermal Shielding	Active
Thermal Noise ADEV Limit	1.6×10^{-16}
Linear Drift Rate	~ 150 mHz/s
Ambient Temperature Sensitivity	~ 4 mK/°C
Weight (incl. Temperature Controller, Vacuum Pump and Controller)	55 kg

