Mephisto MOPA

Ultra-Narrow Linewidth High Power CW DPSS Laser

Mephisto MOPA (Master Oscillator Power Amplifier) is a high power single-frequency continuous-wave solid-state laser designed for demanding low noise scientific and OEM applications. Laser's unique stability originates from the properties of widely recognized Non-Planar Ring Oscillator (NPRO) which is in the heart of MOPA's seed unit. The MOPA exhibits optical properties unmatched by any other commercial product, such as ultra-narrow linewidth of 1 kHz or extremely low intensity noise (-130 dB/Hz RIN), which is the result of integrated Noise Eater (NE) technology. Laser user has full control over emission frequency which can be adjusted by temperature and PZT. MOPA emits at 1064 nm wavelength and is available at power levels of 8, 25, 42 and 55W. Frequency doubled laser version is available upon request.

Unmatched combination of high output power, ultra-narrow linewidth, frequency tuning, extremely low noise, and excellent laser beam parameters makes Mephisto MOPA the laser of choice for demanding scientific applications like atom trapping and cooling, optical metrology, quantum optics, gravitational wave studies, LIDAR, OPO pumping and other applications requiring extremely narrow linewidth and ultra-stable laser beams.

FEATURES

- Master oscillator power amplifier (MOPA) configuration
- Monolithic non-planar ring oscillator (NPRO) seed laser
- Extremely long coherence length
- Noise Eater – active intensity noise reduction technology
- User-installed, turn-key operation
- Low noise control electronics

APPLICATIONS

- Atom Trapping and Cooling
- Optical Lattices
- Gravitational Wave Studies
- Laser-based Metrology
- Quantum Optics and Phenomena
- Nonlinear Optics Pump Source (SHG, DFG, OPO)
- LIDAR

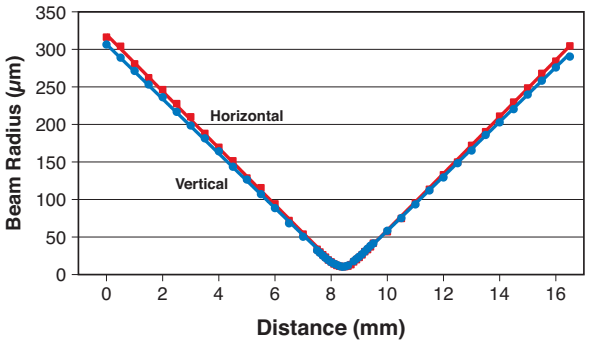
COHERENT®
Superior Reliability & Performance

SPECIFICATIONS	Mephisto MOPA
Laser Power at 1064 nm	8, 25, 42, 55
Operational Mode	Continuous-wave
Spatial Mode	TEM_{00} (M^2 <1.3)
Beam Roundness	<1.1
Thermal Tuning Coefficient (GHz/K)	-3
Thermal Tuning Range (GHz)	30
Thermal Response Bandwidth (Hz)	≅1
PZT Tuning Coefficient (MHz/V)	≅1
PZT Tuning Range (MHz)	±65
PZT Response Bandwith (kHz)	100
Emission Spectrum	Single-frequency
Spectral Linewidth (kHz) (over 100 ms)	≅1
Coherence Length (km)	>1
Frequency Stability[1] (MHz/min.)	≅1
Relative Intensity Noise (RIN) (dB/Hz), f >20 kHz	<-130
Intensity Noise, 10 Hz to 2 MHz (% rms)	<0.06
Waist Location (inside laser head) (mm)	≅105
Laser Head Size (L x W x H) for 8W, 25W and 42W for 55W	 386 x 381 x 117 mm (15.2 x 15.0 x 4.6 in.) 386 x 461 x 117 mm (15.2 x 18.1 x 4.6 in.)
Laser Head Weight for 8W, 25W and 42W for 55W	 26 kg (57.3 lbs.) 28 kg (61.7 lbs.)
Laser Controller Master Size (L x W x H)	90 x 340 x 235 mm (3.5 x 13.4 x 9.25 in.)
Laser Controller Amplifier Size (L x W x H)	135 x 420 x 450 mm (5.3 x 16.5 x 17.7 in.)
Laser Controller Master Weight	4.2 kg (9.3 lbs.)
Laser Controller Amplifier Weight[2]	11.9 to 13.1 kg (26.2 to 28.9 lbs.)
Laser Head Cooling[3]	Water cooling
Water Flow Rate (l/min.)	>3
Water Pressure at Laser Head (bar)	<4
Water Temperature[4] (°C)	25
Cooling Power[2] (W) (chiller)	300 to 600
Options	Frequency doubled MOPA version available upon request

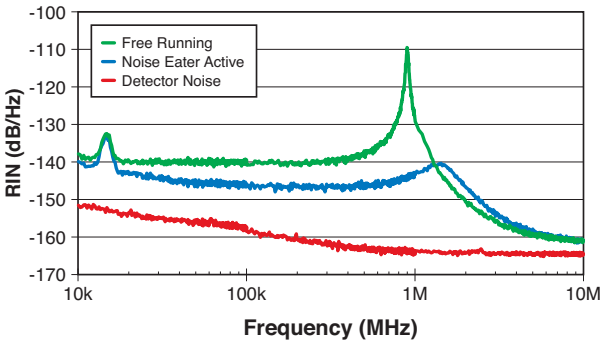
1 Measured at constant room temperature.
2 Depending on model.
3 Non-deionized water recommended. Chiller available upon request.
4 Operation above dew point required to avoid condensation.

TYPICAL PERFORMANCE DATA

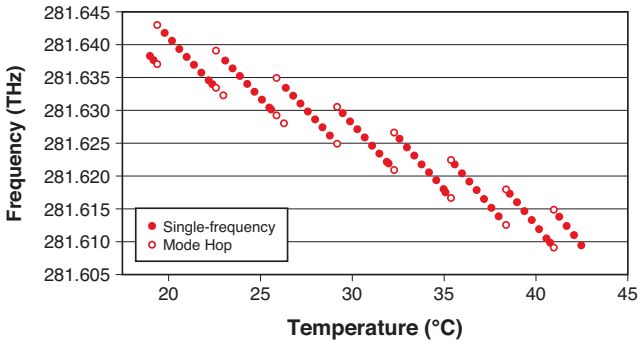
Beam Quality



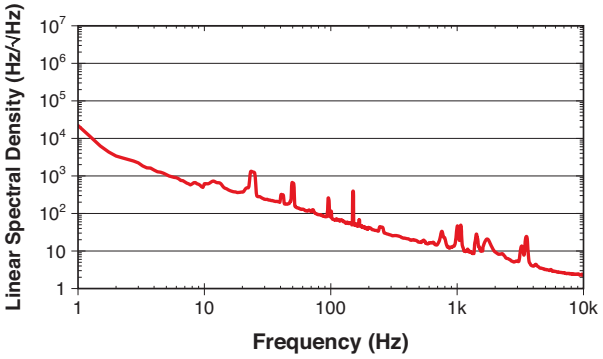
Relative Intensity Noise



Thermal Frequency Tuning



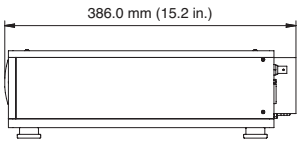
Frequency Noise



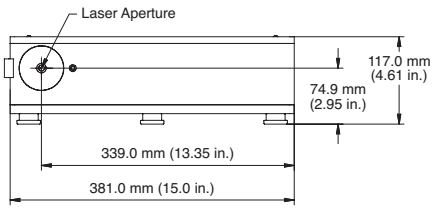
MECHANICAL SPECIFICATIONS

Mephisto MOPA 8W/25W/42W

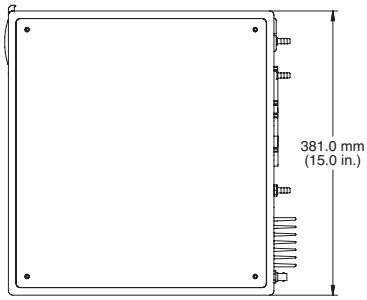
Side View



Front View

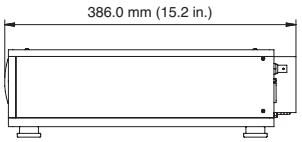


Top View

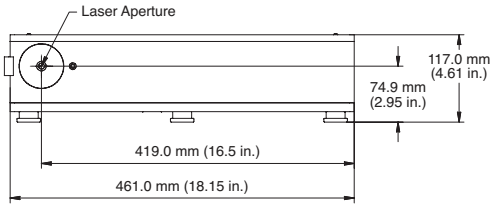


Mephisto MOPA 55W

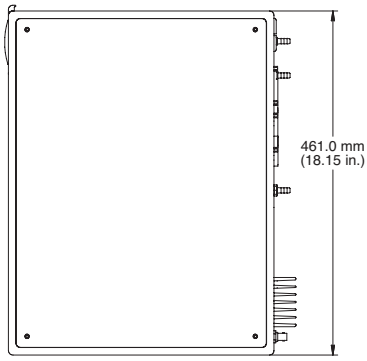
Side View



Front View



Top View



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