

Mira

Widely Tunable, Femtosecond, Picosecond and CW Flexible, Ultrafast Ti:Sapphire Lasers

Continuing to enabling new research, and still in demand since its introduction in 1991, Mira remains the most powerful and flexible ultrafast Ti:S laser system available — a testament to its great design, with many features that remain unique to this day.

For example, switching between femtosecond, picosecond and continuous-wave operation is fast and simple, while robust, passive Kerr lens modelocking reduces complexity and improves reliability. Every system also comes with Optima™ a suite of controls and diagnostics that greatly simplifies system optimization and daily operation.



FEATURES

- Simple, stable Kerr lens modelocking for ease-of-use and reliability
- Optima™ simplifies system alignment, monitoring and control of the laser. It consists of:
 - Fast photodiode
 - Autoranging power monitor detector
 - CW detector
 - Automatic modelocking starter
 - β -Lock™ automatic GTI control for skip-free ps wavelength tuning – only available on Mira
- Integrated pump beam steering optics with multiple pump port options for easy pump alignment and flexible layout
- Auxiliary CW cavity included for ease of alignment and tunable CW output

APPLICATIONS

- Time-Resolved Spectroscopy
- Raman Spectroscopy (CARS)
- Ti:S Ultrafast Amplifier Seeding
- Terahertz Generation
- Material Modification Including Micro- and Nano-Texturing, LIPSS
- Quantum Communication Studies

SPECIFICATIONS ^{1,2}	Mira 900-D		Mira HP-D	
	Mira 900-F	Mira 900-P	Mira HP-F	Mira HP-P
Output Power (W) (depending on Pump Laser below)				
Verdi-G5	>0.75	>0.75		
Verdi-G8	>1.0	>1.0		
Verdi-G10	>1.4	>1.4		
Verdi-G12	>1.8	>1.8		
Verdi-G15	>2.2	>2.2	>2.8	>2.5
Verdi-G18			>3.5	>3.0
Tuning Range (nm)	700 to 1000 ³	700 to 1000 ³	690 to 1050 ³	700 to 1000 ³
Pulse Width ⁴	<115 fs	<2 ps	<130 fs ⁵	<2 ps
RMS Noise ⁶ (%)	<0.1	<0.1	<0.1	<0.1
Peak-to-peak power stability measured over 2 hours ⁷ (%)	<3	<3	<3	<3
Repetition Rate ⁸ (MHz)	76	76	76	76
Spatial Mode ⁹	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀
1/e ² Beam Diameter at Exit Port (mm)	0.8 ±0.2	0.8 ±0.2	0.8 ±0.2	0.8 ±0.2
Full Angle Beam Divergence at Exit Port (mrad)	1.9 ±0.3	1.7 ±0.3	1.5 ±0.3	1.5 ±0.3
Polarization	Horizontal	Horizontal	Horizontal	Horizontal
STANDARD FEATURES				
Optima™				
- Fast photodiode	•	•	•	•
- Autoranging power monitor detector	•	•	•	•
- CW detector	•	•	•	•
- Automatic modelocking starter	•	•	•	•
- Relative humidity sensor	•	•	•	•
- β-Lock™ automatic GTI control for skip-free ps wavelength tuning	NA	•	NA	•
Purgeable enclosure for operation across the water absorption bands	•	•	•	•
Integrated pump beam steering optics with 3 pump port options for easy alignment and layout flexibility	•	•	•	•
Auxiliary CW cavity for ease of alignment and tunable CW output ¹⁰	• ¹¹	•	• ¹¹	•

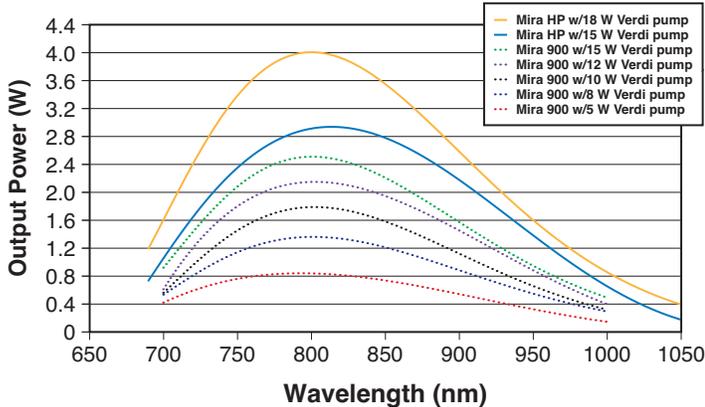
Notes:

- Specifications apply only with Coherent pump lasers.
- Specifications apply at 800 nm and standard rep. rate of 76 MHz unless otherwise stated.
- Wider coverage possible with short wave or extended long wave optics sets.
- Based on sech² deconvolution of 0.65 times autocorrelation width.
- In fs mode, the pulses are typically 1.5x the transform limit and so can be further compresses in an external compressor.
- Measured rms in a 10 Hz to 20 MHz bandwidth.
- Measured after warm-up with crystal cooling water maintained at ±0.1°C.
- Rep. Rates in the range of 74 to 84 MHz available on request.
- Typical M² <=1.1.
- Additional test option required for optimum CW tuning performance.
- Requires additional 3-plate BRP tuning element (not included) for skip-free tuning.

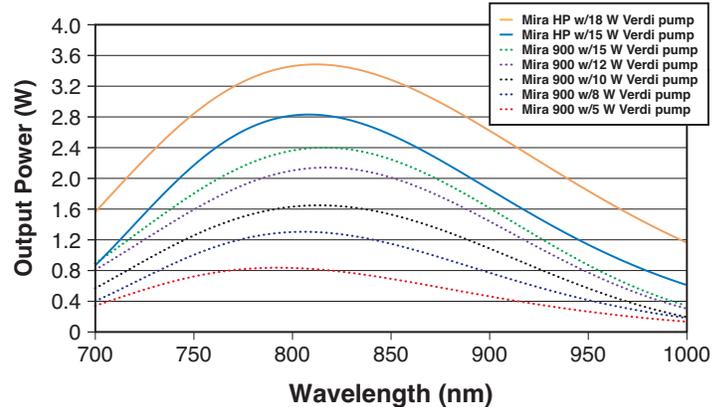
OPTIONS AND ACCESSORIES (NOT INCLUDED)	Mira 900-D		Mira HP-D	
	Mira 900-F	Mira 900-P	Mira HP-F	Mira HP-P
	Short Pulse Option (<70 fs)	Long Pulse Option (>3.5 ps or >6 ps)	Short Pulse Option (<70 fs)	Long Pulse Option (>3.5 ps)
	External Pulse Compressor (SPO-I or -II)		External Pulse Compressor (SPO-I or -II)	
	PowerTrack™ Active Pump Beam Steering (enhances power stability specification to <2% over 24 hours)			
	SynchroLock-AP - Repetition Rate Synchronization			
	Pulse Picker			
	Harmonic Generators (SHG, THG, FHG)			
	Mira OPO-X - Optical Parametric Oscillator (IR, Visible, fs, ps)			
ELECTRICAL AND COOLING REQUIREMENTS				
Voltage (VAC)	110 or 240			
Current Max. (A)	1			
Line Frequency (Hz)	50 or 60			
Cooling	Water-cooled via pump laser cooling loop			
Laser Head Dimensions (L x W x H)	111.1 x 38.1 x 19.7 cm (43.75 x 15 x 7.75 in.)			
Beam Height	120.6 mm (4.75 in)			

TYPICAL PERFORMANCE DATA

Typical Power Curves for Verdi-pumped Mira 900-F and Mira HP-F



Typical Power Curves for Verdi-pumped Mira 900-P and Mira HP-P



Mechanical Specifications

Mira

