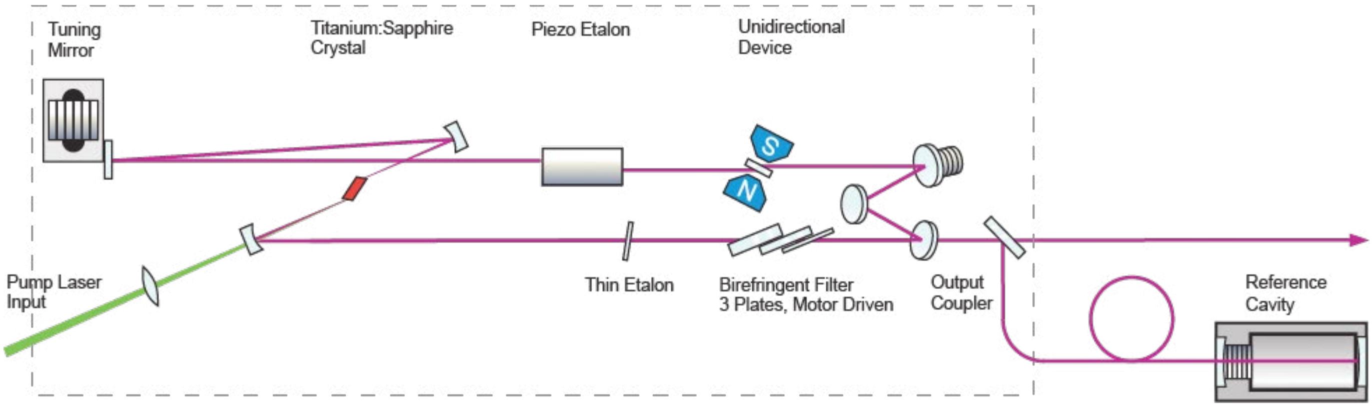
Matisse® CW Tunable Ring Lasers

The Spectra-Physics® Matisse series is a family of state-of-the-art single frequency ultra-stable, narrow linewidth tunable ring lasers. The Matisse system has the industry's highest output power, the narrowest external linewidth, the broadest tuning range.

Out of Plane Ring Resonator

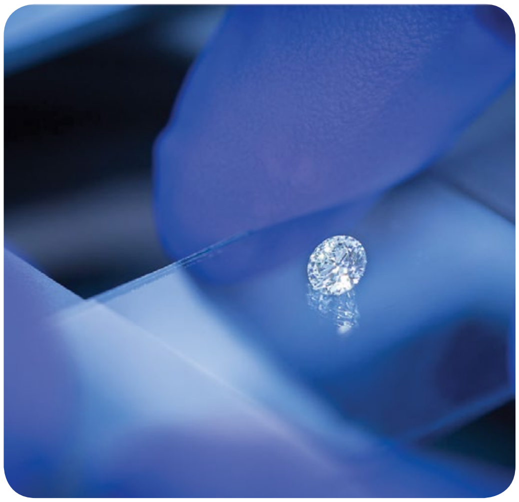
The Out of Plane cavity design is a stable and more reliable configuration delivering years of worry free operation.

All CW ring lasers support uni-directional propagation of light within the laser cavity. Most ring lasers utilize a thin intracavity waveplate which is easily damaged, resulting in lower output power and performance. The Matisse lasers are configured with an Out of Plane cavity design eliminating the need for this thin waveplate.



Matisse optical layout with reference cavity. The Matisse features an Out of Plane ring resonator design and two etalons for maximum mode stability.

Featured Application



Quantum computers, tap-proof data transfer or highly sensitive sensors – quantum mechanical properties, such as superposition and entanglement, are fundamental to many of tomorrow's technological systems. In the interdisciplinary core area of quantum information and technology, scientists at Ulm University investigate quantum physical phenomena in theory and by experimentation. The overall goal is to gain complete control over quantum systems. It is also about quantum physical effects in condensed matter, in nanostructures and in biological systems.

Novel sensors for use in cells are an important goal in research at Ulm University. To achieve this, scientists focus on the manipulation of individual atoms in diamonds. Prof. Fedor Jelezko, one of the world's leading experts in controlling the smallest particles in solids - as demonstrated by the prestigious awards he has won - is involved in these research groups.

Matisse Features

Narrowest Linewidth

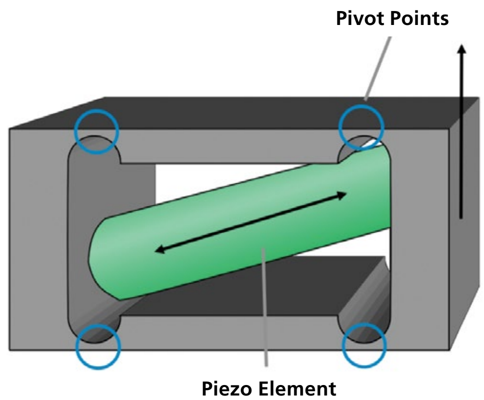
The Matisse is available with three levels of frequency stabilization: Passive stabilization with phase lock loop, active stabilization with reference cell, and active stabilization with Pound-Drever-Hall locking for ultra-narrow linewidths to <30 KHz (100 ms integration time).

Mode-Hop-Free Tuning

Superior mechanical stability, specially designed optical mounts, unique tuning methods, and the preferred Out of Plane cavity design of the Matisse C all contribute to the exceptional mode-hop-free scanning range of >50 GHz. In order to take this to the next level, we have developed “Scan Stitching” for wide mode-hop-free tuning over the full wavelength range (up to 300 nm).

Flexure Optical Mounts for Optimal Power Flatness

Even the smallest tilts in linear travel when wavelength tuning by changing the cavity length of a ring laser will result in decreased output power. All optics meant to travel linearly in the Matisse are mounted on flexure optical mounts. These mounts enlarge the scan range and guides linear translation, therefore providing power flatness to within 5% across 50 GHz of mode-hop-free tuning.

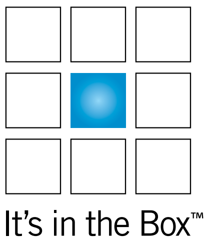


Parallelogram Piezo Device: Accurate parallel motion in a single direction integrated lever transmission motion of up to 200 µm.

Pumped by Millennia® eV™ DPSS Laser

The Millennia eV platform is based on Spectra-Physics’ It’s in the Box™ design, where the laser optical cavity, diode and control electronics are all integrated in a single, compact package, eliminating the need for an external power supply.

With its industry leading scalability from 5 W to 25 W average power and high reliability, Millennia eV is the next generation laser of choice for demanding scientific applications such as the pumping of CW Ti:Sapphire lasers.

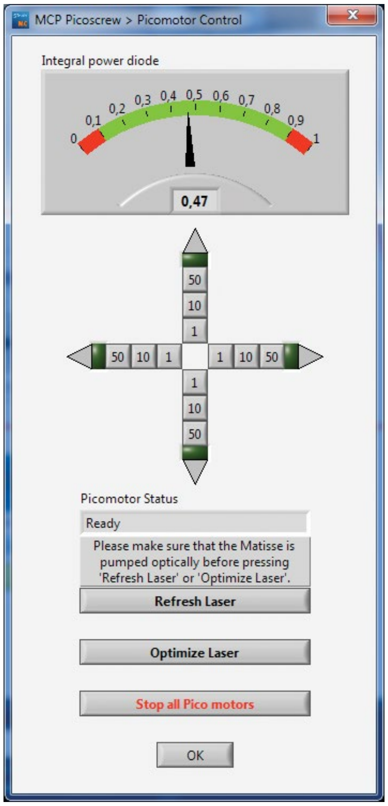


Matisse Stability

Electronic Laser Self Alignment (ELSA)

The Beam Steering Mirror on the input of the Matisse is mounted on a Picomotor™ actuated mirror mount. The Picomotor actuator is the best technology on the market enabling "set and forget" alignment. To account for long term pump beam-walk, the output power of the Matisse is monitored and provides feedback for self-alignment.

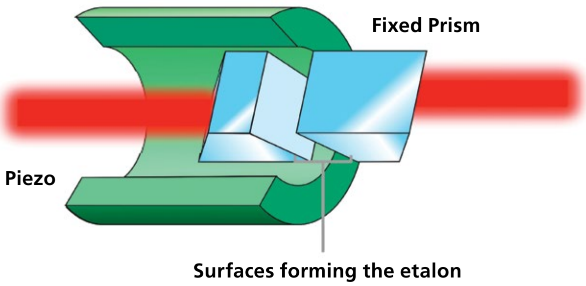
Matisse input beam-steering mirror.



ELSA control GUI.

Two Etalons

The unique cavity design of the Matisse incorporates two etalons. The second etalon provides increased long term mode stability. This "thick etalon" uses air gap technology for maximum locking stability



Thick etalon air-gap design.

Variable Low Frequency Locking

CW single frequency ring lasers utilize a Phase Lock Loop (PLL) in order to stabilize the laser cavity to a single longitudinal mode. The Matisse incorporates a unique PLL technique that delivers low dither frequencies (down to 500 Hz) to minimize laser noise and allows easy adjustability of the frequency (500 Hz – 3 kHz) via software.

Counter Drift Option

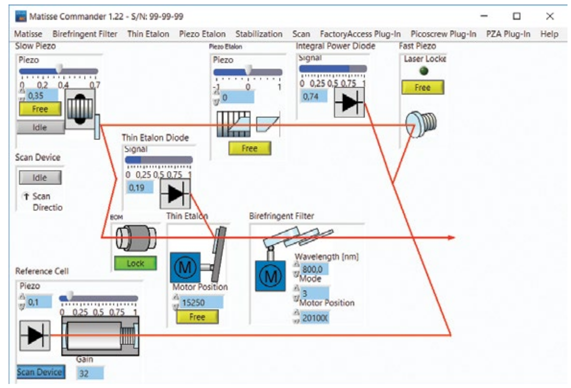
The Matisse can counteract the wavelength drift which is specific to any tunable CW single mode laser.

To further counteract drift for a Matisse without reference cavity, a good wavemeter can be used as reference. Or for a Matisse laser with reference cavity an optional strain gauge can be installed on the scanning piezo. It is also possible to use the Matisse reference cavity as a transfer cavity or to stabilize it to an atomic resonance or a frequency comb.

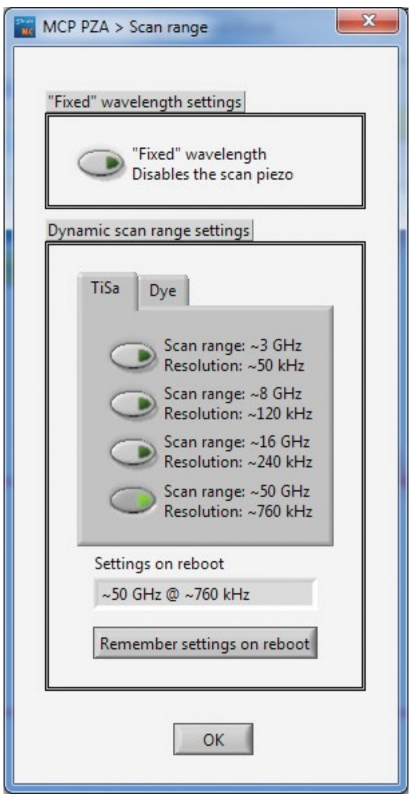
Matisse Software Control

Fully Automated Software Control

The Matisse is controlled with an intuitive GUI allowing fully automated and easy operation. Functionality, such as wavelength selection, piezo scanning, and frequency locking are easily visualized with a pictorial schematic of the Matisse laser cavity. Other GUI windows display automated monitoring of beam alignment and laser performance.

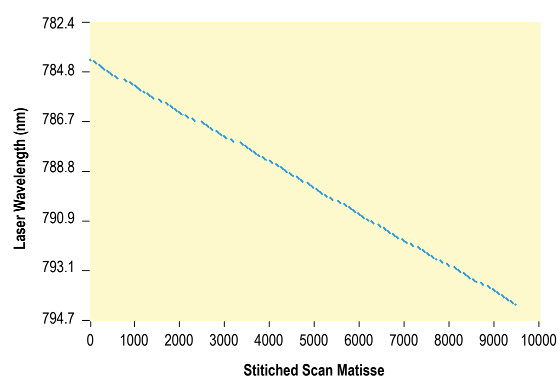


Screenshot of the Matisse Commander software.



Automated Scan Stitching

The Matisse can perform indefinitely long scans by stitching the 50 GHz scans together. An implemented software routine automatically optimizes the position of all the optical elements involved in wavelength selection, allowing to scan the laser in 50 GHz steps without the need to manually reset or realign any components.



Dynamic Scan Range

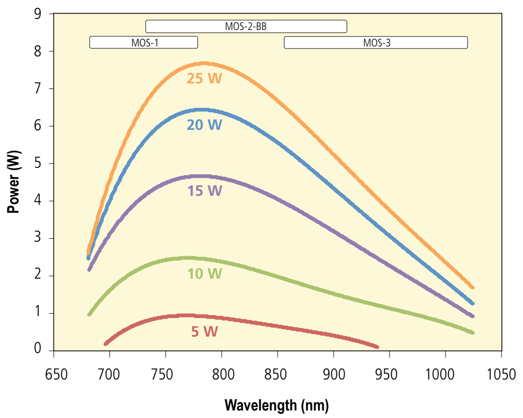
The Dynamic Scan Range function allows easy adjustment of the wavelength tuning resolution. This is achieved via a built in switchable piezo amplifier with easy software control. Tuning resolutions down to 50 kHz can be selected when fine wavelength adjustments are needed.

Matisse Tuning Curves

Tune over 300 nm with one optics set

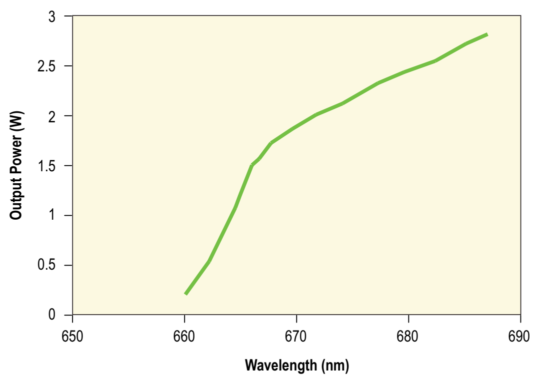
Broadband optics provides over 300 nm automated continuous tuning with no need to change optics. Other wavelength options are available for higher power at specific wavelength ranges between 670 nm and 1038 nm.

Matisse tuning Curves with Millennia eV Pump[1]



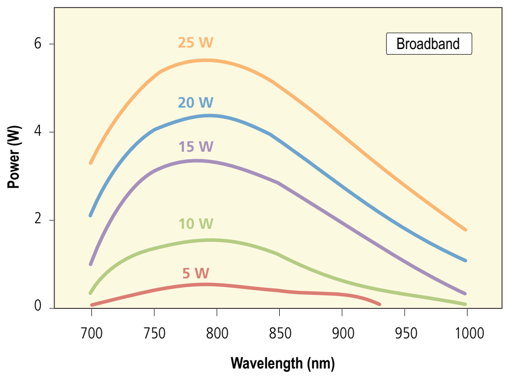
1. Typically measured performance; not a guaranteed or warranted specification.

Matisse tuning curve with MOS-1-BB and MOS-1-EXT mirrors. Pumped with a Millennia eV 15W laser[1]



1. Typically measured performance; not a guaranteed or warranted specification.

Matisse tuning curve with a single broadband mirror set. Pumped with various pump powers[1]



1. Typically measured performance; not a guaranteed or warranted specification.

Matisse Models

Matisse CR

Passively Stabilized

- Phase Lock Loop
- Linewidth <2 MHz (100 ms), <1.4 MHz (100 µs)

Matisse CS

Actively Stabilized

- Reference Cell
- Linewidth <50 kHz (100 ms), <35 KHz (100 µs)

Matisse CX

Pound-Drever-Hall Stabilized

- Linewidth <30 kHz (100 ms), <20 KHz (100 µs)

Matisse 2

- Ultimate Flexibility
- Ti:Sapphire and Dye Options

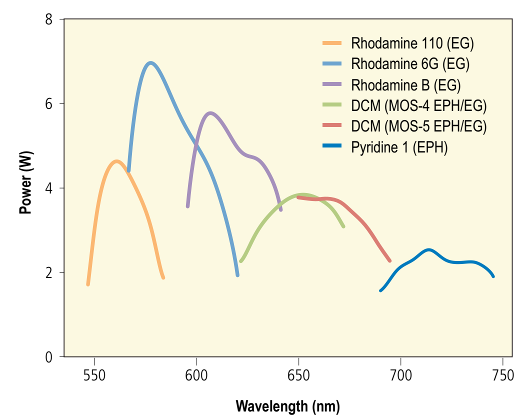
The Matisse 2 is a flexible open architecture platform and is available with Ti:Sapphire or Dye gain medium for wavelength options across the visible range. The Matisse 2 can be easily converted between Ti:Sapphire and Dye and optics readily changed.

Matisse CS with Millennia eV pump laser

Matisse C Compact Form

The Matisse C is a closed box and fully automated system. For the CS version, the reference cavity is housed beneath the Millennia eV pump laser for a compact layout.

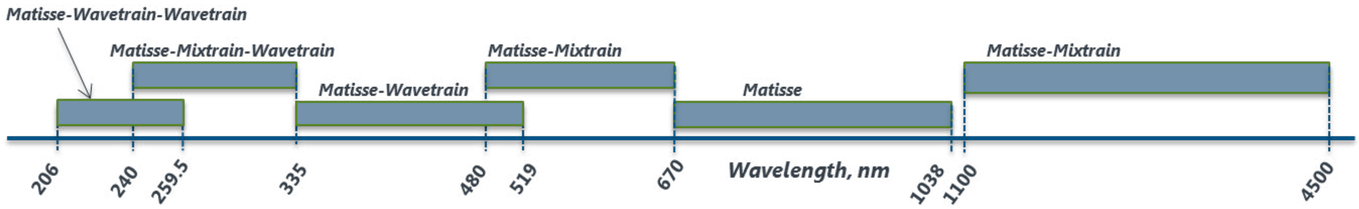
Matisse 2 Dye tuning curve [1]

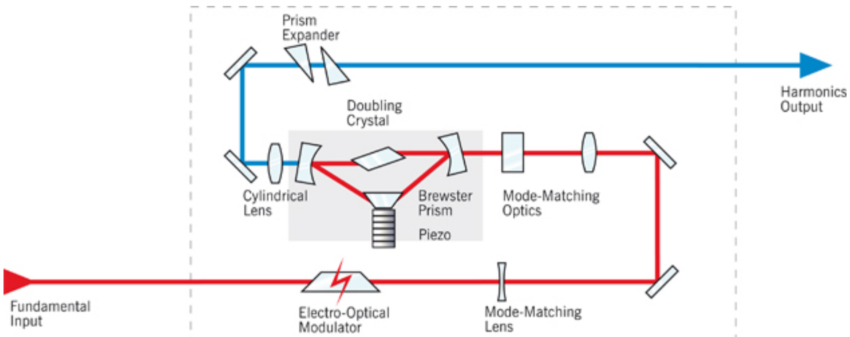


1. Typically measured performance; not a guaranteed or warranted specification.

Wavelength Extension – An automated all solid state solution

With various configurations of the Matisse, WaveTrain® doubler, and MixTrain™ frequency mixer, Spectra-Physics offers an all solid state solution for wavelengths ranging from 206 nm to 4.5 μm.

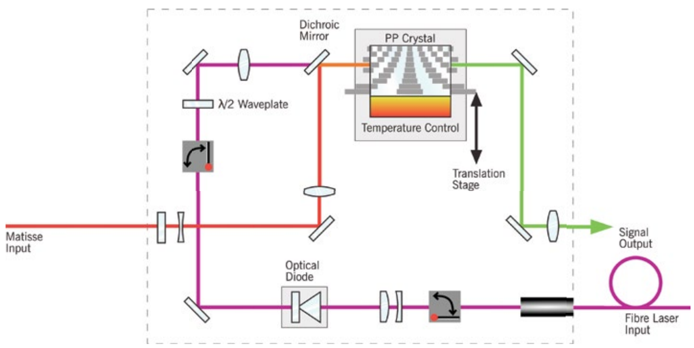




WaveTrain 2 optical schematic

WaveTrain 2 is an advanced stand-alone device that provides simple frequency doubling of single frequency CW laser beams. With greater efficiency than traditional intra-cavity or extra-cavity methods, this product can be used to generate the second harmonic of the output of the Matisse.

The MixTrain utilizes quasi-phase matching in periodically poled crystals for sum- or difference frequency mixing of two cw-lasers. The system uses a motor controlled translation stage for changing the period of the crystal and a temperature stabilized oven capable of heating up to 180°C. All optics for beam shaping, polarization control, beam combination, and beam separation are included. An optical diode isolates the fiber laser input from back reflections from the setup.



MixTrain 2 optical schematic

Matisse® 2

Ultra-Narrow Linewidth Tunable Ring Laser

mks | Spectra-Physics®

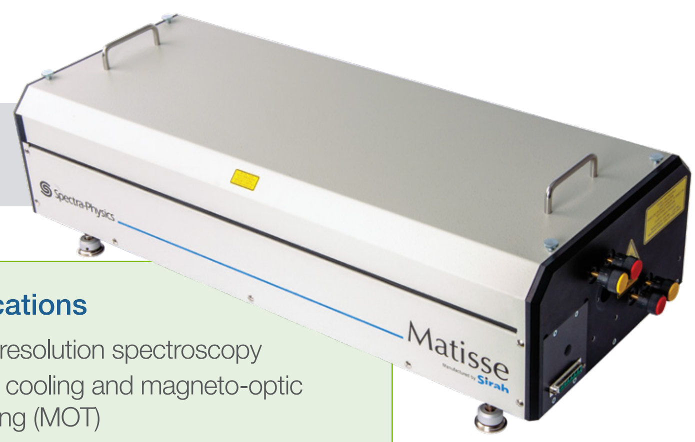
The Spectra-Physics® Matisse® 2 series is a family of state-of-the-art single frequency ultra-stable, narrow linewidth tunable ring lasers that are ideal for Quantum and AMO (atomic, molecular and optical physics) applications. The Matisse 2 system has the industry's highest output power, the narrowest external linewidth, the broadest tuning range, and the most flexible architecture.

Coupled with the Millennia® eV™ 25 pump laser, the Matisse 2 produces over 7.2 W of output power. With flexibility to be configured for either Ti:Sapphire or dye as the laser gain medium, Matisse 2 provides an unprecedented tuning of >470 nm and linewidths down to 30 kHz, with fully integrated PDH lock to X reference cell.

Matisse 2 TR and DR

The Matisse 2 R-Series ring laser with its mechanically quiet design provides excellent passive stability and ultra-low noise, single-frequency operation. Electronically controlled wavelength-selecting elements—a birefringent filter, a thick etalon, and a thin etalon—keep the laser centered on a single longitudinal mode. This enables long, mode-hop-free wavelength scans while maintaining constant, low-noise output power levels.

The Matisse 2 TR Ti:Sapphire ring laser provides a spectral linewidth of <4 MHz and can be readily upgraded to the higher resolution Matisse 2 TS. In fact, because of its modularity, any Matisse 2 laser can be field upgraded to either a Ti:Sapphire or dye gain medium, or to a configuration with higher resolution – from an R-Series to an S-Series or an X-Series.



Matisse 2 Advantage

- Highest output power available >7.2 W
- Narrowest linewidth <30 kHz rms
- Field-upgradeable to dye or Ti:Sapphire gain medium
- Widest mode-hop-free Diezo tuning of 50 GHz
- Dust-sealed housing and massive steel baseplate
- Fast Digital Signal Processing (DSP) with open-source software
- Sapphire dye jet nozzle
- Automated picomotor alignment

Applications

- High-resolution spectroscopy
- Atom cooling and magneto-optic trapping (MOT)
- Atomic clocks
- Bose-Einstein condensates
- Frequency combs
- Quantum computing
- Microcavity resonators
- Quantum applications

Matisse 2

Matisse 2 TS and DS

The Matisse 2 S-Series actively-stabilized ring laser incorporates an external reference cavity with feedback to a cavity-length-stabilizing fast piezo-driven mirror. To guarantee a truly independent frequency feedback signal, the reference cavity is thoroughly isolated against thermal and mechanical perturbations and is fiber coupled outside the laser housing.

The Matisse 2 TS actively-stabilized Ti:Sapphire ring laser has an internal spectral linewidth of <50 kHz, while the Matisse 2 DS dye ring laser provides a spectral linewidth of <200 kHz.

Matisse 2 TX and DX

The Matisse 2 X-Series ring laser provides spectral linewidths to <30 kHz for the Ti:Sapphire active gain medium, and <100 kHz for the dye laser. This ultra-narrow linewidth is the result of very fast cavity length stabilization with a response bandwidth in the MHz range. This is achieved by use of an intra-cavity electro-optic modulator (EOM).

Also key to achieving this ultra-narrow linewidth is the feedback error signal from the external reference cavity using the Pound-Drever-Hall stabilization scheme and a high finesse external reference cavity. Pound-Drever-Hall provides an unambiguous measure of wavelength position uninfluenced by laser intensity fluctuations.

Matisse 2 TX-light

The Matisse 2 TX-light fills the linewidth gap between the Matisse 2 TS and the Matisse 2 TX. It utilizes the Pound-Drever-Hall locking technique and the high-resolution reference cavity of the TX to provide the feedback signal to the fast Piezo-driven mirror of the TS. The negligible sensitivity of the Pound-Drever-Hall method to intensity fluctuations, as well as the extremely stable locking it provides, lead to laser linewidths of less than 50 kHz.

Open cavity Matisse 2 TX showing intra-cavity EOM for fast cavity length stabilization

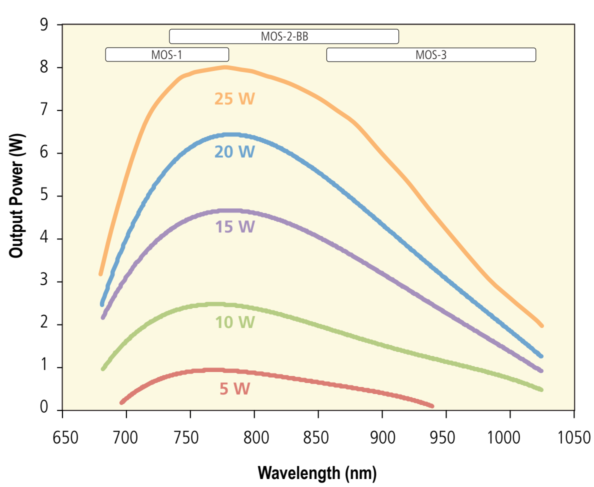
Matisse 2 TX with separate, optional reference cavity with Pound-Drever-Hall feedback scheme

Matisse 2 Specifications[1]

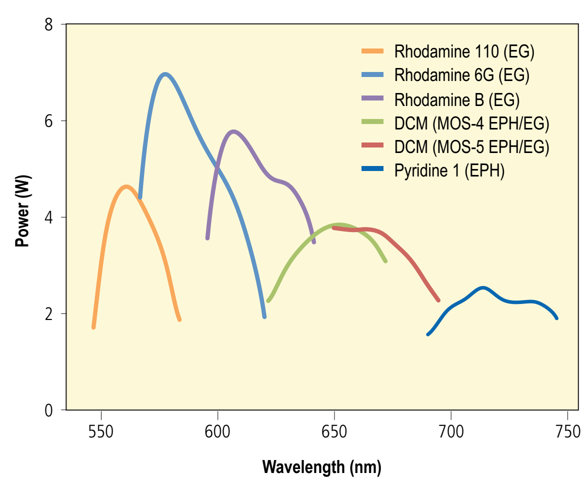
	Matisse 2 TR	Matisse 2 TS	Matisse 2 TX-light	Matisse 2 TX	Matisse 2 DR	Matisse 2 DS	Matisse 2 DX
General Characteristics							
Laser Gain Medium	Ti:Sapphire	Ti:Sapphire	Ti:Sapphire	Ti:Sapphire	Dye	Dye	Dye
Linewidth[5]	<4 MHz rms	<50 kHz rms[6]	<50 kHz rms[6]	<30 kHz rms[6]	<20 MHz rms[6]	<200 kHz rms[6]	<100 kHz rms[6]
Spatial Mode	TEM_{00}				TEM_{00}		
Beam Diameter[2]	1.4 mm (typical)				1.4 mm (typical)		
Beam Divergence[7]	<1 mrad				<1 mrad		
Amplitude Noise	<0.1% rms (above pump noise, added in quadrature)				<0.5% rms		
Scan Range	>50 GHz (at 780 nm)				>60 GHz (at 575 nm)		
Tuning Range[3, 8]							
MOS-1 Optics Set	680–790 nm	680–790 nm	680–790 nm	690–770 nm			
MOS-2 Optics Set	750–870 nm	750–870 nm	750–870 nm	750–870 nm			
MOS-2-BB Optics Set	730–930 nm	730–930 nm	730–930 nm	730–930 nm			
MOS-3 Optics Set	880–1038 nm	880–1038 nm	880–1038 nm	880–1010 nm			
MOS-4 Optics Set					550–660 nm	550–660 nm	550–660 nm
MOS-5 Optics Set					650–760 nm	650–760 nm	650–760 nm
Output Power[4]							
Millennia eV 25 W pump	7.2 W			6.2 W	6.0 W		4.5 W
Millennia eV 20 W pump	5.5 W			4.7 W	4.5 W		3.4 W
Millennia eV 15 W pump	3.8 W			3.3 W	3.0 W		2.2 W
Millennia eV 10 W pump	2.0 W			1.6 W	1.8 W		1.4 W
Millennia eV 5 W pump	0.8 W			N/A	0.8 W		N/A
Millennia Pump Laser and Lab Requirements							
Pump Laser Polarization	Horizontal						
Pump Laser Power	5–25 W						
Ambient Conditions	±0.5°C in the 20–25°C range, non-condensing humidity conditions						
Cooling	Water required to remove 20 W of heat from crystal; series connection from Millennia chiller recommended; 16–21°C ±0.1°C suggested Dye versions: Water required to remove 100 W from dye circulator						
Laboratory	Vibrational isolated optical table, dust-free air (flow box)						
Electrical	100–250 VAC, max 2.5 A						
Computer Control	Windows operating system; USB port						

1. Due to our continuous product improvement, all specifications are subject to change without notice.
2. At Matisse 2 output port.
3. Specification applies to Millennia eV 15 W, 20 W and 25 W pump lasers. Please inquire for other pump powers.
4. At 780 nm for Ti:Sapphire and at the peak of R6G dye for dye version.
5. Linewidth measurements made over a period of >100 msec.
6. Linewidths relative to built-in reference cavity.
7. Measurement of half angle.
8. Extended tuning ranges available upon request. Contact Spectra-Physics.

Typical Matisse TR, TS Tuning Curve[1]

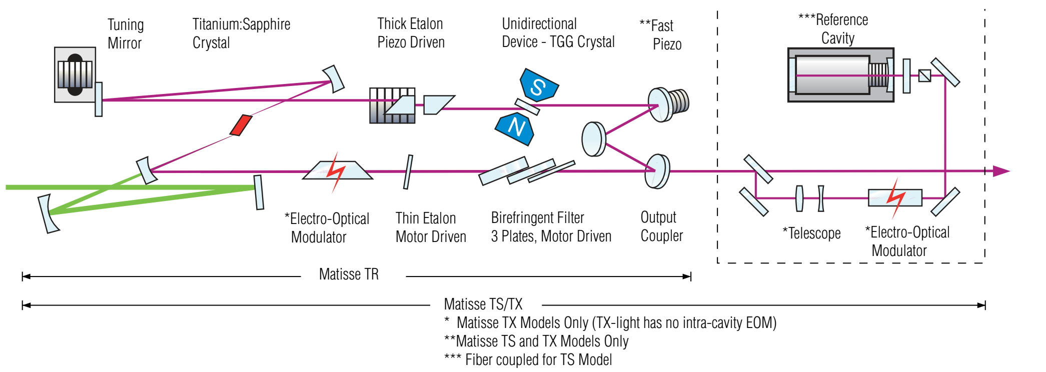


Typical Matisse DR, DS Tuning Curve 25W Pumped[1]

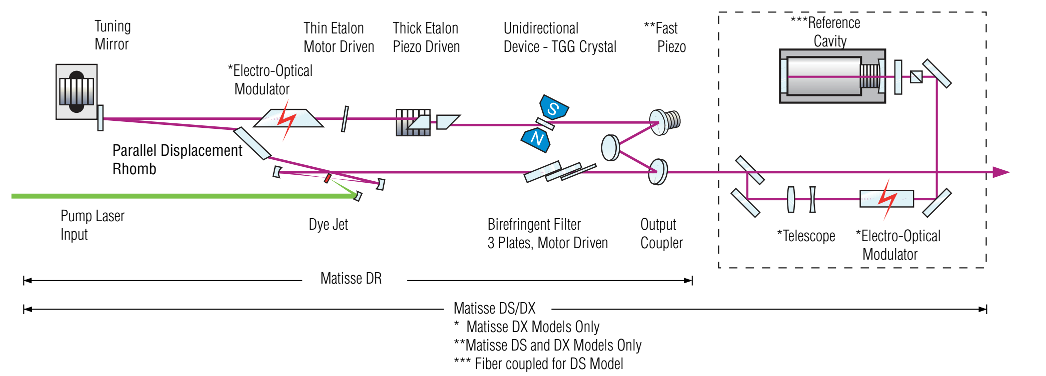


1. Typically measured performance; not a guaranteed or warranted specification, pumped by Millennia EV .

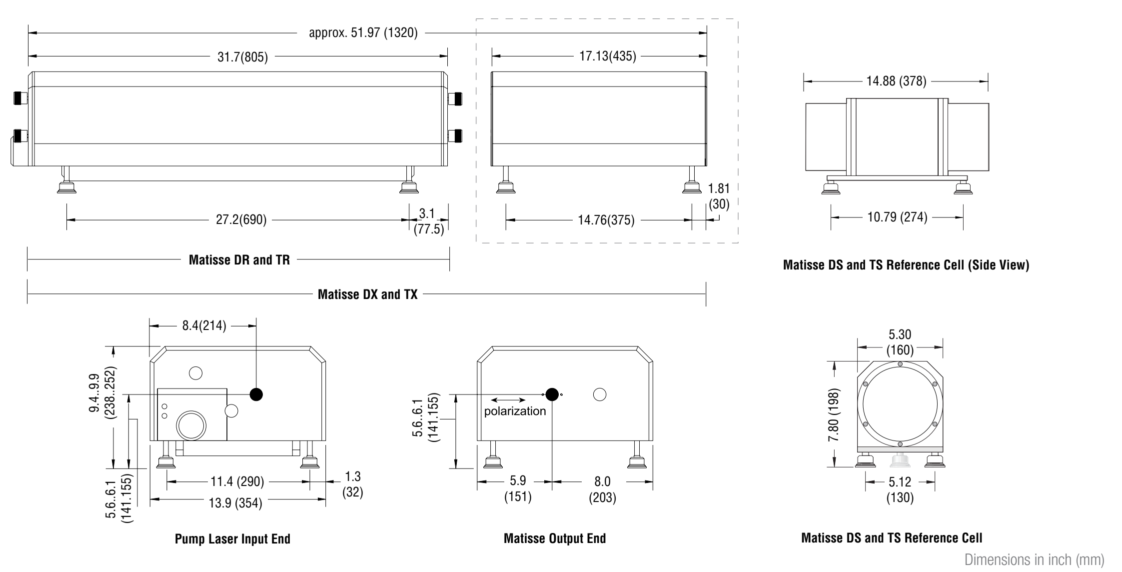
Matisse 2



Matisse 2 Ti:Sapphire Optical Layouts



Matisse 2 Dye Optical Layouts



Matisse 2 Dimensions

mks | Spectra-Physics®

www.spectra-physics.com

3635 Peterson Way, Santa Clara, CA 95054, USA
PHONE: 1-800-775-5273 1-408-980-4300 FAX: 1-408-980-6921 EMAIL: sales@spectra-physics.com

Belgium	+32-(0)0800-11 257	belgium@newport.com	Korea	+82-31-8021-1600	korea@spectra-physics.com
China	+86-10-6267-0065	info@spectra-physics.com.cn	Netherlands	+31-(0)30 6592111	netherlands@newport.com
France	+33-(0)1-60-91-68-68	france@newport.com	Singapore	+65-6664-0040	sales.sg@newport.com
Germany / Austria / Switzerland			Taiwan	+886-3-575-3040	sales@newport.com.tw
	+49-(0)6151-708-0	germany@newport.com	United Kingdom	+44-1235-432-710	uk@newport.com
Japan	+81-3-3556-2705	spectra-physics@splasers.co.jp			

Matisse® 2

Ultra-Narrow Linewidth Tunable Ring Laser

MKS | Spectra-Physics®

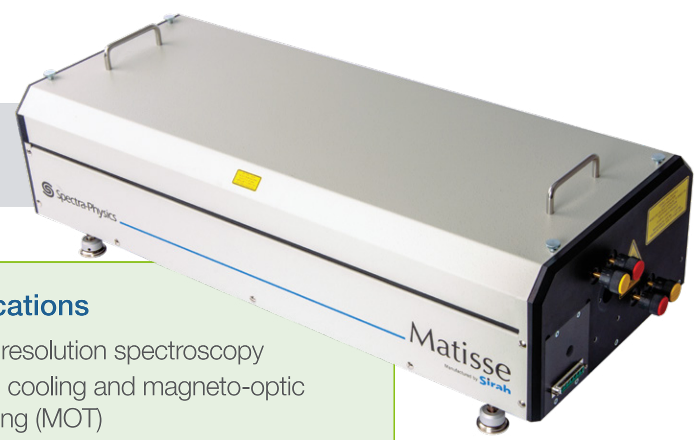
The Spectra-Physics® Matisse® 2 series is a family of state-of-the-art single frequency ultra-stable, narrow linewidth tunable ring lasers that are ideal for Quantum and AMO (atomic, molecular and optical physics) applications. The Matisse 2 system has the industry's highest output power, the narrowest external linewidth, the broadest tuning range, and the most flexible architecture.

Coupled with the Millennia® eV™ 25 pump laser, the Matisse 2 produces over 7.2 W of output power. With flexibility to be configured for either Ti:Sapphire or dye as the laser gain medium, Matisse 2 provides an unprecedented tuning of >470 nm and linewidths down to 30 kHz, with fully integrated PDH lock to X reference cell.

Matisse 2 TR and DR

The Matisse 2 R-Series ring laser with its mechanically quiet design provides excellent passive stability and ultra-low noise, single-frequency operation. Electronically controlled wavelength-selecting elements—a birefringent filter, a thick etalon, and a thin etalon—keep the laser centered on a single longitudinal mode. This enables long, mode-hop-free wavelength scans while maintaining constant, low-noise output power levels.

The Matisse 2 TR Ti:Sapphire ring laser provides a spectral linewidth of <4 MHz and can be readily upgraded to the higher resolution Matisse 2 TS. In fact, because of its modularity, any Matisse 2 laser can be field upgraded to either a Ti:Sapphire or dye gain medium, or to a configuration with higher resolution – from an R-Series to an S-Series or an X-Series.



Matisse 2 Advantage

- Highest output power available >7.2 W
- Narrowest linewidth <30 kHz rms
- Field-upgradeable to dye or Ti:Sapphire gain medium
- Widest mode-hop-free Diezo tuning of 50 GHz
- Dust-sealed housing and massive steel baseplate
- Fast Digital Signal Processing (DSP) with open-source software
- Sapphire dye jet nozzle
- Automated picomotor alignment

Applications

- High-resolution spectroscopy
- Atom cooling and magneto-optic trapping (MOT)
- Atomic clocks
- Bose-Einstein condensates
- Frequency combs
- Quantum computing
- Microcavity resonators
- Quantum applications

Matisse 2

Matisse 2 TS and DS

The Matisse 2 S-Series actively-stabilized ring laser incorporates an external reference cavity with feedback to a cavity-length-stabilizing fast piezo-driven mirror. To guarantee a truly independent frequency feedback signal, the reference cavity is thoroughly isolated against thermal and mechanical perturbations and is fiber coupled outside the laser housing.

The Matisse 2 TS actively-stabilized Ti:Sapphire ring laser has an internal spectral linewidth of <50 kHz, while the Matisse 2 DS dye ring laser provides a spectral linewidth of <200 kHz.

Matisse 2 TX and DX

The Matisse 2 X-Series ring laser provides spectral linewidths to <30 kHz for the Ti:Sapphire active gain medium, and <100 kHz for the dye laser. This ultra-narrow linewidth is the result of very fast cavity length stabilization with a response bandwidth in the MHz range. This is achieved by use of an intra-cavity electro-optic modulator (EOM).

Also key to achieving this ultra-narrow linewidth is the feedback error signal from the external reference cavity using the Pound-Drever-Hall stabilization scheme and a high finesse external reference cavity. Pound-Drever-Hall provides an unambiguous measure of wavelength position uninfluenced by laser intensity fluctuations.

Matisse 2 TX-light

The Matisse 2 TX-light fills the linewidth gap between the Matisse 2 TS and the Matisse 2 TX. It utilizes the Pound-Drever-Hall locking technique and the high-resolution reference cavity of the TX to provide the feedback signal to the fast Piezo-driven mirror of the TS. The negligible sensitivity of the Pound-Drever-Hall method to intensity fluctuations, as well as the extremely stable locking it provides, lead to laser linewidths of less than 50 kHz.

Open cavity Matisse 2 TX showing intra-cavity EOM for fast cavity length stabilization

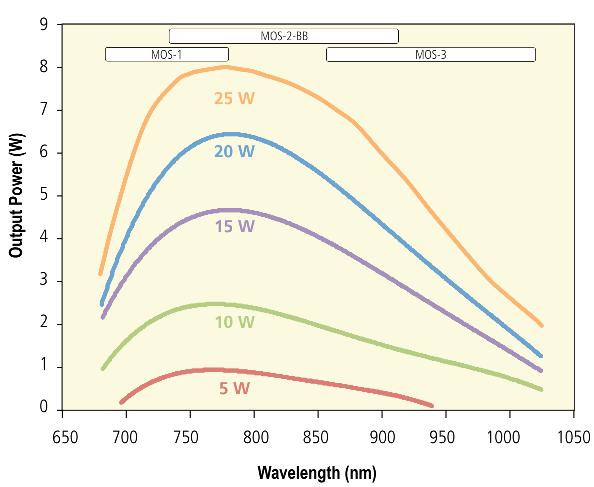
Matisse 2 TX with separate, optional reference cavity with Pound-Drever-Hall feedback scheme

Matisse 2 Specifications[1]

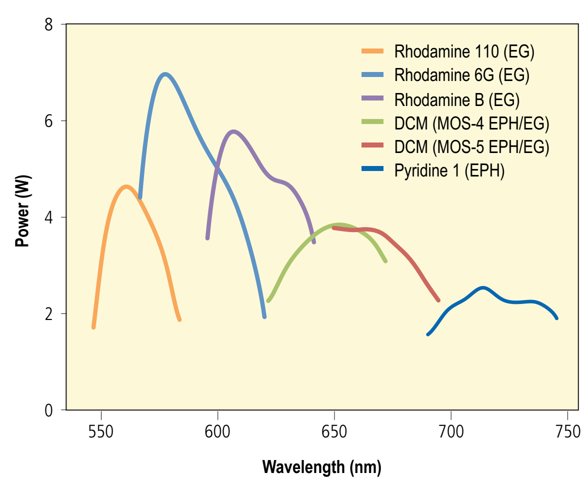
	Matisse 2 TR	Matisse 2 TS	Matisse 2 TX-light	Matisse 2 TX	Matisse 2 DR	Matisse 2 DS	Matisse 2 DX
General Characteristics							
Laser Gain Medium	Ti:Sapphire	Ti:Sapphire	Ti:Sapphire	Ti:Sapphire	Dye	Dye	Dye
Linewidth[5]	<4 MHz rms	<50 kHz rms[6]	<50 kHz rms[6]	<30 kHz rms[6]	<20 MHz rms[6]	<200 kHz rms[6]	<100 kHz rms[6]
Spatial Mode	TEM_{00}				TEM_{00}		
Beam Diameter[2]	1.4 mm (typical)				1.4 mm (typical)		
Beam Divergence[7]	<1 mrad				<1 mrad		
Amplitude Noise	<0.1% rms (above pump noise, added in quadrature)				<0.5% rms		
Scan Range	>50 GHz (at 780 nm)				>60 GHz (at 575 nm)		
Tuning Range[3, 8]							
MOS-1 Optics Set	680–790 nm	680–790 nm	680–790 nm	690–770 nm			
MOS-2 Optics Set	750–870 nm	750–870 nm	750–870 nm	750–870 nm			
MOS-2-BB Optics Set	730–930 nm	730–930 nm	730–930 nm	730–930 nm			
MOS-3 Optics Set	880–1038 nm	880–1038 nm	880–1038 nm	880–1010 nm			
MOS-4 Optics Set					550–660 nm	550–660 nm	550–660 nm
MOS-5 Optics Set					650–760 nm	650–760 nm	650–760 nm
Output Power[4]							
Millennia eV 25 W pump	7.2 W			6.2 W	6.0 W		4.5 W
Millennia eV 20 W pump	5.5 W			4.7 W	4.5 W		3.4 W
Millennia eV 15 W pump	3.8 W			3.3 W	3.0 W		2.2 W
Millennia eV 10 W pump	2.0 W			1.6 W	1.8 W		1.4 W
Millennia eV 5 W pump	0.8 W			N/A	0.8 W		N/A
Millennia Pump Laser and Lab Requirements							
Pump Laser Polarization	Horizontal						
Pump Laser Power	5–25 W						
Ambient Conditions	±0.5°C in the 20–25°C range, non-condensing humidity conditions						
Cooling	Water required to remove 20 W of heat from crystal; series connection from Millennia chiller recommended; 16–21°C ±0.1°C suggested Dye versions: Water required to remove 100 W from dye circulator						
Laboratory	Vibrational isolated optical table, dust-free air (flow box)						
Electrical	100–250 VAC, max 2.5 A						
Computer Control	Windows operating system; USB port						

1. Due to our continuous product improvement, all specifications are subject to change without notice.
2. At Matisse 2 output port.
3. Specification applies to Millennia eV 15 W, 20 W and 25 W pump lasers. Please inquire for other pump powers.
4. At 780 nm for Ti:Sapphire and at the peak of R6G dye for dye version.
5. Linewidth measurements made over a period of >100 msec.
6. Linewidths relative to built-in reference cavity.
7. Measurement of half angle.
8. Extended tuning ranges available upon request. Contact Spectra-Physics.

Typical Matisse TR, TS Tuning Curve[1]

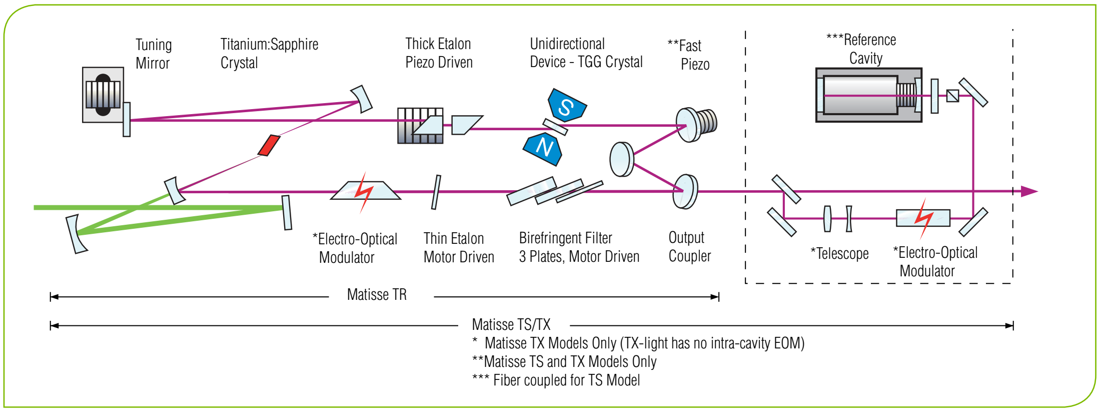


Typical Matisse DR, DS Tuning Curve 25W Pumped[1]

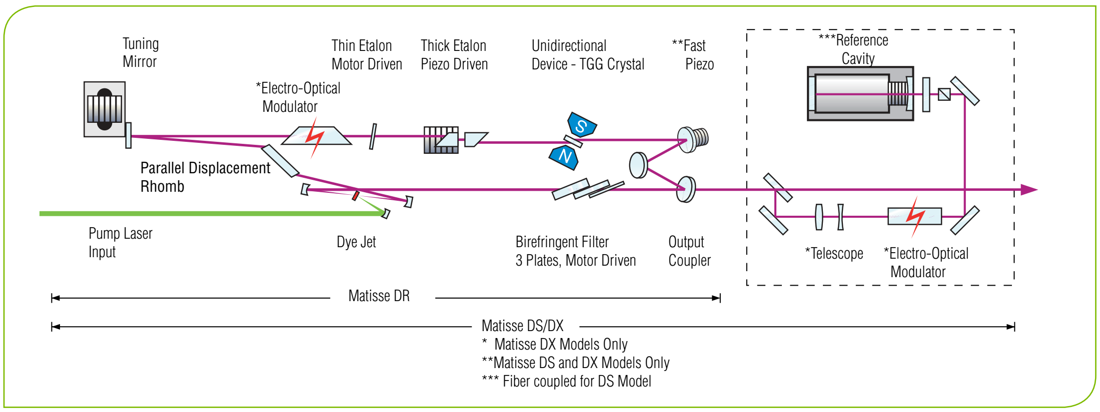


1. Typically measured performance; not a guaranteed or warranted specification, pumped by Millennia EV .

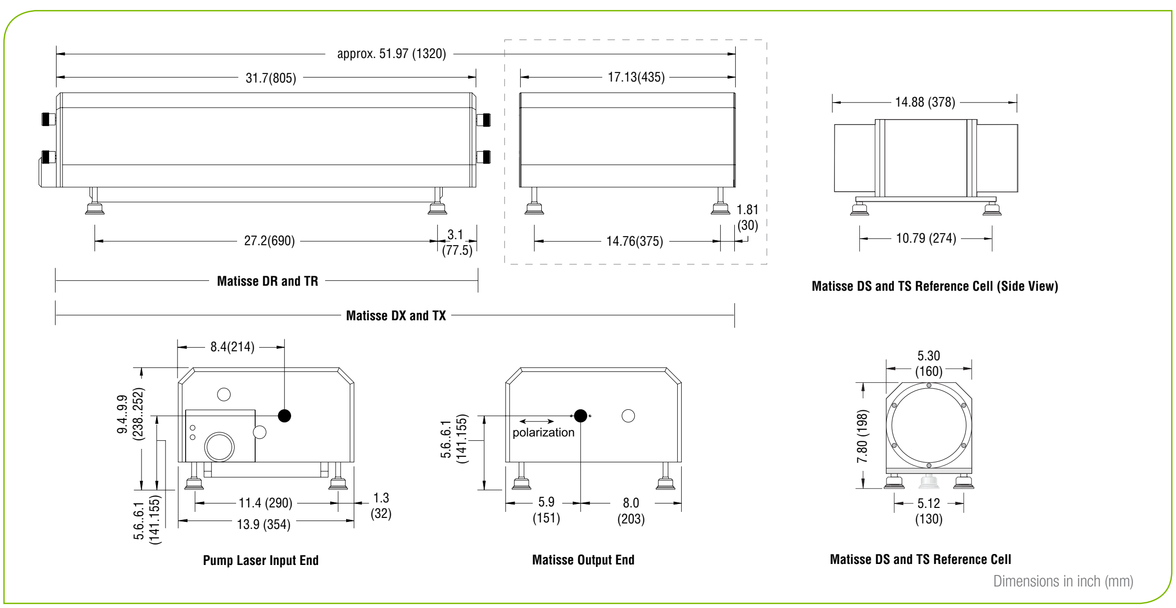
Matisse 2



Matisse 2 Ti:Sapphire Optical Layouts



Matisse 2 Dye Optical Layouts



Matisse 2 Dimensions

mks | Spectra-Physics®

www.spectra-physics.com

3635 Peterson Way, Santa Clara, CA 95054, USA
PHONE: 1-800-775-5273 1-408-980-4300 FAX: 1-408-980-6921 EMAIL: sales@spectra-physics.com

Belgium	+32-(0)0800-11 257	belgium@newport.com
China	+86-10-6267-0065	info@spectra-physics.com.cn
France	+33-(0)1-60-91-68-68	france@newport.com
Germany / Austria / Switzerland	+49-(0)6151-708-0	germany@newport.com
Japan	+81-3-3556-2705	spectra-physics@splasers.co.jp
Korea	+82-31-8021-1600	korea@spectra-physics.com
Netherlands	+31-(0)30 6592111	netherlands@newport.com
Singapore	+65-6664-0040	sales.sg@newport.com
Taiwan	+886-3-575-3040	sales@newport.com.tw
United Kingdom	+44-1235-432-710	uk@newport.com

SP-DS-20200127