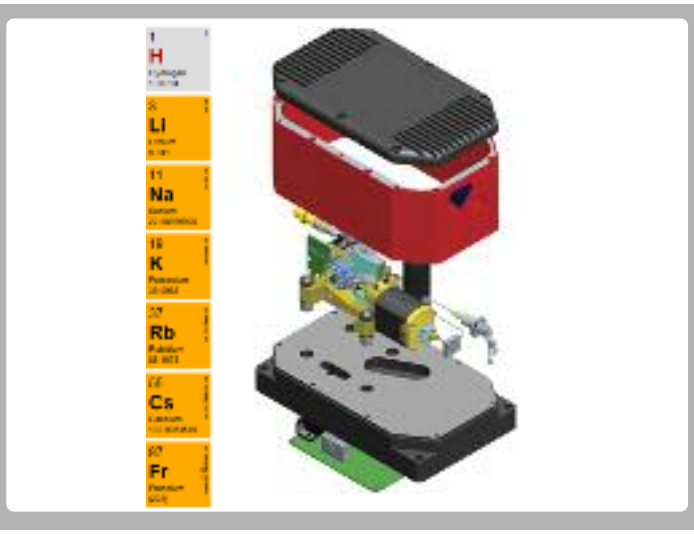
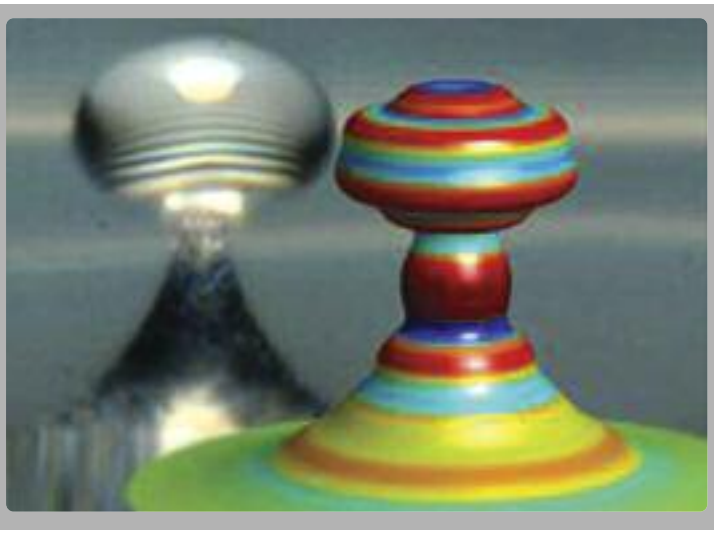
Tunable Diode Lasers





Simply Better™ Photonics

New Focus™
A Newport Corporation Brand

New Focus Simply Better Photonics

Founded in 1990 with the mission of providing Simply Better™ Photonics Tools, New Focus has built a portfolio of high-performance products that includes tunable lasers, opto-electronics, high-resolution actuators, stable optomechanics, vacuum and ultraclean solutions, and OEM engineered solutions. Our products are used in demanding applications around the world including semiconductor equipment, biomedical, industrial, test and measurement and advanced research.

As part of Newport we have returned to our focus on making great tools for scientists and researchers. We are taking all the engineering we have learnt in the industrial world and have remade all our legacy tunable lasers and high speed electronics products. You will see the results of that in the new laser products we have launched recently.

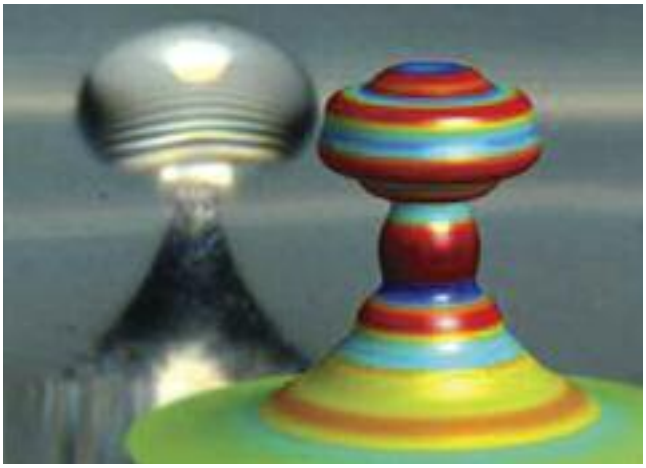
We believe tools that you use in the lab should be just that, simple and reliable tools, not an experiment in a box.

Need a wavelength or tuning range that you don't see? Smoother linearity or a tighter line width? Let us know, these are the real life challenges we get excited about trying to solve.

We still know that good engineering requires an in-depth knowledge of our customers, their visions and problems, and how technology can make their applications really work. And we still want to have fun helping researchers do the best science they can.

Talking face to face is great so let us know if you're going to be in Silicon Valley. We'd love to show you around our factory, or just drop by our booth at a trade show or conference.

We look forward to hearing from you.



On the cover

Optomechanical Modal Spectroscopy (OMMS) of the natural vibrations of on-chip micron-scaled spheres is described by Tal Carmon (U of Michigan) and Kerry J. Vahala (Caltech) (Phys. Rev. Lett. 2007). CW optical power evanescently coupled into these silicon spheres induces excitation of eigen frequencies via the centrifugal radiation pressure of the optical whispering-gallery-mode. These oscillations are then monitored by measurement of the modulated transmitted power. While in atomic spectroscopy optical emission lines originate from the modes of the atom, emission lines from the devices in the image (Stokes lines) relates to its optically excited mechanical modes that is represented on the right-hand side of the image where deformation represents the (exaggerated) deformation of this sphere.

The New Focus Velocity Widely Tunable laser delivers mode-hop-free wavelength tuning for cavity optomechanics and other microcavity research, such as bio-detection and harmonic generation.

New Focus Lasers Selection Guide

Widely Tunable

TLB-6700 Velocity® Tunable Lasers Page 3

Complete redesign of our popular TLB-6300 Velocity series

- Swept, step and fine tuning over up up to 80 nm mode-hop-free
- Most wavelengths from 630 to 2000 nm and custom as well
- Applications: spectroscopy, sensing, metrology, laser seeding, FM locking and more

TLB-6600 Venturi™ Tunable Lasers Page 6

- Swept and step tuning over wavelength ranges up to 110 nm
- Mode-hop-free at up to 2000 nm/s
- Applications: Telecommunications and data communications test, fiber sensing, spectroscopy and more

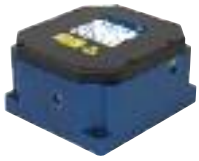
TLM-8700 OEM Tunable Laser Modules Page 6

- State-of-the-art swept wavelength performance
- For integration into OEM systems for volume applications

Fine-Frequency Tunable

TLB-6800 Vortex™ Plus Tunable Lasers Page 8

- Fine tuning
- 70 mW power at 780 nm
- High speed modulation



NEW A-7100 Vantage™ Tunable Diode Laser Page 10

- Piezo fine tuning and manual coarse tuning
- Magnetic damping for mechanical stability
- Tuning arm viewing window

Fixed Wavelength

SWL-7500 Single Wavelength Lasers Page 11

- Exceptional fixed wavelength and power stability
- All solid-state with a tiny footprint
- 150 mW at 785 nm with 200 kHz linewidth for precision Raman Spectroscopy

Amplifier

TA-7600 VAMP™ Tapered Amplifiers Page 12

2 W at 780 nm

0.5 W at 671 nm

- 0.5 - 2 W of amplified power at a variety of infrared wavelengths
- Fiber-coupling input ensures fast, easy, and reliable alignment
- Applications: atomic cooling, spectroscopy, creating Bose-Einstein Condensates and more

Tunable External Cavity Diode Lasers

Tunable External Cavity Diode Lasers (ECDL) are employed in many applications, including coherent optical telecommunications, atomic and molecular laser spectroscopy, laser cooling, atomic clocks, environmental sensing, and optical microcavities. Aside from tunability, these applications often require narrow linewidth single mode operation. Semiconductor diode lasers typically operate with several longitudinal modes lasing simultaneously, leading to low coherence and large linewidths. One method of extracting highly coherent light from a semiconductor-based laser requires that you anti-reflection (AR) coat the diode so it acts only as a gain element. The diode can then be placed in an external cavity that contains wavelength-selective optics so that only a single mode lases at any given time. See Figure 1.

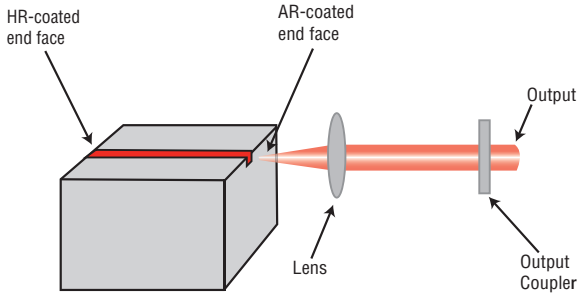


Figure 1. Laser diode placed into an external cavity. The anti-reflection coating prevets the diode fron self lasing

Two typical configurations enabling tuning across the diode gain band are the Littrow and Littman-Metcalf designs. These utilize a grating to provide optical feedback into the diode chip, as illustrated in Figure 2. In the Littrow design, mode is selected by rotating the diffraction grating. In the Littman-Metcalf design, the grating remains fixed and mode selection occurs by rotation of an additional mirror in the cavity.

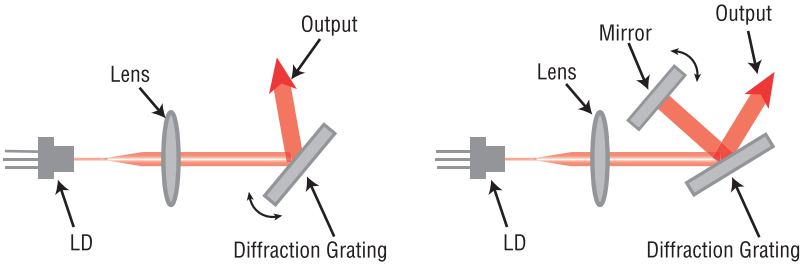


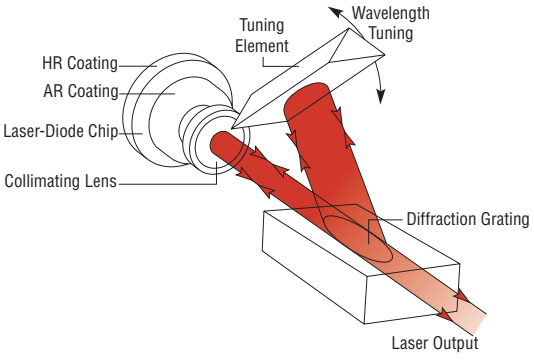
Figure 2: Tunable external-cavity diode lasers in Littrow and Littman-Metcalf configuration

Littman-Metcalf vs. Littrow Configurations

There are advantages and disadvantages to both the Littman-Metcalf and Littrow cavity designs. In general, the Littrow design results in higher output laser power; however, advances in chip manufacturing technology and optical coatings have led to higher power Littman-Metcalf ECDLs. The Littman-Metcalf design has greater wavelength selectivity and tends to deliver a smaller linewidth than the Littrow. Where diodes cannot be AR coated we offer the new high performance Vantage laser.

Mode-hop-free Wide Tuning of New Focus Lasers

True single-mode tuning requires that the optical feedback be dominated by the external optics and not by reflections from the diode facet. We use AR-coated diodes to reduce residual diode reflectivities to below 0.001 which guarantees single-mode operation.



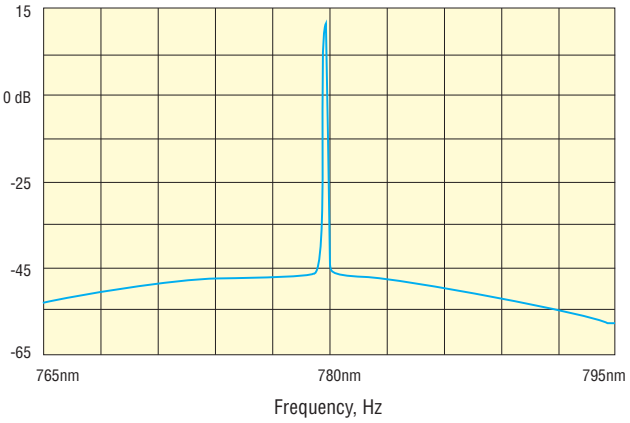
A *modified Littman-Metcalf configuration.*

We place the diode in an external laser cavity that is based on the modified Littman-Metcalf configuration. In this cavity, a grazing-incidence diffraction grating and a tuning element provide all the necessary dispersion for single-mode operation. The amplitudes of non-lasing modes are suppressed to 40 dB below the lasing mode.

The wavelength in a modified Littman-Metcalf laser is changed by tilting the retroreflector, which changes the diffracted wavelength fed back into the cavity. To prevent mode hopping, the cavity length must be kept at a constant number of wavelengths as the laser tunes. This requires that the pivot point around which the element tilts be positioned with sub-micron accuracy. Using a patented technique pivot-point location, we produce lasers with true continuous, mode-hop-free, tuning across tens of nanometers.

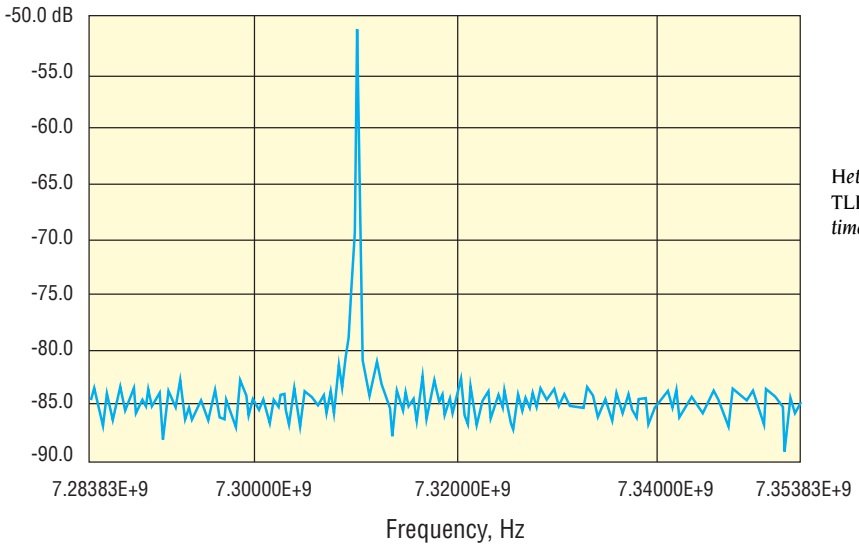
TLB-6700 Velocity® Widely Tunable Lasers

At New Focus, we take pride in all of our products. We are especially proud of the Velocity Widely Tunable Laser Series. The Velocity offers complete single mode tuning across its entire specified wavelength range of nanometers to 10s of nanometers, absolutely mode-hop-free. A DC motor is used for wide tuning, and in addition, the Velocity is capable of piezo fine tuning with a range of 50-100 GHz.



- Huge mode-hop-free tuning range
- Motorized and Piezo control for wide scanning and fine tuning
- Higher power
- Improved stability, <200 kHz linewidth
- Integrated permanent fiber coupling

Linewidth as a Function of Integration Time



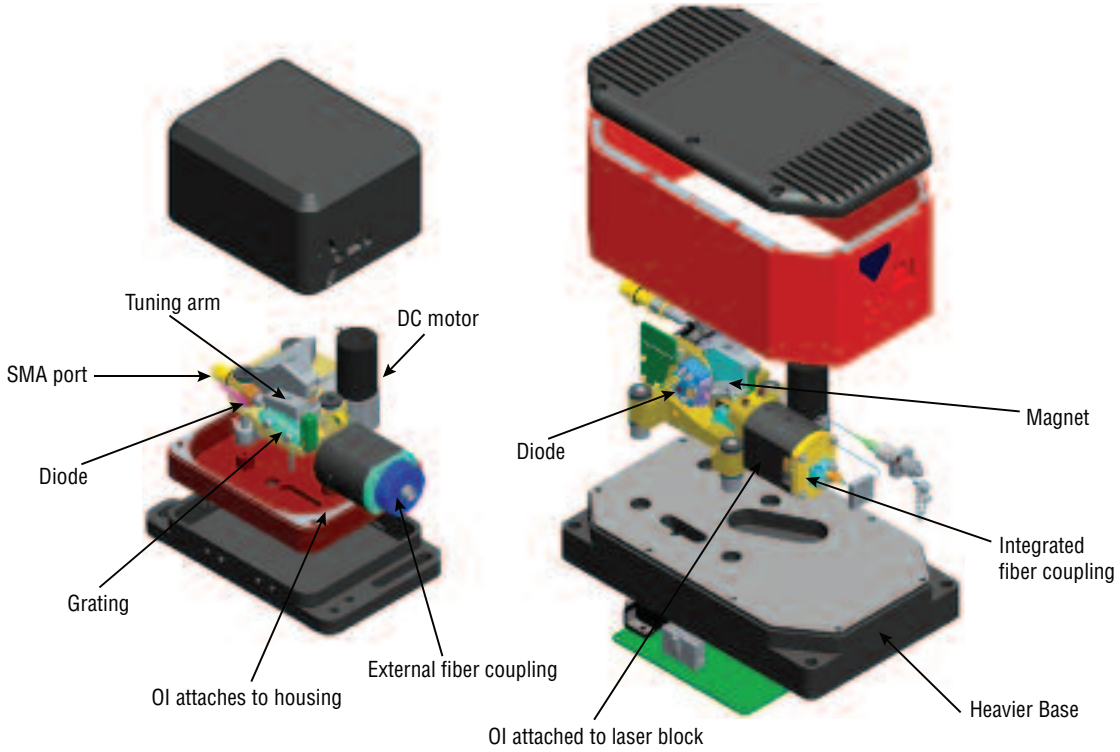
Heterodyne beat note of two Velocity TLB-6712 lasers, 50 ms integration time. Deconvoluted FWHM <200 *k*Hz.

What is meant by instantaneous linewidth?

Besides the time dependent jitter component in the linewidth, the timeless intrinsic linewidth is determined by the cavity design. This can be measured by heterodyning on a very short time scale (less than 1 μs) with a real-time spectrum analyzer or with any spectrum analyzer by matching the resolution bandwidth to the laser linewidth. The signal strength on the spectrum analyzer will only drop if the resolution bandwidth is smaller than the heterodyned signal.

Redesign of the Velocity® Laser

Our engineers have completely redesigned the Velocity laser. While the same Littman / Metcalf design of the laser cavity is utilized, we've implemented heavier housing, thicker insulation, more power temperature control, and introduced our unique Magnetic Dampening to the 6700 Velocity. This means we can now bring you higher power output but with an even further reduced linewidth. That's more power with even greater precision.



More Robust

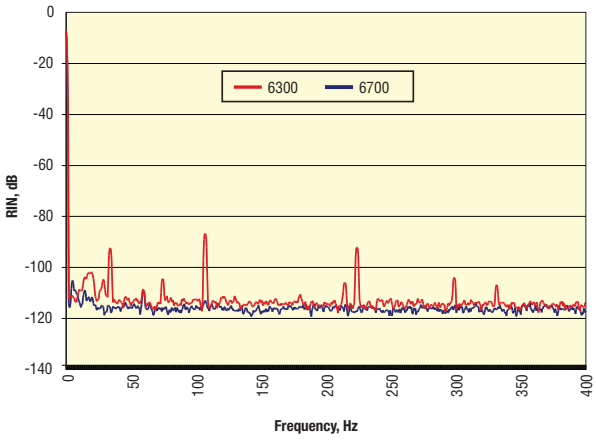
- The enlarged drop-tested and shock proof housing ensures a robust system.
- Thicker insulation increases thermal and mechanical isolation.
- Integrated optical isolator and fiber coupling eliminates fiber misalignment.
- The fiber is now encased in a metal jacket.

Higher Power

With a redesigned system, we are now able to incorporate various types of high power diodes, giving you more power to deliver to your experiments.

Lower Noise

- More powerful temperature control reduces wavelength drift and power fluctuations.
- Magnetic damping stabilizes the tuning arm and reduces vibrational noise.
- A new controller delivers more current and less noise, narrowing the laser linewidth.



RIN *test data for the Velocity 6700 and Velocity 6300.*

Velocity® Specifications

Specifications[1]	TLB-6704	TLB-6711	TLB-6712	TLB-6716	TLB-6718
Min Mode-Hop Free Tuning Range[2]	635-638 nm[6]	729-739 nm[7]	765-781 nm	830-853 nm	945-975 nm
Min Mode-Hop Free Tuning Range (Fine-Frequency)	>80 GHz (110 pm)	>80 GHz (140 pm)	>80 GHz (150 pm)	>60 GHz (150 pm)	>50 GHz (160 pm)
Free Space Power[3]	8 mW @ 638 nm	20 mW @ 737 nm	50 mW @ 780 nm	50 mW @ 850 nm	30 mW @ 960 nm
Max Tuning Speed	5 nm/s	8 nm/s	8 nm/s	10 nm/s	10 nm/s
Typical Beam Size (mm)	1.0x1.0	1.8x1.7	1.5x1.2	1.3x0.6	1.2x0.8
Linewidth (50 ms Integration Time)	<200 kHz (50 ms Integration time)				
Wide Tuning Resolution	0.01 nm				
Fine-Frequency Modulation Bandwidth	<2 kHz				
Max Current Modulation Bandwidth[4]	<1 MHz				
Max Current Modulation Bandwidth[5]	<100 MHz				

Specifications[1]	TLB-6721	TLB-6724	TLB-6725	TLB-6728	TLB-6730
Min Mode-Hop Free Tuning Range[2]	1030-1070 nm	1270-1330 nm	1390-1470 nm[8]	1520-1570 nm	1550-1630 nm
Min Mode-Hop Free Tuning Range (Fine-Frequency)	>50 GHz (190 pm)	>50 GHz (290 pm)	>30 GHz (200 pm)	>30 GHz (240 pm)	>30 GHz (260 pm)
Free Space Power[3]	60 mW @ 1064 nm	30 mW @ 1300 nm	45 mW @ 1450 nm	30 mW @ 1550 nm	30 mW @ 1600 nm
Max Tuning Speed	12 nm/s	15 nm/s	15 nm/s	20 nm/s	20 nm/s
Typical Beam Size (mm)	1.8x0.9	1.9x1.7	1.9x1.7	1.9x1.7	1.9x1.7
Linewidth (50 ms Integration Time)	<200 kHz (50 ms Integration time) kHz				
Wide Tuning Resolution	0.01 nm				
Fine-Frequency Modulation Bandwidth	<2 kHz				
Max Current Modulation Bandwidth[4]	<1 MHz				
Max Current Modulation Bandwidth[5]	<100 MHz				

More wavelengths available. Contact factory for further information.

1. Specifications are subject to change.
2. Contact New Focus for all available wavelength ranges.
3. Fiber coupled and optical isolator options available. Typical fiber-coupling efficiency is 40-50%.
4. Current modulation through controller.
5. Current modulation directly to diode through laser head SMA port.
6. 635-639 nm extended wavelength range available.
7. Any 10 nm wavelength range within 725-741 nm available. Call New Focus for specs and custom quote.
8. Any 80 nm wavelength range within 1390-1490 nm available. Call New Focus for specs and custom quote.

TLB-6700 Tunable Laser Controller

The 6700 Tunable Laser controller has been engineered with direct feedback from our customers. We've increased the current to allow higher power from our lasers yet reduced the noise even further for sharper linewidths and better results. The 6700 controller monitors the Velocity lasers current, temperature, and wavelength. Each head has optimized factory settings. The 6700 controller will read the laser's optimum settings and automatically limit the current and scan ranges to protect the laser diode cavity. Operation is simple. Either from the front panel or via the USB GUI, the user can just dial up and set the desired wavelength and power. Min and max wavelengths points can be entered, and the Velocity can be set to scan back and forth between them.

- Higher current – 200 mA now standard
- Lower noise <250 nA RMA with 200 mA current
- Wavelength monitoring of Velocity laser head
- Complete tuning control - set a wavelength range for multiple scans
- USB interface

TLB-6600 Venturi™ Swept-Wavelength Tunable Lasers

- Ultrafast 2000 nm/s tuning enables true real-time measurements
- Ultrawide 110 nm mode-hop-free tuning
- >70 dB ASE low-noise version for high-dynamic-range test and measurement
- Multiple integrated options available

The TLB-6600 lasers deliver it all. They combine the best in tunability—ultrafast, ultrawide, and mode hop-free—with low noise, high accuracy and repeatability. Because the lasers are based on our award-winning design, they are extremely dependable with OEM-proven 24/7 reliability (over 100-million cycles tested without failure). Ideal for fiber sensing, spectroscopy, laser seeding, metrology and fiber-optics testing, these lasers are available with a variety of options so you can build the system you need.

TLB-6600 Venturi™ Swept-Wavelength Tunable Lasers

Specifications[1]	TLB-6600-H-CL	TLB-6600-L-CL	TLB-6600-H-O	TLB-6600-L-O	TLB-6600-840
Mode-Hop Free Tuning Range (nm)	1520-1630 nm	1510-1620 nm	1265-1345 nm	1265-1345 nm	835-845 nm
Tuning Speed	2-2,000 nm/s	2-2,000 nm/s	2-2,000 nm/s	2-2,000 nm/s	5-1,000 nm/s
Wavelength Resetability			±15 pm		
Absolute Wavelength Accuracy (with PWR option)			<1 pm		
Output Power (fiber-coupled)	>6 mW	>1 mW	>4 mW	>1 mW	>3 mW
Output Power Flatness (swept)			>50 dBc		
ASE	>40 dB	>70 dB	>40 dB	>70 dB	>40 dB
Integrated Dynamic Range	>15 dB	>55 dB	>15 dB	>55 dB	N/A
Fiber Optic Connector			FC/APC		
Fiber Type	SM or PM	SM or PM	SM	SM	SM
Integrated Options Available[2]	PWR, VOA, PC, RM	PWR, VOA, PC, RM	N/A	N/A	N/A

1. Specifications are subject to change.
2. PWR - Precision Wavelength Reference, VOA - Variable Optical Attenuator, PC - Polarization Controller, RM - Rack Mount. Contact New Focus for futher details.

TLM-8700 OEM Swept-Wavelength Lasers

- Ultrawide 110 nm mode-hop-free tuning
- Tuning speeds greater than 2000 nm/s
- OEM-proven reliability (>100-million cycles tested)

Just like all of our benchtop tunable lasers, these modules carry our reputation as the leading supplier of test-and-measurement tunable lasers. If you have specific needs, please don't hesitate to contact us. We want to work with you to develop a design that's right for you. The TLM-8700 OEM laser module is just one example of our OEM component portfolio. New Focus designs, develops and manufactures custom optical solutions for a broad selection of companies in all branches of the photonics industry.

Vortex™ Fine-Frequency Tunable Lasers

Evolution of Excellence

Vortex

Introduced in 1996, the Vortex 6000 Series Tunable Lasers offered narrow-linewidth and low-noise performance built to our customer's wavelength specification. Based on a proven monolithic design, there were no adjustable components that could become misaligned over time. The laser cavity and drive electronics were designed to provide maximum frequency-modulation capabilities, allowing for modulation above the frequency of mechanical-noise sources.

In 2002, New Focus partnered with NASA's Jet Propulsion Laboratory (Pasadena, CA) to develop the next generation atomic clocks for microgravity measurements and GPS space deployment, as part of an experiment to test many of the predictions of Albert Einstein's Theory of Relativity. New Focus proudly released the StableWave™ 7000 Series in 2004. To deliver truly reliable performance, these lasers use an exceptionally rugged, patented laser cavity.

StableWave™

Vortex II

The New Focus engineering team was once again asked to provide the next level of laser performance that would help the atomic spectroscopy community and others with their need for low frequency jitter and drift in a mode-hop-free tunable laser. The Vortex II 6900 Series, the third generation fine tuning ECDL design released in 2008, is even more resistant to acoustical and mechanical perturbations than its predecessor. The technical challenge came down to stiff rotational motion without translation. Sub-nanometer errors are precluded if we were to avoid frequency jitter and mode hopping. It was under this mandate that Star-Flex motion actuation and the patent-pending technique of magnetic damping were born.

Star-Flex Actuation

The Vortex Plus is also among the New Focus line of Finely Tunable Lasers. Conserving the same robust cavity and StarFlex actuator, New Focus has adapted the Vortex II to accept longer diode chips, resulting in significantly higher output power. The Vortex Plus operates with our low noise 6700 laser controller, reducing the laser linewidth from 300 kHz to 200 kHz. Also, an SMA port for direct diode current modulation has been reintroduced to the Vortex Plus, enabling up to 100 MHz high speed modulation.

Vortex Plus

TLB-6800 Vortex™ Plus Tunable Lasers

Vortex Plus

- Premier finely tunable laser for scientific applications
- Exceptional ease of use and wide mode hope free tuning
- Magnetic damping for ultra stable narrow linewidths
- Fiber coupling and optical isolation available

The Vortex Plus Precision Series Single Mode Finely-Tuned Lasers provide the most stable open-loop performance available today. Low frequency jitter is combined with narrow linewidth. Choose the TLB-6904 for wavelengths from 632.5 to 640 nm. When ordering, please specify the exact center wavelength (to 10 pm) in vacuum. Part number includes complete laser system and the Vortex 6800 Laser Controller. Heads and controllers can also be sold separately.

TLB-6800 Tunable Laser Controller

- Interchangeable laser heads
- High-speed current modulation
- Easy frequency modulation
- Complete control of laser parameters
- Complete computer control and LabVIEW™ programs
- Detector and general-purpose input
- Built in function generator

The TLB-6800-LN Tunable Laser Controller is a high power low noise controller for operating all of our precision tuning lasers. This controller was engineered to work with existing Vortex and Stablewave laser heads. A function generator is now built into the controller for simple piezo sweeping control.

Vortex™ Plus Specifications

Specifications[1]	TLB-6802	TLB-6804	TLB-6808	TLB-6813	TLB-6814
Available Wavelengths[2]	460.8 nm	632.5-640 nm	668-678 nm	765-781 nm	794-806 nm
Min Mode-Hop Free Tuning Range (Fine-Frequency)	>25 GHz	>120 GHz	>120 GHz	>100 GHz	>100 GHz
Free Space Power (mW)	40	8	20	50	30
Linewidth (50 ms Integration Time)	300 kHz				
Fine-Frequency Modulation Bandwidth	>100 Hz (100 GHz Amplitude) >1.5 kHz (>20 GHz Amplitude)				
Max Current Modulation Bandwidth	<1 MHz				
Options[3]	Custom Wavelengths, Free-space, Optical isolator, Fiber-coupled				

Specifications[1]	TLB-6815	TLB-6817	TLB-6818	TLB-6819	TLB-6820
Available Wavelengths[2]	815-825 nm	838-853 nm	890-910 nm	910-945 nm	960-995 nm
Min Mode-Hop Free Tuning Range (Fine-Frequency)	>90 GHz	>90 GHz	>90 GHz	>80 GHz	>80 GHz
Free Space Power (mW)	8	40	15	5	12
Linewidth (50 ms Integration Time)	300 kHz				
Fine-Frequency Modulation Bandwidth	>100 Hz (100 GHz Amplitude) >1.5 kHz (>20 GHz Amplitude)				
Max Current Modulation Bandwidth[4]	<1 MHz				
Options[3]	Custom Wavelengths, Free-space, Optical isolator, Fiber-coupled				

Specifications[1]	TLB-6821	TLB-6823	TLB-6824	TLB-6828	TLB-6830
Available Wavelengths[2]	1030-1070 nm	1220-1250 nm	1270-1330 nm	1520-1630 nm	1570-1630 nm
Min Mode-Hop Free Tuning Range (Fine-Frequency)	>60 GHz	>60 GHz	>60 GHz	>50 GHz	>50 GHz
Free Space Power (mW)	60	5	5	20	15
Linewidth (50 ms Integration Time)	300 kHz				
Fine-Frequency Modulation Bandwidth	>100 Hz (100 GHz Amplitude) >1.5 kHz (>20 GHz Amplitude)				
Max Current Modulation Bandwidth[4]	<1 MHz				
Options[3]	Custom Wavelengths, Free-space, Optical isolator, Fiber-coupled				

[1]Specifications are subject to change.
[2]Contact Newport for all available wavelength ranges.
[3]Typical fiber-coupling efficiency is 40-50%.

LB1005 High-Speed Servo Controller

- One box solution
- Large bandwidth of 10 MHz
- High-speed control using both piezo-electric transducers and current modulation inputs

Specifications	
Input Voltage Noise	<10 nV/√ Hz
Input Impedance	1 MΩ
Input/Output Voltage	±10 V
Bandwidth	>10 MHz
Adjustable Gain	-40 to +40 dB
Adjustable P-I Corner Frequency	10 Hz to 1 MHz
Integrator Hold	TTL Triggered

Gain and P-I corner are independently adjustable.

TLB-7100 Vantage™ Tunable Diode Laser

NEW

- Piezo fine tuning and manual coarse tuning to access the entire diode gain band
- Magnetic damping for mechanical stability
- Tuning arm viewing window to effortlessly return to your desired wavelength
- Output shutter for safety
- Laser head recognition for smart current and temperature settings

The TLB-7100 Vantage Tunable Diode Laser is the latest addition to the New Focus family of lasers. An external cavity diode laser, the Vantage adopts the popular Littrow design to offer higher power at a variety of wavelengths to meet your experimental needs. Each laser unit is optimized to a user specified wavelength to provide top performance and mode-hop-free piezo tuning while providing the option to manually coarse tune to another wavelength within the diode gain band. The Vantage laser comes standard with our new low noise TLB-6800-LN controller with head recognition to automatically set the best diode temperature for the individual laser as well as a current upper limit to protect the diode from damage. The TLB-6800-LN includes an internal function generator, USB and RS232 communication, feed forward capability, and intuitive digital interface to make your lab life easier. New Focus Vantage…Simply Better Littrow™.

TLB-7100 Vantage Tunable Diode Laser

Specifications[1]	Value	Comment
Linewidth	300 kHz	Integrated over 50 ms
Wavelength Stability	1 pm 5 pm	Over 1 hour Over 36 hours
Modulation Frequency	>100 Hz >1.5 kHz	100 GHz amplitude >20 GHz amplitude
Max Current Modulation Bandwidth	<1 MHz	Through controller
Max Current Modulation Bandwidth	<100 MHz	Directly to diode through laser head SMA port
Optical Output	Free-space	

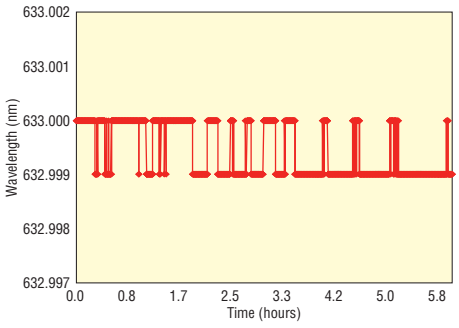
Model Number	Wavelength Tuning Range[2]	Mode-Hop Free Tuning Range	Typical Minimum Power
TLB-7102	392 - 398 nm	2 GHz without feedforward 10 GHz with feedforward	15 mW @ 397 nm
TLB-7113	780 nm	~ 70 GHz	100 mW @ 780 nm
TLB-7117	830 - 867 nm	~ 70 GHz	90 mW @ 852 nm

1. Published specifications at the time of order are guaranteed. The Vantage is serviceable both at the factory and on-site. Specifications are guaranteed when factory built and serviced only.
2. Laser is optimized at your specified wavelength. Please indicate desired wavelength to 0.01 nm.
3. Laser can be coarse tuned across diode gain band. Contact New Focus for more information.

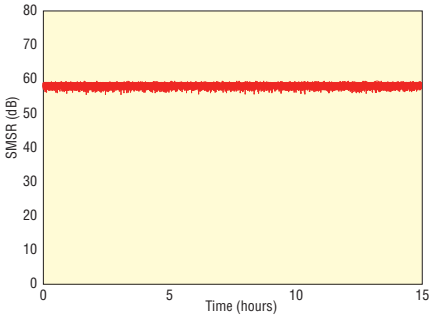
SWL-7500 Single Wavelength Diode Lasers

- Exceptional fixed wavelength and power stability
- All solid-state with a tiny footprint
- Factory set wavelengths e.g. 633 nm, 660 nm, 780 nm, 785 nm, 850 nm, 1610 nm
- 150 mw at 785 nm with 200 kHz linewidth for precision Raman Spectroscopy
- Custom wavelengths upon request
- Rugged, OEM ready

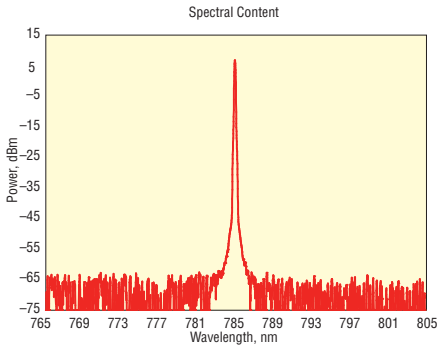
The SWL-7500 series lasers offer extremely narrow linewidths from an OEM-ready platform designed for stability and longevity. This new addition to our market-leading line of external-cavity diode lasers offers single longitudinal mode performance at a single, fixed wavelength. The user may choose the output wavelength anywhere within a specified wavelength range and the factory will build the laser at that precise wavelength. Long-term wavelength and power stability makes this laser a miniature work horse. With a footprint that is smaller than a business card, the laser will fit in most instrument designs with room to spare. We have carefully designed these lasers to operate continuously on a single longitudinal mode and minimal frequency drift as the heart of any imaging, metrology, or spectroscopic measurements.



Highly stable cavity design yields extremely low wavelength drift.



Long-term side mode suppression ratio measurement with no multimoding or mode hops.



Amplified Stimulated Emission (ASE) spectrum with low background interference and clean, unambiguous signal.

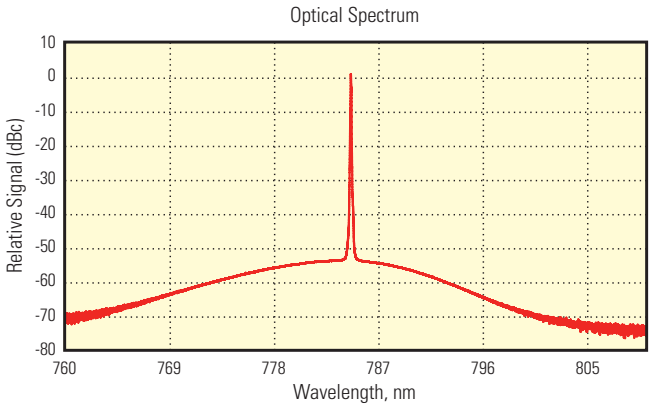
Specifications[1]	SWL-7504	SWL-7505	SWL-7509	SWL-7513	SWL-7513-H
Available Wavelengths	632.5-635 nm	650-660 nm	682-692 nm	765-785 nm	780-790 nm
Center Wavelength	633 nm	660 nm	687 nm	780 nm, 785 nm	785 nm
Center Wavelength Stability			±1.5 pm		
Output Power	8 mW @ 633 nm	20 mW @ 660 nm	8 mW @ 687 nm	70 mW @ 780 nm, 785 nm	150 mW @ 785 nm
Power Stability			<2%		
Linewidth			<200 kHz		
ASE			>-65 dBc		
Side Mode Supression Ratio			<-50 dBc		
Rated Life	>5000 hrs	>5000 hrs	>5000 hrs	>6000 hrs	>6000 hrs

1. Specifications are subject to change.

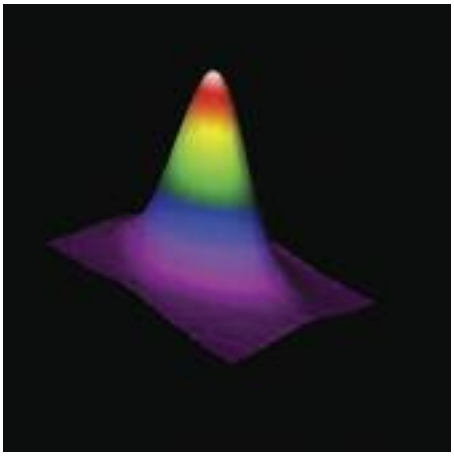
TA-7600 VAMP™ Tapered Amplifiers

- 0.5 - 2 W of amplified power at a variety of infrared wavelengths
- Standards models available at 767 nm, 780 nm, 795 nm, 852 nm, 915 nm
- Fiber-coupled input ensures fast, easy, and reliable alignment
- Active input power monitoring ensures that self lasing won't damage the tapered amplifier chip
- Custom wavelengths and powers available
- Use your own seed laser or our Vortex II for a complete MOPA system

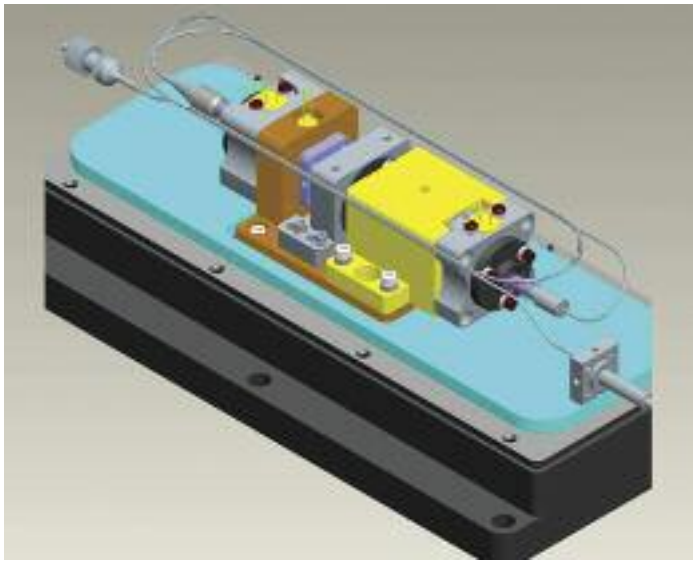
The New Focus VAMP series of Tapered Amplifiers are designed to provide up to 2 W of amplified power at a variety of infrared wavelengths. The VAMP will faithfully amplify tunable single-frequency light produced by External Cavity Diode Lasers as well as other light sources of appropriate wavelength. The New Focus engineering team designed reliability and ease of use into the VAMP as well as performance. Fiber-coupling input ensures fast, easy, and reliable alignment. Simply make a secure connection with your FC/APC fiber and that's it - no tweaking. Active input power monitoring insures that self lasing won't damage the tapered amplifier chip. A power lock loop monitors and levels the output power to provide quiet, low-drift output all day long even when your laboratory environment changes. A simple USB driven GUI provides all the control you need.



The VAMP features extremely high ASE rejection to improve your signal to noise.



Beam profile at 60 cm.



View of the VAMP Tapered Amplifier interior.

VAMP™ Specifications

	TA-7612	TA-7613	TA-7613-H	TA-7614	TA-7616	TA-7618
Wavelength Range (nm)[1]	755-775	775-785	779-790	787-810	825-855	910-920
Center Wavelength (nm)	765	780	780	795	850	915
Max Output Power[2]	>1.5 W	>1 W	>2 W	>0.5 W	>1 W	>1 W
Output Power (fiber-coupled)[3]	> 0.5 W	> 0.5 W	N/A	>0.25 W	> 0.5 W	N/A
Beam Divergence (mrad)	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Min Input at FC/APC Connector	See Comments Below[3]					
Beam Pointing Stability	<50 µrad (±2°C)					
ASE (at maximum power)	<-45 dB (0.01 mm OSA resuolution)					
Long Term Stability (Power, closed loop)	<1%					
Operating Temperature Range (°C)	15-30					
Max Input at FC/APC Connector	100 mW					
Linewidth	Seed Laser Dependent					
Frequency Jitter	Seed Laser Dependent					

1. The TA-7600 series of Tapered Amplifiers is available at many wavelengths. If you do not see your target wavelength, please contact your regional sales manager or representative for further information.
2. At Center Wavelength. Contact factory for power at your specific wavelength. Specifications (other than output power) are when seeded by a New Focus Vortex II or Velocity laser. Minimum fiber-coupled seed power is required to reach specified output power. All specifications subject to change without notice.
3. Minimum seed power is 30 mW for TA-7608 (300 mW output power is achieved with a 9 mW Vortex II seed laser), 15 mW for TA-7612, TA-7616, TA-7614, 20 mW for TA-7613, TA-7613-H and 10 mW for TA-7618 to achieve full specified power output. The tapered amplifier has a safety shutoff feature, activated below 5 mW, that prevents damage to the tapered chip.

Vortex Plus and VAMP

Seeding the VAMP

When seeded with a low-ASE source such as the Vortex Plus or Velocity lasers, the VAMP faithfully reproduces the narrow linewidth and high contrast ratio. The VAMP will also accept other seed sources, including many homemade ECDLs. Remember that the VAMP requires fiber coupled input to consistently ensure precise alignment.

Velocity and VAMP

Create Your All New Focus MOPA

New Focus offers a complete solution to create your MOPA (Master Oscillator Power Amplifier), giving you the power you need for your atomic spectroscopy, laser cooling, and BEC experiments.

Atom	Seed Laser	Amplifier	Power	Atom
Li	TLB-6908-P	TA-7608	0.4 W	671 nm
K	TLB-6913-P	TA-7612	1 W	767 nm
	TLB-6712-P	TA-7612	1 W	767 nm
Rb	TLB-6913-P	TA-7613	1 W	780 nm
	TLB-6913-P	TA-7613	2 W	780 nm
	TLB-6712-P	TA-7613	1 W	780 nm
	TLB-6712-P	TA-7613-H	2 W	780 nm
Cs	TLB-6917-P	TA-7616	1 W	852 nm

More combinations available. Contact factory for further information.

New Focus™
A Newport Corporation Brand

www.newport.com/newfocus

3635 Peterson Way, Santa Clara, CA 95054, USA
PHONE: 1-800-222-6440 1-408-980-4300 FAX: 1-408-919-6083 EMAIL: sales@newfocus.com

	PHONE	EMAIL
Belgium	+32-(0)0800-11 257	belgium@newport.com
China	+86-10-6267-0065	china@newport.com
France	+33-(0)1-60-91-68-68	france@newport.com
Japan	+81-3-3794-5511	spectra-physics@splasers.co.jp
Taiwan	+886 -(0)2-2508-4977	sales@newport.com.tw

	PHONE	EMAIL
Irvine, CA, USA	+1-800-222-6440	sales@newport.com
Netherlands	+31-(0)30 6592111	netherlands@newport.com
United Kingdom	+44-1235-432-710	uk@newport.com
Germany / Austria / Switzerland	+49-(0)6151-708-0	germany@newport.com

Newport Corporation, Irvine, California and Franklin, Massachusetts; Evry and Beaune-La-Rolande, France and Wuxi, China have all been certified compliant with ISO 9001 by the British Standards Institution. Santa Clara, California is DNV certified.

Newport Corporation, Global Headquarters
1791 Deere Avenue, Irvine, CA 92606, USA
PHONE: 1-800-222-6440 1-949-863-3144
EMAIL: sales@newport.com
Complete listings for all global office locations are available online at www.newport.com/contact