



**CLEO 2002** in Long Beach was definitely a good vintage for lasers from Coherent; one that will be remembered for some time by Scientific and Bio-Instrumentation communities. For years now, our Life Sciences customers have asked us one simple question: »Please, can we have a femtosecond laser tunable over the whole Ti:S range, but, I don't want to ever have to touch it!« At Coherent, we have done exactly this! Amongst other new products presented in this flyer, the Chameleon laser was the highlight of CLEO. Reviews from visitors on the booth, MPE customers and true laser jocks themselves

have confirmed that this laser will become a laboratory best seller, to complement the success of our established femtosecond Kerr-Lens-Mode-locked Mira Ti:Sapphire lasers over the past decade.

Enjoy reading about our new products launched at CLEO: go ahead and contact your local Coherent representative to make sure you get your Chameleon before others do.

CLEO 2002

Chameleon, Hands-Free Ultrafast Ti:Sapphire Laser

Improving the Best

Coherent Semiconductor Business Unit

Mira Syncro-Lock AP™

Mira-900-Optima

# CHAMELEON

First Hands-Free Ultrafast Ti:Sapphire Laser to Tune More than 210 nm



Coherent introduces the Chameleon™; the first hands-free, single-box ultrafast Ti:Sapphire laser to tune more than 210 nm.

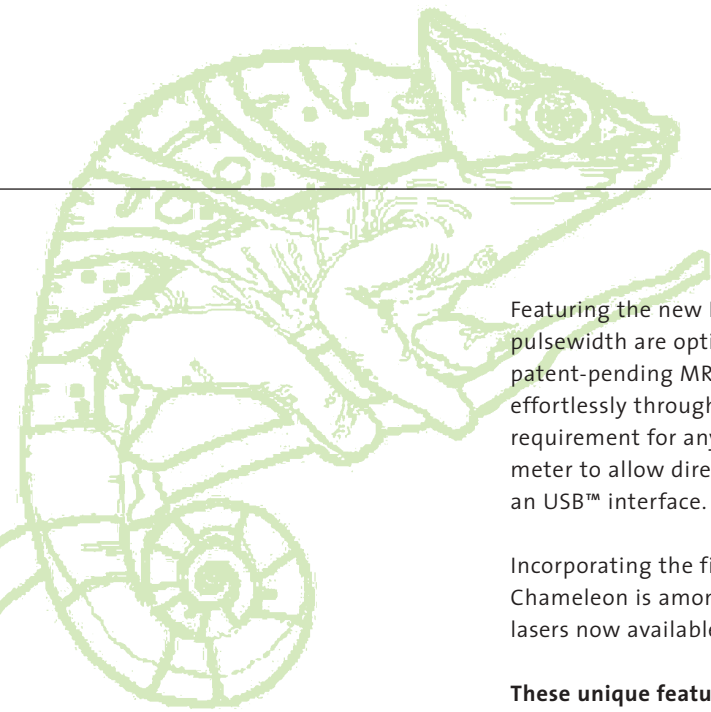
Launched at the Conference on Lasers and Electro-Optics 2002 (CLEO), Chameleon™ (see Fig. 1) provides femtosecond pulses tunable over more than 210 nm, ideal for scientific applications ranging from multi-photon excitation (MPE) microscopy to nonlinear spectroscopy.

This new ultrafast laser is perfectly suited for MPE Biologists who require a fully automated laser, capable of exciting a wide range of fluorescent media, including the new green and yellow fluorescing proteins.

The sealed system consists of a solid-state 532 nm pump source and a Kerr Lens Modelocked Ti:Sapphire oscillator. It is automatically controlled by an RS 232 interface or via a menu-driven front panel display.



Fig 1: Chameleon laser head, power supply and MRU-1000 (Chiller not shown).



Featuring the new Power Pulse™ system, Chameleon's output power and pulsewidth are optimized automatically at all wavelengths. Also, with its patent-pending MRU-1000 miniature air recirculator, Chameleon tunes effortlessly through atmospheric water vapor absorption lines without the requirement for any external purge. The laser head has a built-in spectrometer to allow direct readout of the laser's wavelength and bandwidth via an USB™ interface.

Incorporating the field-proven solid-state Verdi™ laser as its pump source, Chameleon is among the most efficient, reliable, and lowest noise ultrafast lasers now available.

**These unique features make Chameleon the ultrafast laser of choice where widely tunable hands-free operation is demanded.**

Key Specifications: ( \*specified at peak of tuning range)

<b>Tuning Range</b>	720 – 930 nm
<b>Output Power</b>	> 1W*
<b>Spatial Mode</b>	TEM <sub>00</sub> , M <sup>2</sup> < 1.1* (see Fig. 2)

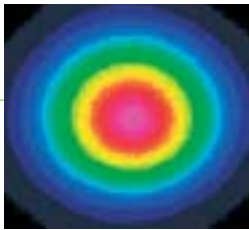


Fig 2:  
Chameleon  
beam profile

Complementing the Chameleon, Coherent now offers a comprehensive family of ultrafast oscillators suited to any ultrafast application.

If your ultrafast requirements are for the wide flexibility of the Mira/Verdi platform, the field-proven industrial-strength of the fixed-wavelength Vitesse™, or the ultimate hands-free wavelength agility of the Chameleon, Coherent has the perfect solution (see UF laser overview attached).

## IMPROVING THE BEST

**The Coherent® Verdi™ laser has set the standard worldwide in high-power.**

The Verdi™ is available with single pump diode configurations up to 6 W, and in dual diode pump configurations up to 10 W. With the advent of Verdi-V6, Verdi™ offers even more of the best.

**Performance**

- Ultra-low noise
- Single-frequency output
- High power
- Diffraction-limited beam

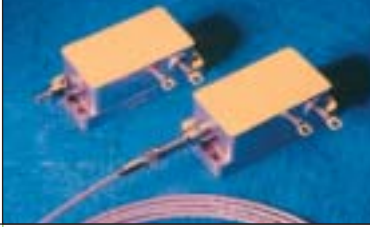
**Convenience**

- User-friendly interface
- Fast warm-up time
- Lowest cost of ownership
- User-replaceable diodes

**Reliability**

- PermaAlign™ solder-bonded optics
- Sealed laser head
- Ultra-long-life AAA™ laser diode material
- Highest 808 nm to green conversion efficiency
- Min-I™ automated pump diode optimization





## Coherent Semiconductor Business Unit Introduces 40 W Fiber Array Packaged (FAP) Diode Laser

Coherent Inc, Semiconductor Business Unit (CSBU) introduces a high power version of its fiber array packaged (FAP™) bars in the 780 to 815 nm wavelength range. With up to 40 W CW, these new high-power FAPs are ideal as efficient sources for solid-state laser pumping and for direct-diode thermal applications in the medical and materials processing industries.

The laser power from the fiber-coupled diode laser is efficiently coupled into an 800- $\mu\text{m}$  multimode fiber bundle, terminated with a SMA 905 connector. Typical drive current for the 40W FAP is  $< 55$  amps. Spectral width is typically  $< 4$  nm FWHM, and beam divergence is  $< 0.14$  NA, encompassing 90 % of the energy.

The 40 W FAP can also be used in all of Coherent's fully-featured, microprocessor-controlled FAP-systems.

# CSBU

## Coherent Semiconductor Division Introduces Broad-Area, 7-Watt, High-Power Diode Laser at 808 nm

Coherent Inc, Semiconductor Business Unit (CSBU) has introduced a 500- $\mu\text{m}$  broad-area, substructured, emitter device rated at 7 Watts CW to complement our existing family of aluminum-free NIR (790 nm to 813 nm) OEM components. This new diode laser is ideal for integration into a range of direct-diode thermal, medical and industrial applications, as well as a pump source for neodymium-based (Nd:), diode-pumped, solid-state lasers.

The OEM single-stripe diode laser is mounted on an industry-standard (10.5 mm x 25 mm) conduction-cooled package. Typical drive current and compliance voltage for the 7 Watt device is less than 8 amps and less than 2 volts. Spectral width is typically less than 2.5 nm, FWHM. Beam divergence is less than  $35^\circ$  by  $10^\circ$ , FWHM.

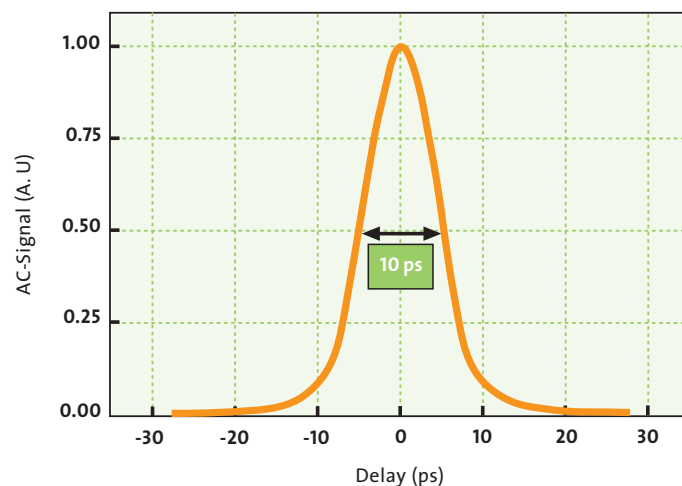


## Extended Picosecond Operation from the Mira-900-Optima

The Verdi pumped Mira ultrafast laser system is now well established in research applications where its combination of high output powers, wide tuning ranges and user-friendly accessories are known to provide the ultimate flexibility.

The Mira-900-Optima also features reliable picosecond performance, with autocorrelations at the 10 ps level (see figure). Gires-Tournois Interferometers (GTI's) are configured to provide additional levels of negative dispersion to access pulse lengths at 3, 5 or 10 ps autocorrelation.

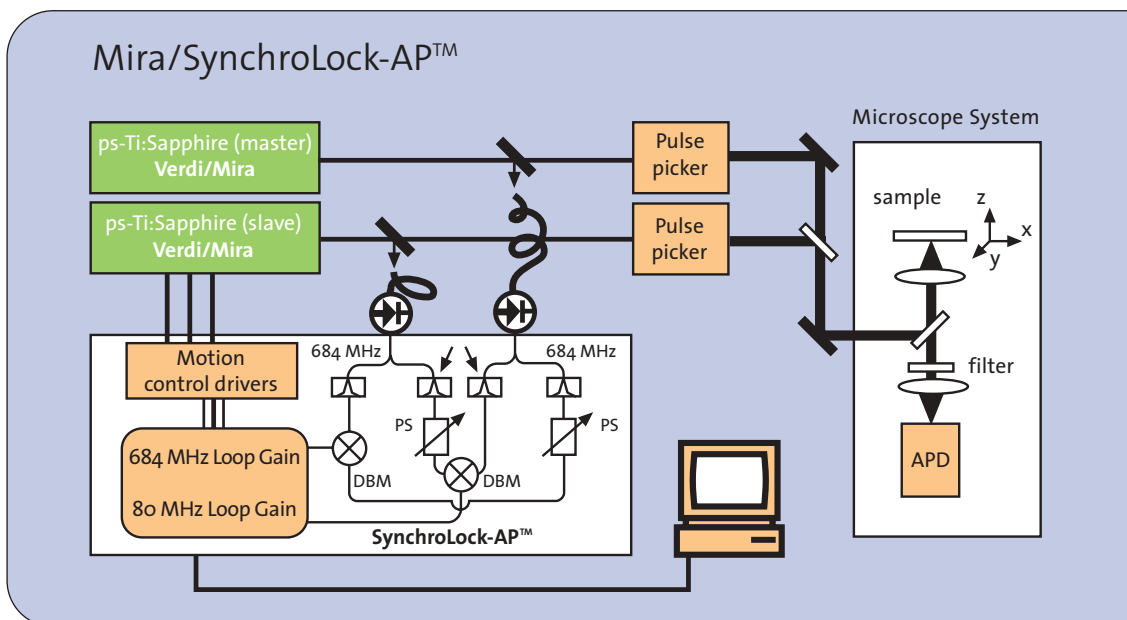
Autocorrelation Trace of a Mira Pulse with Long Pulse Option



# Mira Syncro-Lock AP™ Cavity-Length Accessory

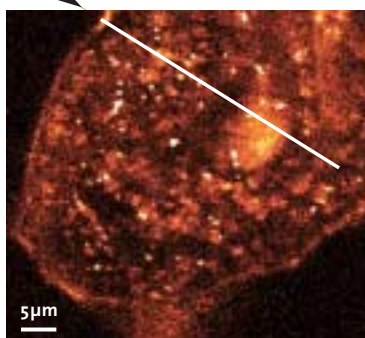
The new Mira Syncro-Lock AP™ Cavity-Length Accessory features fiber optically coupled high-speed photodiodes to lock one or more mode-locked lasers together with a timing jitter of < 250 fs (in ps-ps, ps-fs or fs-fs operations).

Combined with the powerful  $\beta$ -Lock technology of the Mira 900 in picosecond operation, the Syncro-Lock AP™ tunes the laser wavelength with ease, providing fast signal search and optimisation, superb signal-to-noise ratio's (CARS Spectroscopy) and high quality images (CARS Microscopy applications). A typical system layout is shown below including two pulse-pickers and a microscope system.



PS, phase shifter; APD, avalanche Photodiode; DBM, double balance mixer.

**A human epithelial cell in phosphate buffer taken with a Coherent Mira Syncro-Lock AP™ System is reproduced below (courtesy: Dr. Eric Potma and Prof. Sunney Xie, Harvard University)**



Lasers tuned to the aliphatic C-H stretch band. Contrast in the image mainly results from lipids. The bright dots are presumably lipid vesicles whereas the other features are membrane structures. Also – the nucleus is easily recognized. The image size is 50 by 50 microns and pixel dwell time is 2 ms (512 x 512 pixels). The image is taken with the epidetection, which avoids the non-resonant background of water.

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# ULTRAFAST OSCILLATORS BY COHERENT: Unique Capabilities, Comprehensive Coverage

**Chameleon™**  
Effortless Ultrafast  
Fully Automated,  
Widely Tunable



**Features include:**

- Compact, hands-free femtosecond laser
- Wide tuning range (720 – 950 nm typical)
- High average power
- Superb beam quality
- Power Pulse™ system optimizes power and pulse width automatically
- Ideal for hands-free M.P.E. imaging

**Mira® F/P/D + Verdi™**  
Flexible Ultrafast  
Multiple Options,  
Widely Tunable



**Features include:**

- Two-box, flexible system
- Tuning ranges cover 690 – 1080 nm (typical)
- Unique Optima package
- Femto-, pico-second or dual versions
- Extend to UV and IR with SHG, THG and OPO
- New Synchro-Lock AP accessory for extremely low jitter CARS studies

**Mira Seed + Verdi**  
Ultrafast Ultrafast  
780 – 840 nm,  
Sub – 20 fs



**Features include:**

- Designed for ultrashort, wide-bandwidth femtosecond pulses
- > 50 nm bandwidth
- Operates at peak of Ti:Sapphire gain bandwidth
- Optional wavelength tuning element
- Applications include short-pulse amplifier seeding, or optical coherence tomography

**Vitesse™**  
Industrial Ultrafast  
Fully Automated,  
Fixed Wavelength



**Features include:**

- Compact, hands-free femtosecond laser
- Fixed wavelength output, > 650 mW at 800 nm
- Available with high- or low-power Verdi pumping
- Suited to industrial or scientific applications, including metrology, and amplifier seeding



For further information please contact your local Coherent subsidiary.