

iChrome Family

Fully Featured Multi-Color Laser Engines



Microscopy

Flow Cytometry

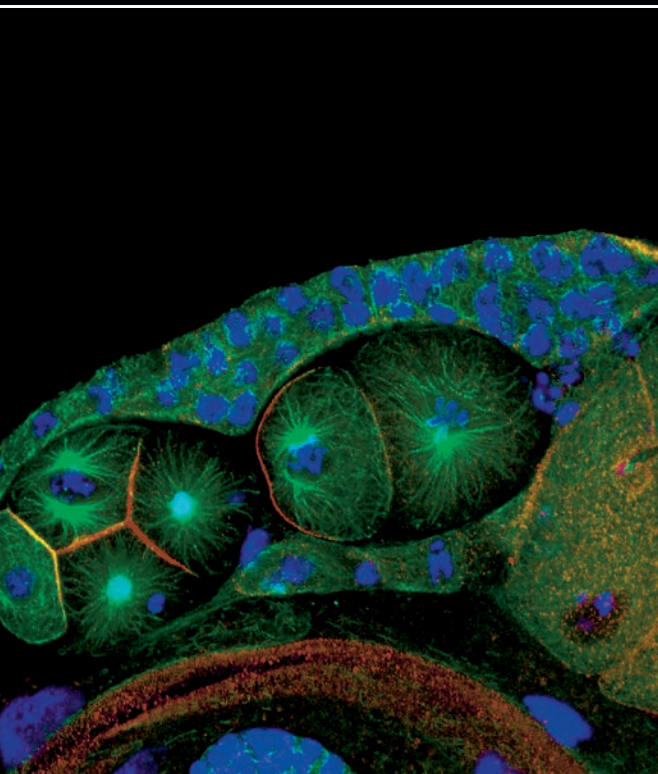
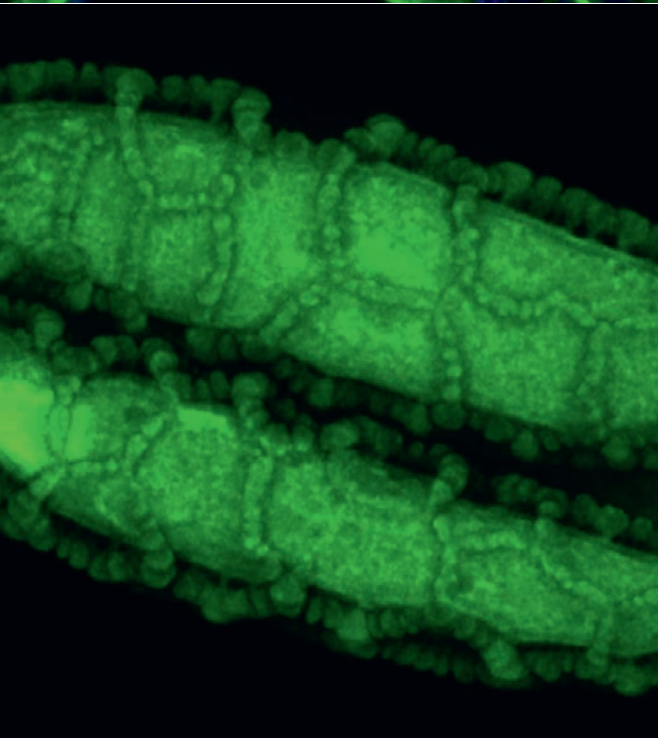
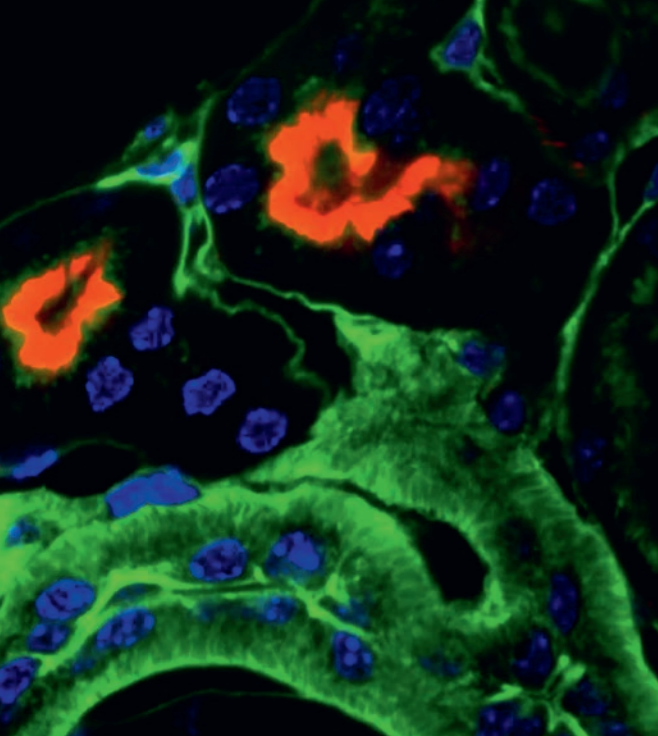
High Throughput Screening

Microplate Reader

Metrology

Life Sciences





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NEXT GENERATION LASER TECHNOLOGY

Fully Featured Multi-Color Laser Engines

The iChrome family addresses the need for multi-color lasers in biophotonics (microscopy, cytometry, DNA sequencing etc.) and metrology (e.g. scatterometry, ellipsometry). These applications require a flexible laser source that provides several wavelengths combined into an optical fiber. The compact and reliable iChrome systems replace cumbersome and maintenance-intensive “breadboard solutions”.

With TOPTICA’s proprietary COOL^{AC} technology all lasers can be perfectly aligned with just one push of a button. iChrome systems can provide up to seven different wavelengths from UV to IR. Individual lasers are efficiently combined and delivered via up to two single-mode, polarization-maintaining or multi-mode fibers.

The iChrome family currently consists of four different laser engines. The iChrome FLE, the “Flexible Laser Engine” with up to 7 colors and many customization options, CLE-20 and CLE-50, compact and cost-effective laser engines with four fixed

lines, and the powerful iChrome MLE with a flexible setup of up to 4 laser lines, including one DPSS laser.

With microprocessor-control the iChrome systems enable flexible OEM integration. High-speed analog and digital modulation allows fast switching of laser wavelengths in arbitrary patterns for complex experiments. In addition, iChrome systems provide high-end features like direct modulation (no external AOM/AOTF required), “complete off” and speckle management, which all can be conveniently controlled via one electronic (RS232, USB, Ethernet) interface.

The iChrome family offers all the features and the necessary flexibility to address even challenging imaging and measurement techniques, either as standalone multi-laser source or fully integrated into existing instruments. At the same time, the systems offer easy and convenient operation for beginners and experienced users as well as “no-screwdriver” installation and alignment.

Applications

- Confocal microscopy
- Light sheet microscopy
- STORM / PALM
- TIRF
- Spinning disk microscopy
- High throughput screening
- High resolution microscopy
- FRAP
- FRET
- Scatterometry
- Ellipsometry



FEATURE HIGHLIGHTS

Highest, long term and stable output power

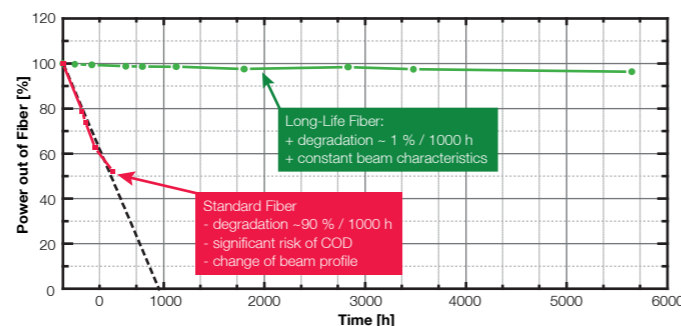
Up to 100 mW per laser line

iChrome systems deliver fiber output powers of up to 100 mW per color. The secret in high output powers after fiber delivery lies in very efficient and stable fiber coupling. This is achieved by high passive stability and active realignment.

Long-term high power UV

- Superior lifetime with proprietary Long-Life fiber @ 405 nm
- Long-Life fiber typical lifetime: > 10.000 h

Specially selected Long-Life fibers ensure high output powers for UV-wavelengths. With these special fibers, the known degradation at 405 nm belongs to the past. Even at 120 mW of 405 nm there is close to no degradation of the optical fiber transmission.



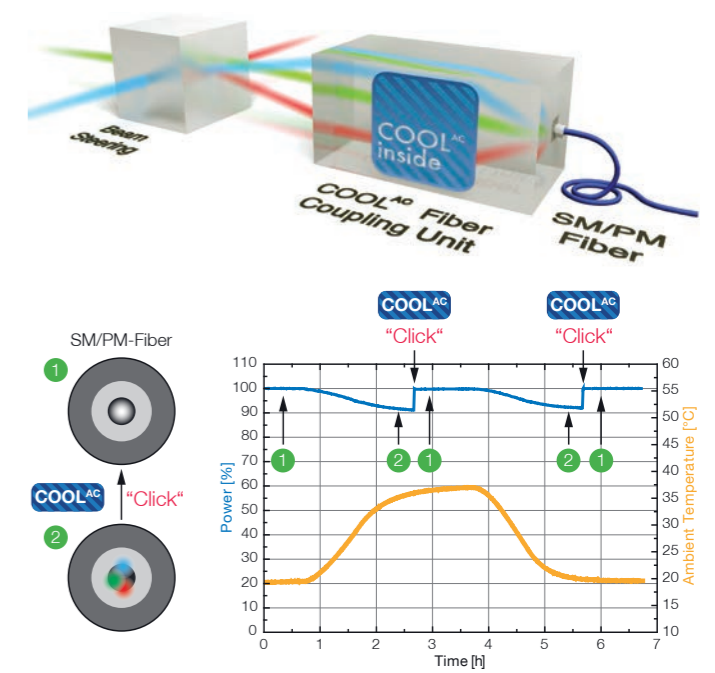
TOPTICA Long-Life fiber - Lifetime at 405 nm / 120 mW

COOL^{AC} automatic realignment

The iChrome family will operate with maximum output power from the first day on. The installation is as easy as the push of a button. Misalignment during shipment will be corrected by COOL^{AC}. Even when the lab environment changes (temperature, vibration, shocks), the unique auto-calibration feature keeps all TOPTICA multi-laser engines at top performance.

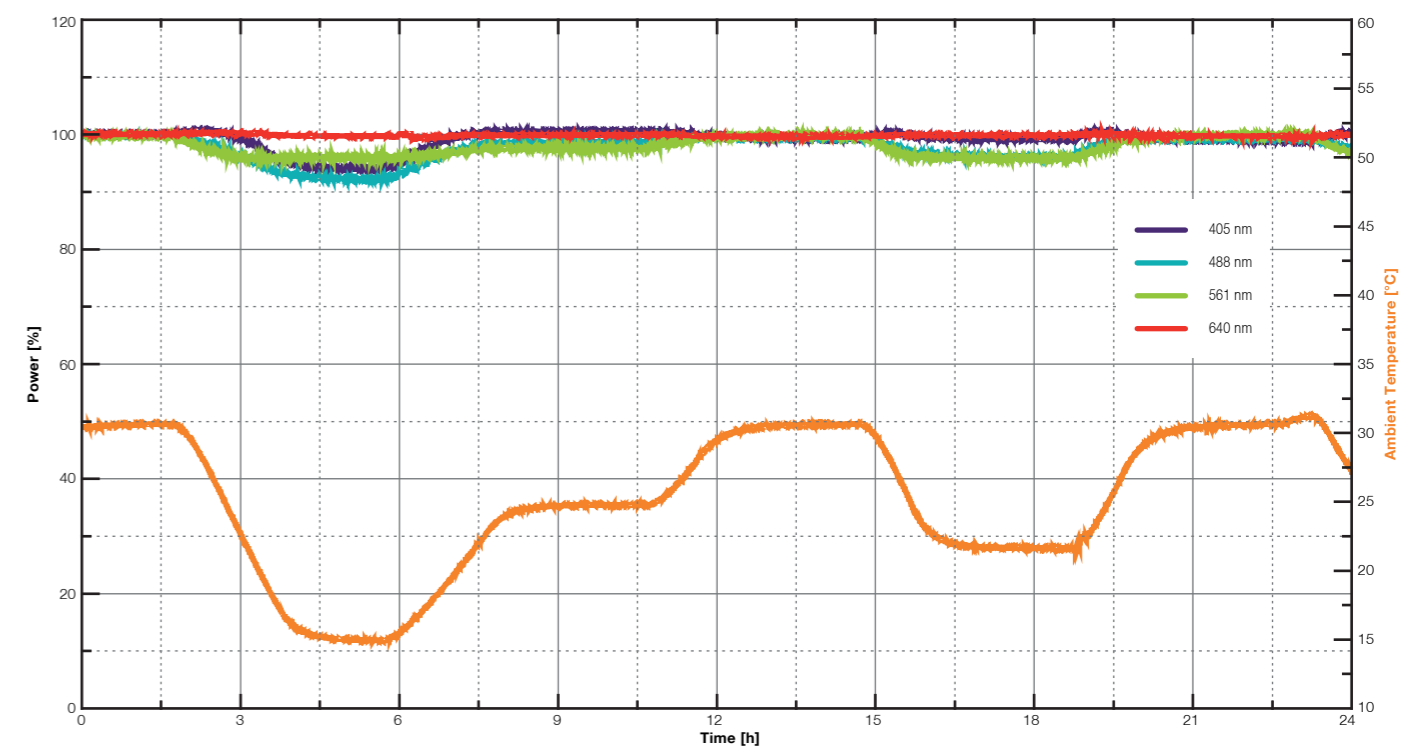
High passive stability may not be sufficient to ensure maximum output power after transportation of the iChrome system or to keep it stable during severe changes of the lab environment (temperature, vibrations). In these cases TOPTICA's proprietary COOL^{AC} (Constant Optical Output Level with Auto-Calibration) technology resets the lasers to maximum output power by just one push of a button.

- Ready to use
- No manual alignment
- Automatic recalibration (just a push of a button)
- Always maximum fiber output power



Severe temperature changes may decrease the output power after fiber delivery (2). COOL^{AC} brings the system back to perfect alignment and maximum power (1) with just one click.

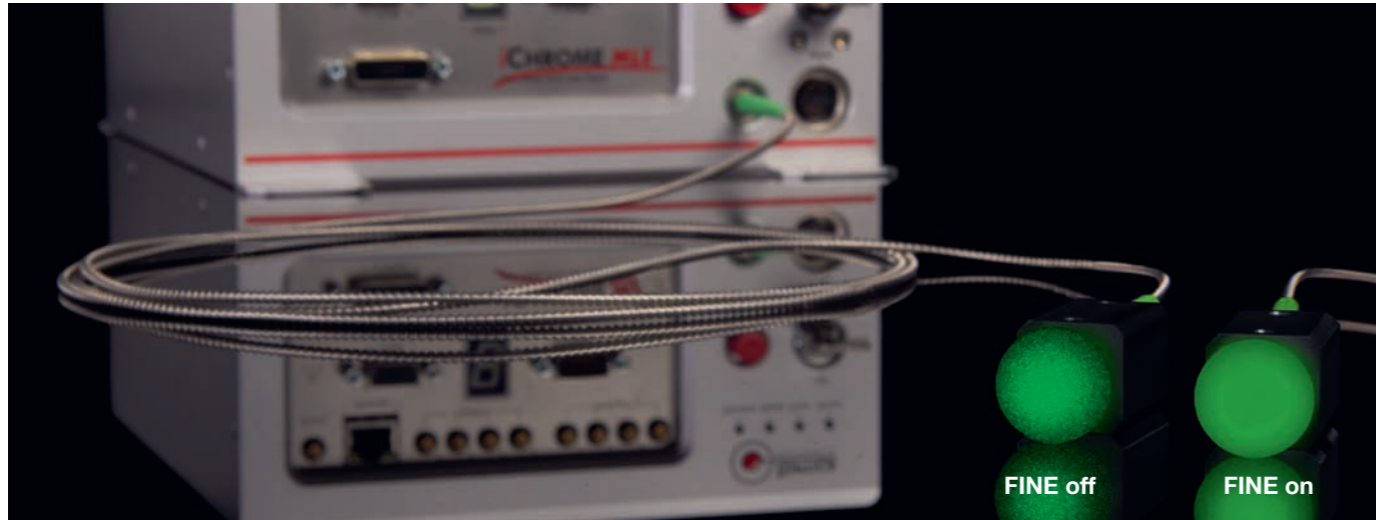
Passive stability



Even in changing environmental conditions the iChrome systems show an excellent passive stability. The different colors maintain a very high coupling efficiency and show no hysteresis – they return to 100 % output power each time the temperature returns to its initial value.

Best image quality

Speckle management



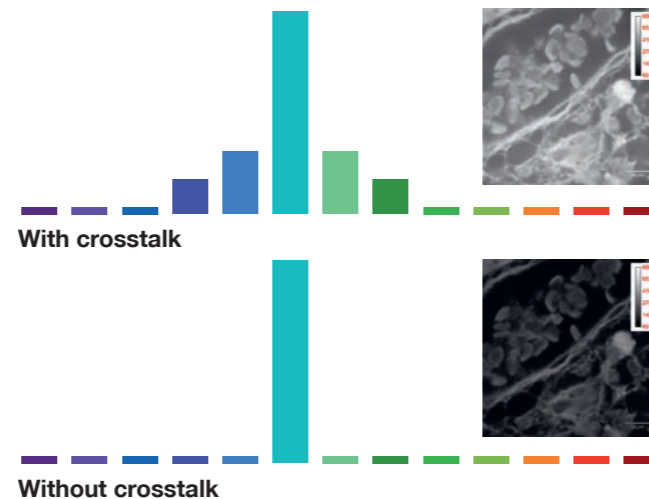
- FINE – reduces speckle artifacts (proprietary)
- Purely electronic feature
- Reduced coherence length

Annoying speckle noise on detectors and imaging systems caused by long coherence lengths is lowered to a minimum. TOPTICA's FINE (Feedback Induced Noise Eraser) feature reduces the coherence length by purely electronic means and is integrated in all iChrome systems. FINE helps to improve the image quality by reducing the mutual interference of wavefronts.

Direct modulation for “no light leak” and “no crosstalk” operation

- No extra hardware (AOM/AOTF) required
- Modulation with complete off (no light leak)
- No crosstalk between wavelengths
- Independent or simultaneous triggering with asynchronous pulses

iChrome systems incorporate direct modulation, where the laser diodes and FDDL (Frequency Doubled Diode Laser) are directly switched at the source. This not only extends lifetime of the laser sources, because lasers are only on when light is actually needed, but also gives the big advantage of truly independent switching (no crosstalk between laser lines as seen with AOTF) and complete off, no residual light when lasers are off (as seen with acousto optic modulators).



Complete off ¹

- True “zero photon” off-state, up to 20 MHz modulation
- Rise and fall times with “complete off” in 5 ns
- High signal-to-noise ratio

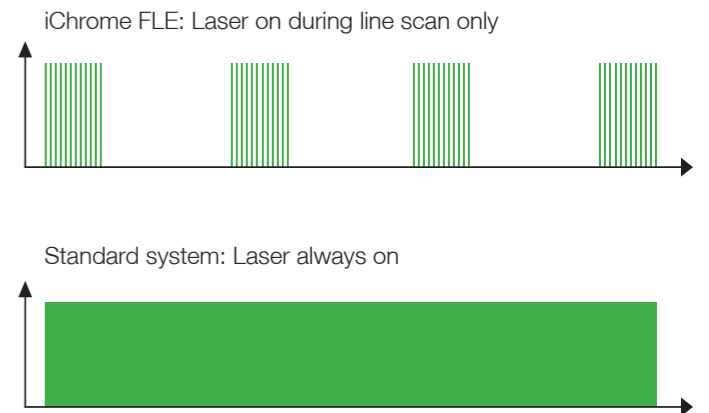
The iChrome systems allow “complete off” modulation up to 20 MHz for applications that require a true “zero photon” dark state (e.g. photoactivated localization techniques, like SMLM), and to increase the signal-to-noise ratio for better image quality and less photo damage.

Long lifetime

Superior lifetime due to direct laser modulation

All iChrome systems (exception DPSS laser in iChrome MLE) feature direct diode modulation. This explicitly includes the FDDL (Frequency Doubled Diode Laser) in iChrome CLE and FLE. Direct modulation preserves lifetime, as lasers are only emitting light, when it is actually needed for the exposure in the application. In contrast, systems with AOTF or AOM modulation always emit light from the laser source, where the AOM or ATOF only “lets light pass” when needed by the application. Such systems leave the lasers running even when no light is needed by the application. The accumulated run-times of the lasers is thus hours or days, even if the application may only run for minutes.

In short, the direct modulation of iChrome systems warrants unsurpassed lifetime of the laser sources and system.



**Up to 30 times higher net lifetime
(compared to AOTF based systems)**

Plug and play



Stand alone use: Graphical user interface

The microprocessor-controlled system enables flexible OEM integration into instruments such as microscopes or flow cytometers. Researchers and developers that want to operate their iChrome system as stand-alone unit however can control all laser parameters conveniently by a graphical user interface (TOPAS). With this software they can configure system settings, control all parameters of each laser individually and fully control all advanced features like COOL^{AC} and FINE. The software can also run scripts to automate more complex custom setups. For the iChrome MLE the TOPAS software also detects an iBeam smart that is connected to the system. This external iBeam smart can also be conveniently controlled via the TOPAS graphical user interface.



DANGER – VISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR
SCATTERED RADIATION
CLASS 4 LASER PRODUCT, EN60825-1:2014

iChrome FLE

Flexible Multi-Color Laser Combiner



i-Chrome FAMILY

A well-adjusted instrument is essential for biophotonics as well as in test & measurement and other demanding applications. The iChrome family supports all the necessary operation modes, such as pulsing, emission of several colors simultaneously and μW to 100 mW output power levels after fiber delivery.

The unique COOL^{AC} technology, a fully automatic beam alignment, ensures that the iChrome family is always perfectly aligned. iChrome multi-laser engines are easy to operate and at the same time enable and support the most demanding research and measurements.

	iChrome FLE	iChrome MLE	iChrome CLE 20	iChrome CLE 50
	For cutting edge applications	For power hungry applications	For cost sensitive applications	For cost sensitive applications
Number of wavelengths	7	4 (+1*)	4	4
Max. Power level	100mW	100 mW	20 mW	50 mW
Switching principle	Direct	Direct / AOM	Direct	Direct
COOL^{AC}	Yes	Yes	Yes	Yes
Number of fibers	1/2	1 (2**)	1	1
Size (H x W x D mm)	131 x 400 x 488	110 x 295 x 248	110 x 201 x 248	137 x 201 x 248
*additional external iBeam smart				
** 2 SM, SM/PM or 2 MM fibers possible				

Key Features

- Up to 7 laser lines for all important fluorophores from 405 to 785 nm
- COOL^{AC} automatic alignment, never again waste valuable lab time for manual laser alignment
- Tailored to your light source requirements with one or two fiber outputs
- Best image contrast and unsurpassed lifetime by AOM/AOTF-free all diode design
- Combine two different applications with one laser engine – fiber switch / fiber splitter

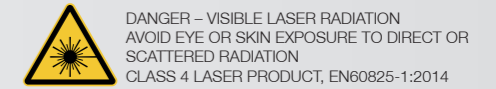
iChrome FLE

TOPTICA's iChrome FLE is a flexible laser engine that combines up to 7 laser lines in up to two polarization-maintaining single-mode fibers. Power levels reach up to 100 mW per laser line. The flexible setup can be customized to fit the special needs of every customer. The FLE's standard wavelength range is 405 – 647 nm, while wavelength of up to 785 nm can be integrated on request. Like all iChrome systems, the FLE guarantees a plug & play installation via TOPTICA's proprietary COOL^{AC} automatic alignment technology.

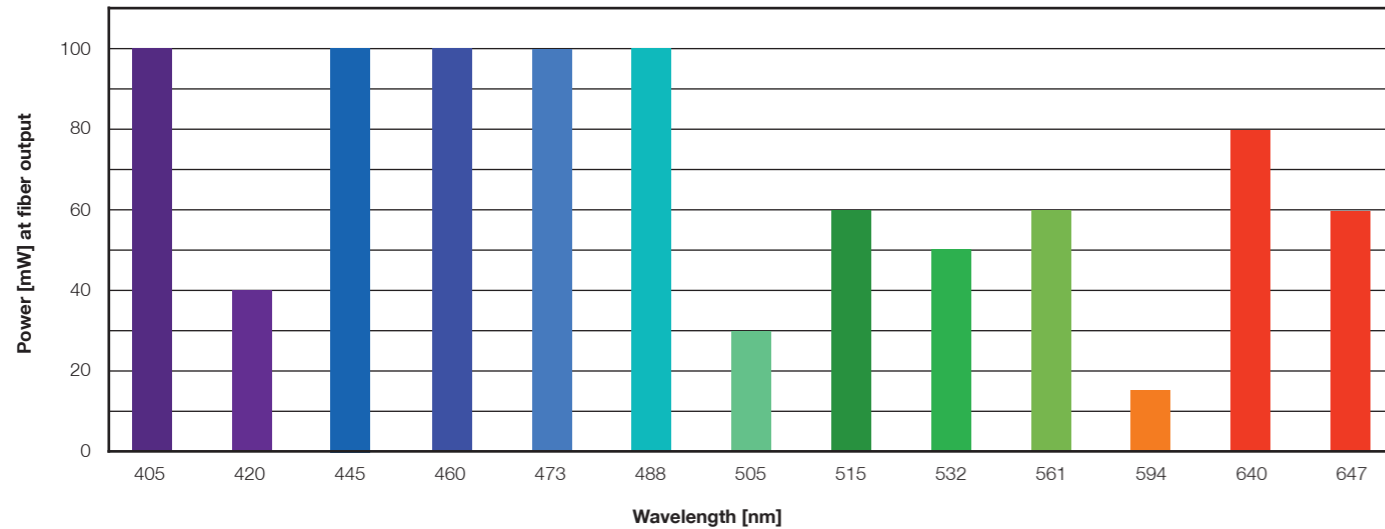
Systems equipped with two laser fibers benefit from TOPTICA's fiber-switching technology, which combines fiber switching and fiber splitting in one option. Power hungry applications can benefit from the full power level at the corresponding fiber, while applications like a two light-sheet setup benefits from an exact and adjustable power balance between both fibers.

iChrome FLE

Flexible Multi-Color Laser Combiner

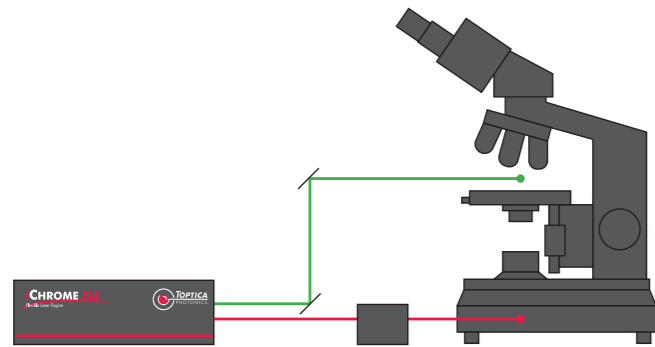


Choose your own colors:
7 out of 13 colors - unlimited possibilities for all important fluorophores

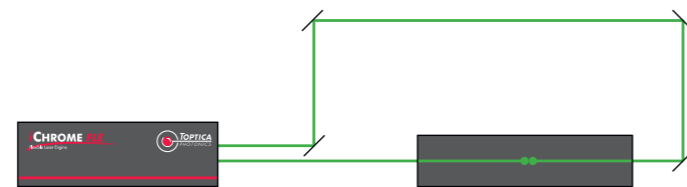


Combine two different applications with one laser engine

Enables bi-directional illumination



i.e. TIRF & Spinning Disk or FRAP & Confocal



i.e. Light Sheet Microscopy

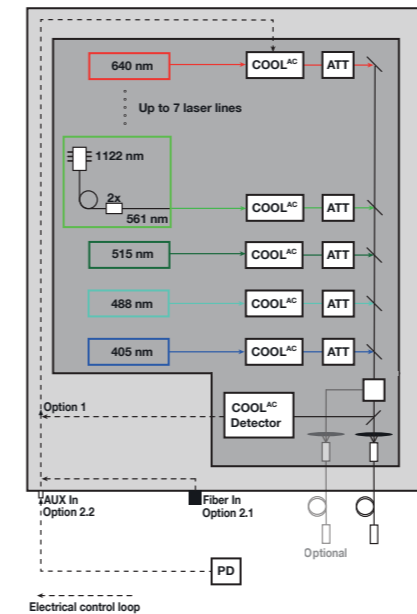
An additional option with the iChrome FLE is a separate fiber for up to two wavelength. TOPTICA's optical design gives room for two lasers to be carried in an extra fiber. This could be special wavelengths, which are designed to run through a separate beam path (for example 405 or 785nm, which are separately corrected within the microscopes beam path). This option could also be used to double existing wavelength for simultaneous high-power operation (for example 405 or 488nm for a separate FRAP input of a microscope).

The iChrome FLE is designed and optimized to suit many different microscopy techniques. Modulation behavior is thoroughly tested and optimized at TOPTICA, to guarantee best performance for scanning applications. With its power level and wavelength range,

the unit is also a perfect fit for many non-scanning applications, like light-sheet microscopy (also known as SPIM), TIRF, spinning disk, super-resolution microscopy and many other applications.

COOL^{AC} gives the laser combiner plug-and-play simplicity. Installation is done with the simple click of a button in the user software. Green wavelength (532, 561 and 594 nm) laser light is generated by TOPTICA's proprietary FDDL (Frequency Doubled Diode Laser) technology, an all diode approach for these very important wavelengths. Each laser line, including the FDDL's, are directly modulated up to a frequency of 1 MHz and TOPTICA's "Complete OFF" mechanism guarantees zero photons in the "off"-state. "Complete OFF" also means, that there is absolutely no cross talk between the individual wavelength.

iChrome FLE mechanical concept



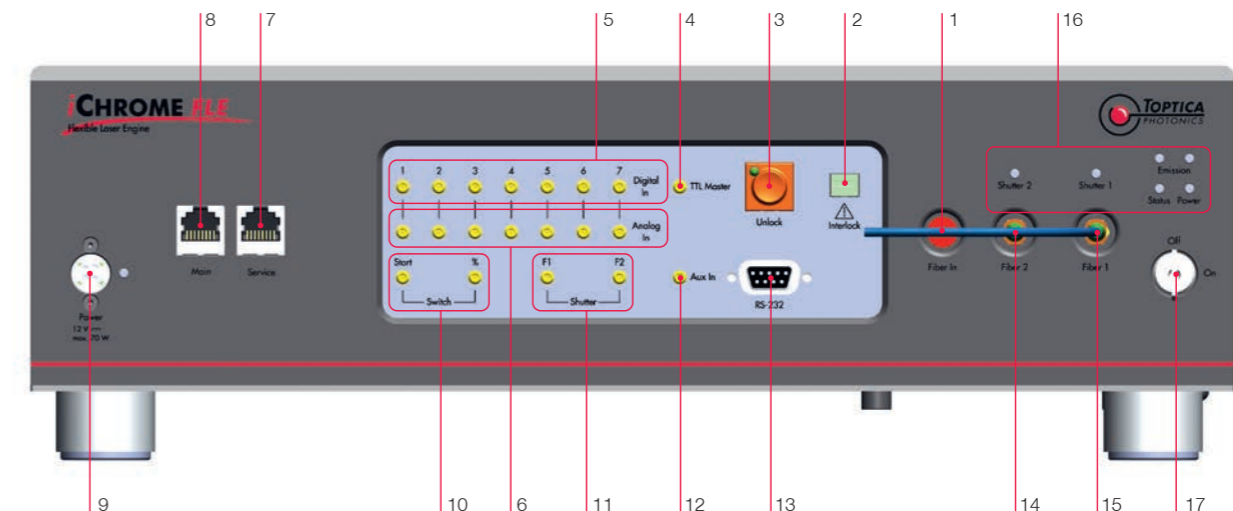
The iChrome FLE incorporates an advanced design of the proven iChrome opto-mechanical setup. Incorporating more lasers was just one of the design goals, adding the attenuator/fiber-switch module as well as an increased flexibility were others. The key objective, maintaining the superior stability and enabling complex, customer specified setups, have been met.

For installation or maintenance purposes, the FLE is equipped with two methods for COOL^{AC} optimization. The internal COOL^{AC} detector (option 1) can be used to

re-optimize fiber coupling purely by internal means.

After transport and installation of the system, COOL^{AC} can also be performed via either an external sensor (option 2.2, AUX in) or the integrated photo diode (option 2.1, fiber in). With these options it is possible to optimize the power from the fiber output and thus reset the COOL^{AC} for future internal optimization.

Flexible integration: Interface Connectors



CONNECTORS						
1	Fiber In port	FC-input	Input for fiber outputs (14 / 15)	9	DC 12 V IN connector	KPJX-4 LED indicator for over-voltage
2	Interlock connector	Interlock	Phoenix-connector	10	Switch inputs	SMB-connector TTL and Analog, 0 .. +5 V
3	Unlock button	To release interlock (Class 4 laser only)		11	Shutter inputs	SMB-connector TTL
4	TTL Master connector	SMB-connector	TTL	12	Aux inputs	SMB-connector Analog, 0 .. +2 V, for laser power calibration
5	Digital inputs	SMB-connector	TTL	13	RS232 connector	DB-9 female RS232 input
6	Analog inputs	SMB-connector	Analog, 0 .. +5 V	14	Laser output 2	
7	Service connector	RJ45-8P8C	Ethernet	15	Laser output 1	
8	Main connector	RJ45-8P8C	Ethernet			
INDICATORS						
16	Control LEDs					
GENERAL						
17	Key switch					



Key Features

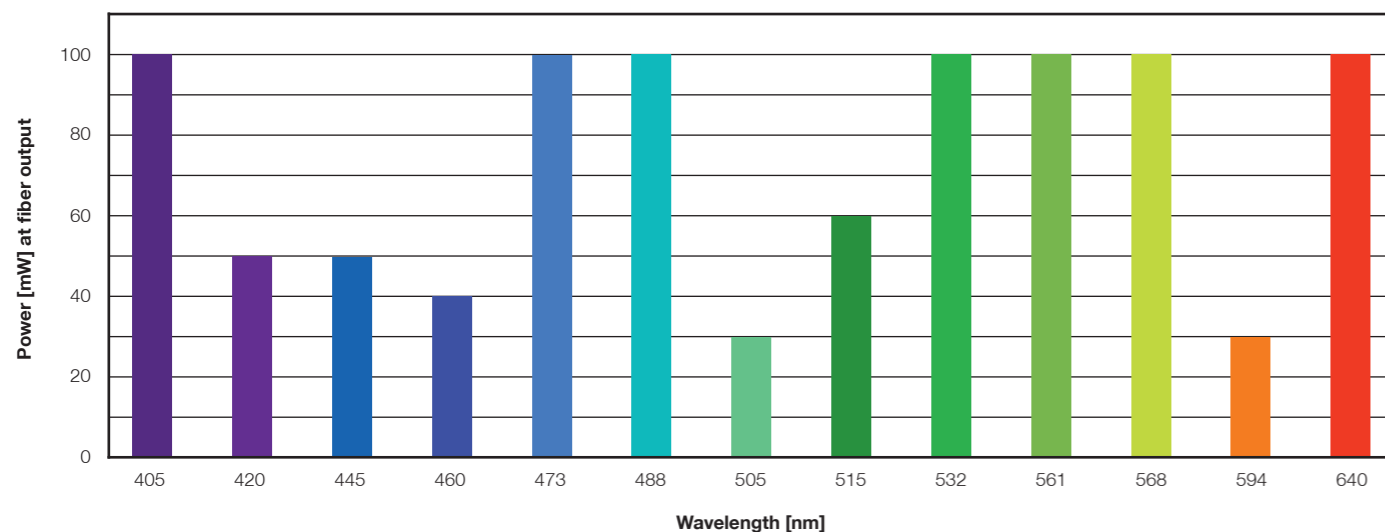
- Perfect choice for Microscopy and Flow Cytometry
- Up to 4 laser lines
- COOL^{AC} – hands-free, self-aligning system
- Direct modulation up to 20 MHz
- Supported by μ-Manager microscopy software

iChrome MLE

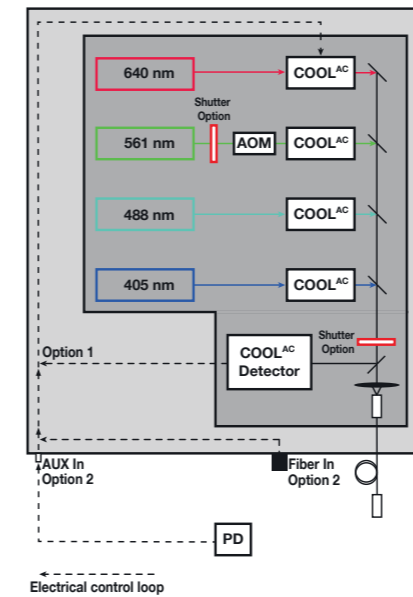
The iChrome MLE can contain up to four different diode lasers, or three diode lasers plus one DPSS laser, fully integrated into one compact box. The microprocessor-controlled system enables flexible OEM integration. High-speed analog and digital modulation allow fast switching of laser wavelength and intensity.

Being the most powerful version of TOPTICA's multi-laser engines, the iChrome MLE can offer up to 100mW per laser line. The standard wavelengths range is from 405 nm to 640 nm. Options such as a shutter, heat sinks a fiber switch for up to two fibers and output collimators complete the building blocks that are available for your customized iChrome MLE. TOPTICA's ingenious COOL^{AC} (Constant Optical Output Level with Auto-Calibration) technology automatically aligns the system with a single push of a button.

This feature ensures a constant optical output level even under strongly varying ambient conditions and completely eliminates the need for manual realignment – making the iChrome family the most advanced multi-line laser systems on the market.



iChrome MLE mechanical concept

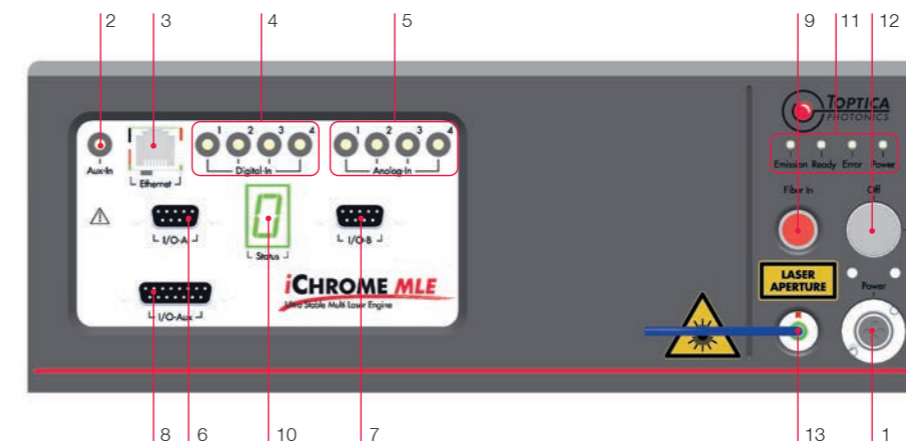


The iChrome MLE fully integrates all laser lines (laser diodes plus DPSS), fiber coupling and COOL^{AC} into one solid, temperature-stabilized optical head. This design makes the system almost independent from external thermal influences.

With its laser beam position detector (COOL^{AC} Detector) it can easily and quickly reset fiber coupling to a saved „Home“ position. This procedure can be extremely helpful for multi-hour measurements, where a perfectly stable laser power is required. For installation, the iChrome MLE offers two different COOL^{AC} optimization

procedures. The system can either optimize directly to the fiber output (by plugging the fiber back into the MLE) or on the reading of a power meter, that may already be installed in the customers instrument setup (via the electrical Aux-in input).

Flexible integration: Interface Connectors

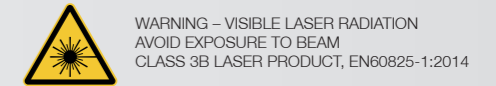


Thanks to different electrical connectors, the iChrome MLE can be conveniently integrated into existing setups and instruments. A fully digital communication can be realized via RS 232 or Ethernet connection. For better compatibility to existing setups, dedicated TTL and analog inputs are available for each wavelength. Furthermore, programmable pins are available, that can be linked to commands according to customer needs.

CONNECTORS			
1	Power input	KPJX-4	
2	Aux input	SMB-connector	Analog, 0 .. +5 V, for laser power calibration
3	Ethernet	RJ45-8P8C	
4	Digital input (laser 1 - 4)	SMB-connector	TTL
5	Analog input (laser 1 - 4)	SMB-connector	Analog, 0 .. +5 V
6	I/O-A	DB-9 female	RS 232 input
7	I/O-B	DB-9 male	RS 232 output (for optional iBeam smart)
8	I/O-Aux	DB-15 female	Interlock, programmable in-/ and outputs
9	Self-calibration fiber input	FC-input	Input for fiber output (#13)
INDICATORS			
10	Display for laser specific status		
11	LEDs for general system status (laser, ready, error, power)		
GENERAL			
12	Key switch		
13	Fiber output		

iChrome CLE

Compact And Efficient Four-Color Laser Engine



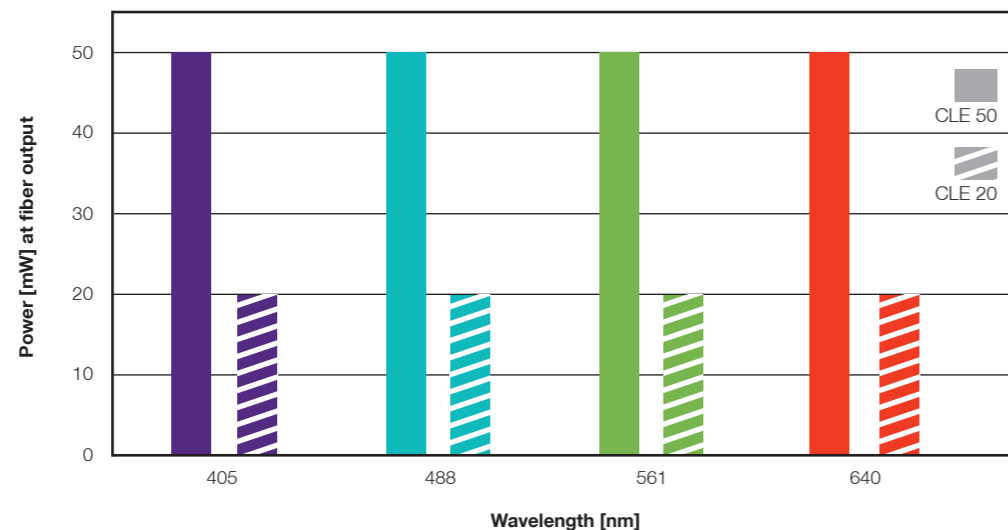
Key Features

- Four colors in one box
- 405, 488, 561, 640 nm with > 20/50 mW each
- COOL^{AC} automatic alignment
- Unique modulation capabilities
- Complete off on all wavelength

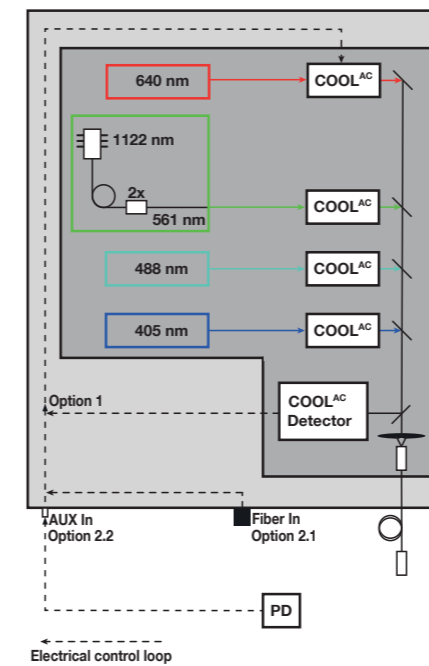
iChrome CLE

TOPTICA's iChrome CLE is a compact laser engine that combines four laser lines in one box. All integrated colors are provided via one polarization-maintaining single-mode fiber. It is available with 405, 488, 561 and 640 nm at a 20 mW or 50 mW guaranteed output power out of the fiber. The iChrome CLE incorporates TOPTICA's proprietary FDDL (Frequency Doubled Diode Laser) for the 561 nm line. This technology provides unique advantages for the user. For the first time, a 561 nm line can be treated as „diode“ with its superior modulation properties, including fast response times, low power consumption and complete off (zero photon) in the off state.

The system guarantees a plug & play installation as the included COOL^{AC} automatic alignment technology will restore full fiber coupling efficiency at the push of a button. OEM integration is easy via the fully unified user interface. All features are addressable via RS232 or Ethernet. The industry standard analog and digital interfaces make the iChrome CLE compatible to existing setups. The iChrome CLE represents the easy to use entry point for a fully integrated and automated laser engine. Customers can take care of their research without the need to ever worry about their illumination source.



iChrome CLE mechanical concept

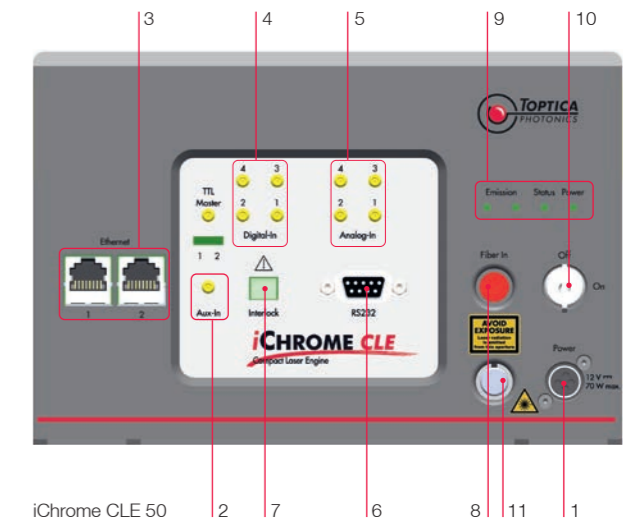
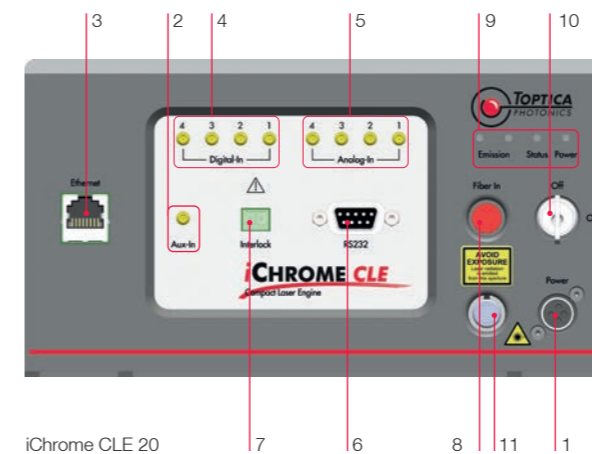


The mechanical design of the iChrome CLE fully integrates all laser lines (laser diodes and FDDL) plus fiber coupling and COOL^{AC} into one solid block, which is temperature stabilized for added stability. This design ensures safe and stable operation almost independent from external influences.

For installation or maintenance purposes, the CLE is equipped with two methods for COOL^{AC} optimization. The internal COOL^{AC} detector (option 1) can be used to re-optimize fiber coupling purely by internal means.

After transport and installation of the system, COOL^{AC} can also be performed via either an external sensor (option 2.2, AUX in) or the integrated photo diode (option 2.1, fiber in). With these options it is possible to optimize the power from the fiber output and thus reset the COOL^{AC} for future internal optimization.

Flexible integration: Interface Connectors



CONNECTORS			
1	Power input	KPJX-4	
2	Aux input	SMB-connector	Analog, 0 .. +5 V, for laser power calibration
3	Ethernet	RJ45-8P8C	
4	Digital input (laser 1 - 4)	SMB-connector	TTL
5	Analog input (laser 1 - 4)	SMB-connector	Analog, 0 .. +5 V
6	RS232	DB-9 female	
7	Interlock	Phoenix-connector	
8	Self-calibration fiber input	FC-input	Input for fiber output (#11)
INDICATORS			
9	LEDs for general system status (emission, status, power)		
GENERAL			
10	Key switch		
11	Fiber output		

Specifications iChrome FLE

Specifications iChrome MLE

Optical Specifications														
Wavelength* (nm)	405	420	445	460	473	488	505	515	532	561	594	640	647	
Max. Number of Wavelengths	7, max. 2x FDDL													
Laser Type	Diode						FDDL				Diode			
Center Wavelength Range [nm]	± 4	± 5	± 5	± 5	± 5	± 4	± 5	± 5	± 2	± 2	± 2	+3-5	+4-2	
Fiber Coupled cw Output Power [mW]	50/100	40	50/100	40/100	40/100	40/100	30	30/60	50	20/60	15	80	60	
Power stability	± 2 % (drift over 8h @ room temperature +/- 3 °C)													
RMS noise (10 Hz - 10 MHz)	< 0.5 %						< 1 %				< 0.5 %			
M ²	< 1.1													
Ellipticity	< 10 %													
Polarization ratio (typ.)	> 60:1, linear													
Polarization orientation tolerance	linear, ± 3° (slow axis aligned to index key)													
Fiber Specifications														
No. of Fiber Outputs	1 or 2													
Fiber Output Switching Time	350 ms													
Fiber Output Power Ratio	variable from 95:5 to 5:95													
Fiber Output Connector	FC/AFC (8° angled) as standard, others like FC/PC, FC/APC, FCP8 or SC on request													
Fiber Cable Length	2 m (max.)													
Fiber Cable Type	3 mm Stainless Steel Reinforced													
Fiber Type	Single-mode, Polarization Maintaining													
Fiber Numerical Aperture (5%) (typ.)	0.080	0.080	0.078	0.077	0.077	0.076	0.075	0.074	0.073	0.071	0.069	0.066	0.066	
Mode-field diameter (typ.) [µm]	3.9	4.1	4.4	4.6	4.9	5.0	5.2	5.4	5.6	6.2	6.7	7.5	7.7	
Electronic Specifications														
Digital Modulation														
Supported digital signal levels	TTL													
Max. digital modulation frequency	1000 kHz													
Rise/Fall time (10 % - 90 %) (ns)	< 0.5 µs						< 5 ns				< 15 ns		< 5 ns	
Trigger to light (typ.)	< 1.5 µs (typ.)						< 50 ns				< 500 ns		< 50 ns	
Digital modulation extinction ratio	inf.						inf.				10 ⁶		inf.	
Analog Modulation														
Maximum modulation frequency	1000 kHz (depending on modulation depth)													
Analog trigger to light (typ.)	< 1.5 µs													
Digital modulation extinction ratio	inf.						inf.				10 ⁶		inf.	
General and Environmental Specifications														
Certification	CE compliance, RoHS compliance, CDRH													
Laser class	3b or 4 (depending on wavelength configuration)													
Digital communication interface	RS 232 (≤ 115.200 baud), Ethernet													
Operating ambient temp. range	15 .. 35 °C													
Storage temperature range	-10 .. 60 °C													
Operating relative humidity	< 90 %, non-condensing (at 20°C)													
Dimensions laser head (H x W x D)	131 x 400 x 488 mm ³ (H x W x D)													
Weight	17 kg													
DC input requirements	12 V DC, < 7 A													
Power consumption	< 80 W													

*other wavelength on request subject to change

Optical Specifications														
Wavelength* [nm]	405	420	445	460	473	488	505	515	532	561	568	594	640	
Center wavelength range [nm]	± 4	± 5	± 5	± 5	± 5	± 4	± 5	± 5	± 2	± 2	± 2	± 2	+3/-5	
Fiber coupled cw output power [mW]	50	50	50	40	40	40	30	40	40	40	65	30	50	
Fiber coupled cw output power - high power version [mW]	100	50	100	100	100	100	30	60	100	100	100	30	100	
Power stability	< 5 % (drift over 8h @ room temperature +/- 3 °C)													
RMS noise (10 Hz - 10 MHz)	< 0.2 %													
Long-term output power average	< 5 % / 1000 hrs													
M ²	< 1.1													
Ellipticity	< 10 %													
Polarization ratio (typ.)	> 100:1, linear													
Polarization orientation tolerance	± 3°													
Fiber Specifications														
Fiber output connector	FC/AFC (8° angled) as standard, others like FC/PC, FC/APC, FCP8 or SC on request													
Fiber cable length (max.)	2 m													
Fiber cable type	3 mm stainless steel reinforced													
Fiber minimum bend radius	50 mm													
Fiber type	Single-mode, polarization-maintaining													
Fiber numerical aperture (5%) (typ.)	0.080	0.080	0.078	0.077	0.077	0.076	0.075	0.074	0.073	0.071	0.070	0.069	0.068	
Mode-field diameter (typ.) [µm]	3.9	4.1	4.4	4.6	4.9	5.0	5.2	5.4	5.6	6.2	6.3	6.7	7.5	
Electronic Specifications														
Digital Modulation														
Supported digital signal levels	TTL													
Max. digital modulation frequency	20 MHz													
Rise/Fall time (10 % - 90 %) (ns)	< 5 ns						< 5 ns				< 15 ns		< 5 ns	
Trigger to light (typ.)	< 1.5 µs (typ.)						< 50 ns				< 500 ns		< 50 ns	
Digital modulation extinction ratio	inf.						inf.				10 ⁶		inf.	
Analog Modulation														
Maximum modulation frequency	1 MHz (depending on modulation depth)													
Analog trigger to light (typ.)	500 ns													
Digital modulation extinction ratio	inf.						inf.				10 ⁶		inf.	
General and Environmental Specifications														
Certification	CE compliance, RoHS compliance, CDRH													
Laser class	Class 3b													
Digital communication interface	RS 232 (≤ 115.200 baud), Ethernet													
Operating ambient temp. range	15 .. 40 °C													
Storage temperature range	-10 .. 60 °C													
Operating relative humidity	< 90 %, non-condensing (at 20°C)													
Dimensions laser head (H x W x D)	110 x 295 x 250 mm ³													
Weight	7.5 kg													
DC input requirements	12 V DC, < 6A, (high power version: 12 V DC, < 11 A)													
Power consumption	< 70 W, (high power version: < 120 W)													

*other wavelength on request subject to change

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