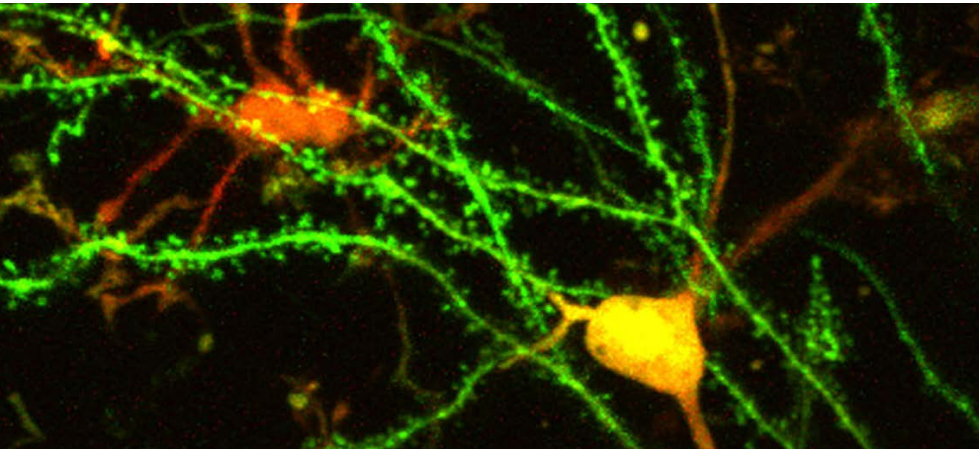


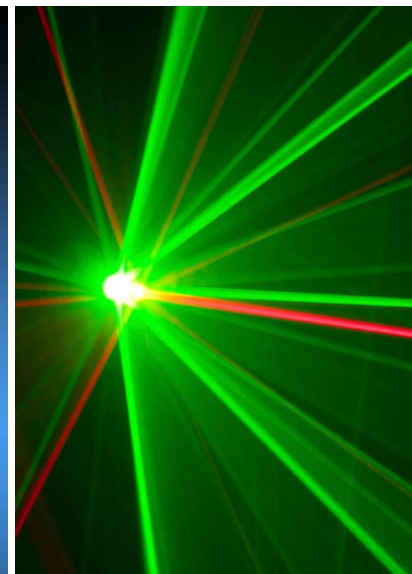


HIGH-END OPTICAL FILTERS

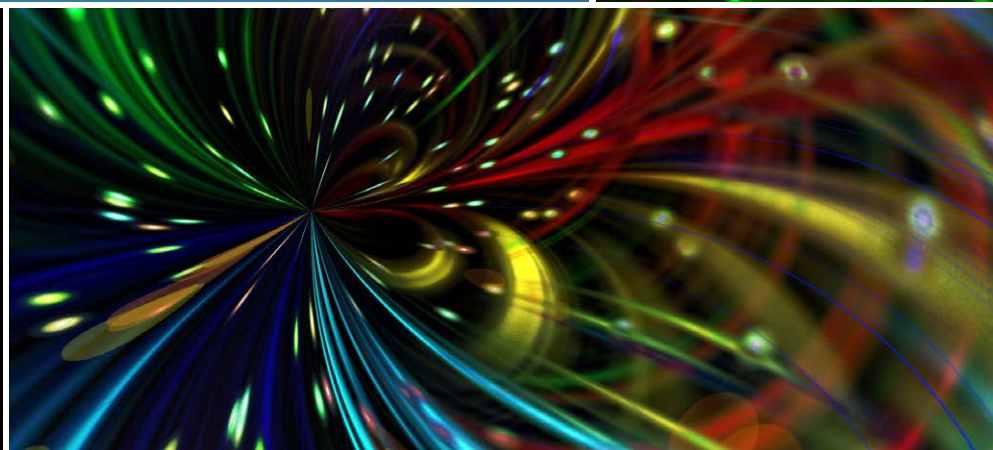
For photonics, spectral analysis and microscopy



Benefit from interdisciplinary and longterm expertise!



Fluorescence analysis
Biomedical optics
Laser systems
Raman / LiDAR
Machine vision
Quantum technologies





FILTER DESIGNS FOR MANY APPLICATIONS

In cooperation with very experienced manufacturers, we will offer optical filters that optimize the performance of your systems. Specified AOI range and cone angles of the light beams will be taken into account as well as manufacturing tolerance and operating temperature. By selecting substrate materials and innovative coating techniques, high-end optical performance can be achieved as well as low budget solutions for bandpass, dichroics, ultrasteep edge or notch filters.

WE ARE AT YOUR SERVICE

- ✓ In depth-advice from filter experts
- ✓ Filter mounting service into cubes and holders
- ✓ Filter quality check
- ✓ Free filter demos and after sale service

FOR OEM CUSTOMERS

- ✓ Filter project support from prototype to series
- ✓ Filter volumes from small batches to high volumes
- ✓ More than 20 years interdisciplinary expertise

- ✓ HIGH-QUALITY SUBSTRATES
- ✓ MODERN SPUTTERING
- ✓ INHOUSE QUALITY CONTROL
- ✓ 10 YEARS WARRANTY
- ✓ FREE FILTER DEMOS

KEY CHARACTERISTICS OF FILTERS

- ▶ Excellent out of band blocking \geq OD6
- ▶ Transmission up to 98 % (avg.)
- ▶ Exceptional environmental and temperature stability ($-200\text{ }^{\circ}\text{C}$ up to $+350\text{ }^{\circ}\text{C}$)
- ▶ CWL tolerances as tight as 0.05 nm in UV-NIR range
- ▶ Center wavelength (CWL) at any wavelength from the UV to the mid IR ($\sim 250\text{ nm}$ to $2.5\text{ }\mu\text{m}$)
- ▶ FWHM bandwidths in UV-NIR range as narrow as 0.1 nm
- ▶ Surface flatness after coating as low as $\lambda/20$ PV/inch @632.8 nm
- ▶ Filter dimensions from 3 x 3 mm to 258 x 258 mm

ASK OUR PRODUCT EXPERTS!



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Christoph Stangl

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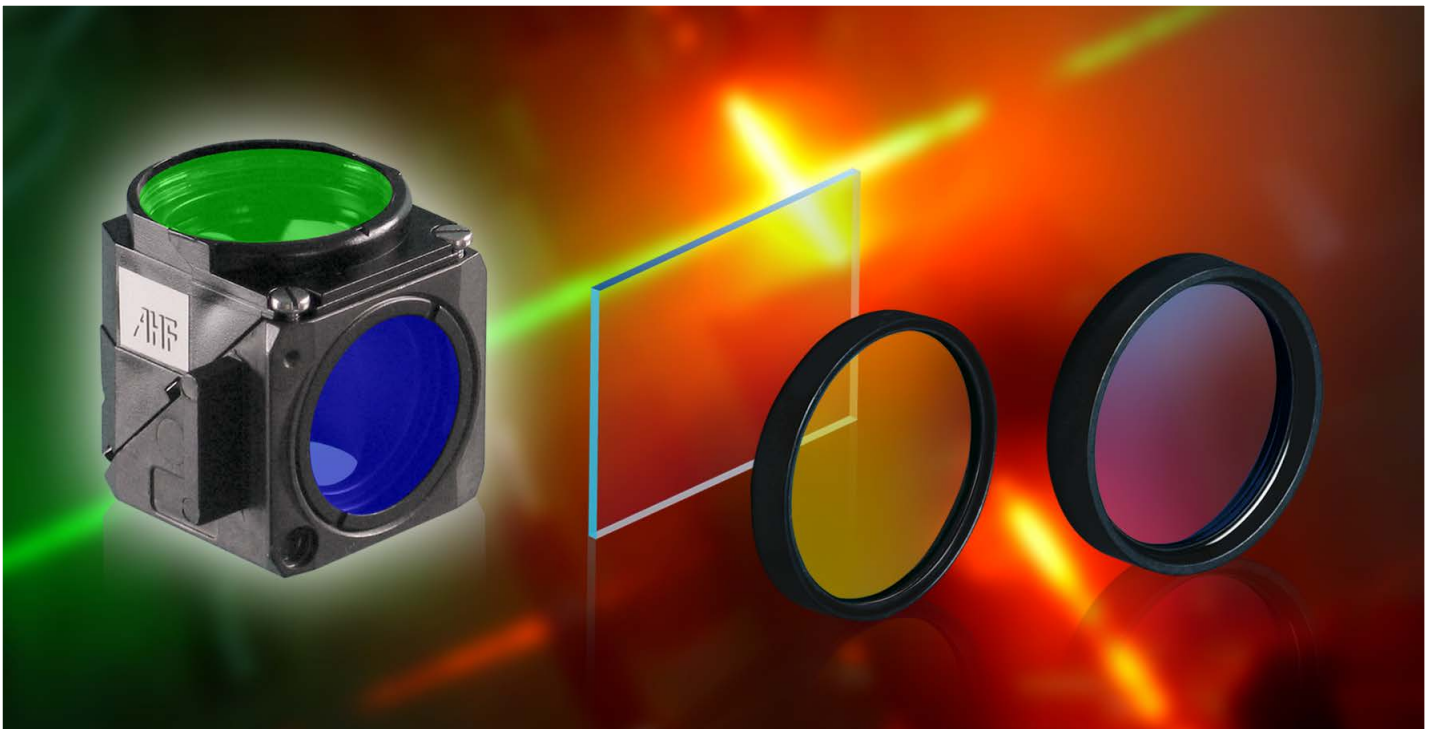


Frederic Feuerbacher

✉ ff@ahf.de

ULTRA STEEP OPTICAL FILTERS

When every photon counts



APPLICATIONS

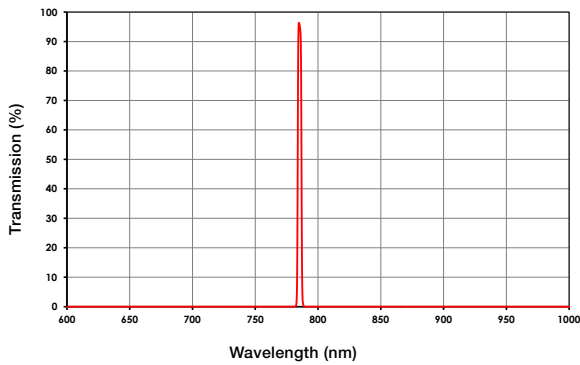
- :: Measurement of Raman scattering (Stokes / Anti-stokes) signals, e.g. SERS, SRS
- :: CARS (Coherent Anti-Stokes Raman Spectroscopy)
- :: Laser reflection and suppression in flow cytometers (FACS) and microscopes
- :: Measurement in quantum optics

YOUR BENEFITS

- :: Extremely steep spectral designs
- :: Transition width up to 0.5 % of laser wavelength
- :: Best signal-to-noise ratios (SNR)
- :: Low ripples in passband
- :: No spectral drift over time
- :: Hard ion-beam sputtered filters

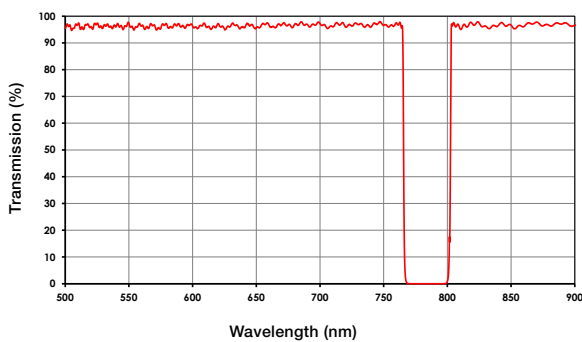
OUR PARTNER





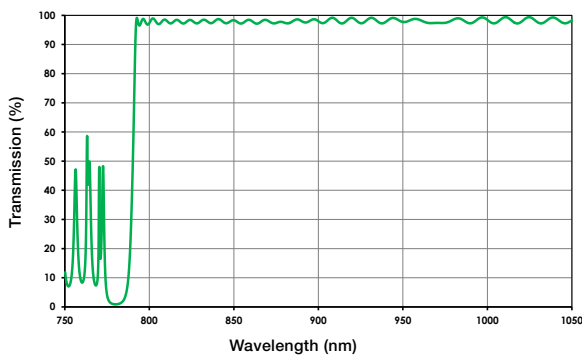
MaxLine® CLEAN-UP FILTERS

- :: Extremely narrowband (up to FWHM 1.2 nm) clean-up filters
- :: Perfectly matched to the corresponding RazorEdge® filters
- :: OD 6 blocking typical within 1.5 % of laser wavelength
- :: Very high transmission (up to 95 %)
- :: Eliminate laser spectral noise leakage



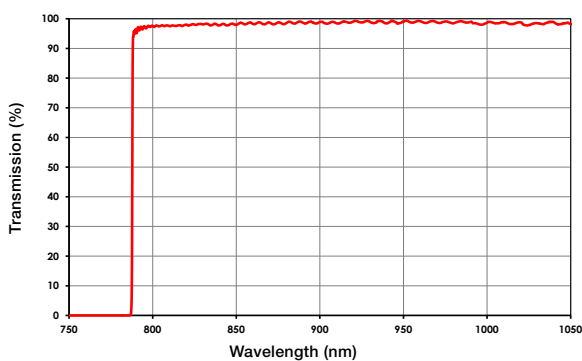
NOTCH-FILTERS

- :: Very narrow bandwidth up to 9 nm
- :: E-grade with laser-line blocking > OD 6
- :: Ultra wide passband range 350 to 1600 nm
- :: High transmission to detect weak signals
- :: Dual- / Triple- / Quad-notch filters for different laser wavelengths available



RazorEdge® BEAMSPLITTERS

- :: Full laser line reflection at 45° incidence with ultrasteep transition from reflection to transmission
- :: Transition width < 1 % of laser wavelength
- :: For "U-grade", no polarization shift!
- :: Perfectly matched to RazorEdge® longpass filters



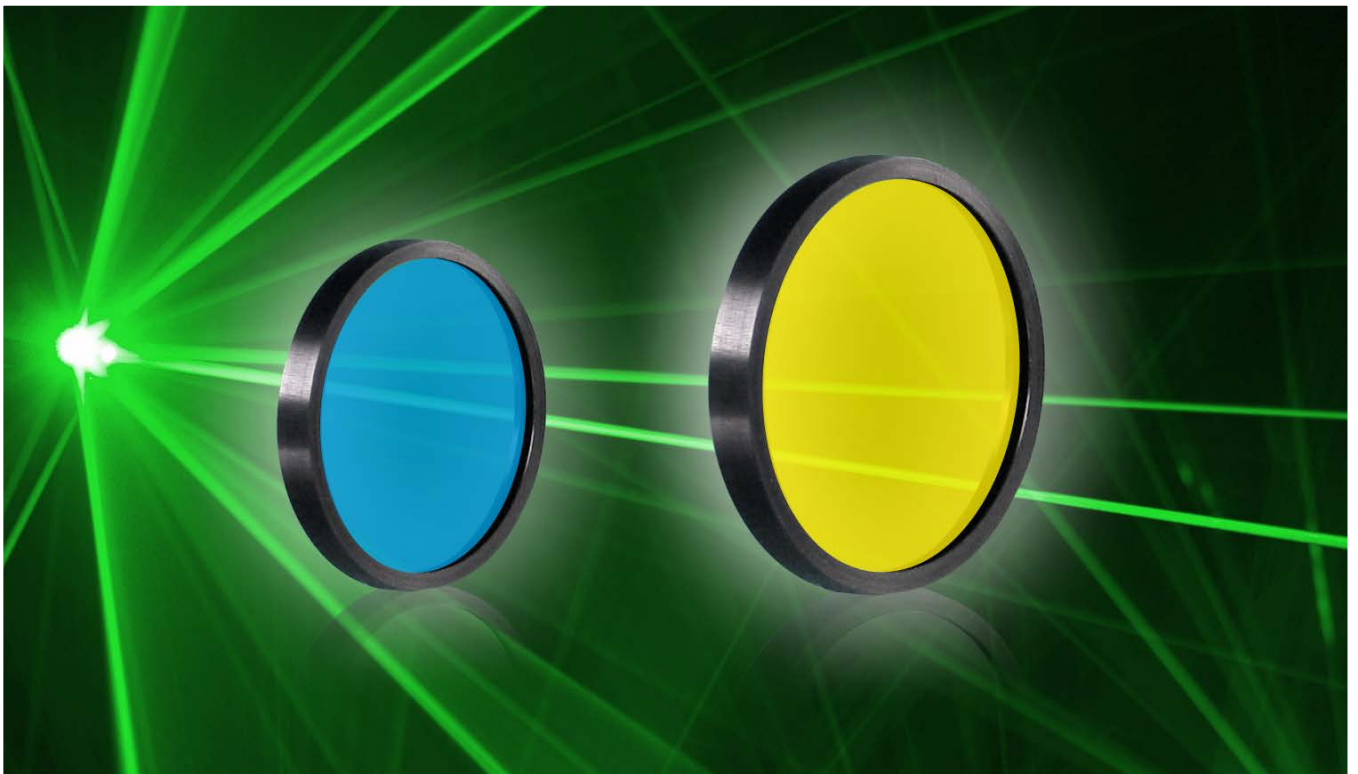
RazorEdge® LONGPASS FILTERS

- :: Transition width 0.5 % of laser wavelength for E-grade filters from laser line blocking OD 6 to 50 % transmission
- :: Ultra-wide transmission range with very high transmission (> 95 %)
- :: High laser damage threshold 1 J/cm² @ 532 nm 10 ns pulse width
- :: Also available as shortpass filters
- :: For measurement of Stokes / Anti-Stokes signals



ULTRA-NARROWBAND FILTERS

For Laser Applications – Pushing the Envelope of Performance



LARGE FORMAT AND IMPROVED TEMPERATURE STABILITY

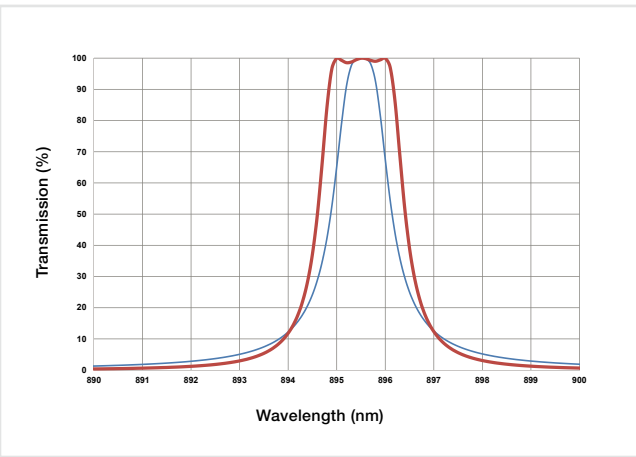
These hard-coated filters with very narrow bandwidth are used in optical systems, like LIDAR (light detection and ranging), Doppler shift detection of plasma velocity, laser clean-up, chemical and gas sensing, as well as for cutting-edge astronomy and instrumentation applications. They are highly resistant to laser damage, which ensures a high level of performance for a long period of time.

APPLICATIONS

- :: Laser Clean-up
- :: Quantum optics
- :: Spectroscopy
- :: Astronomy
- :: LIDAR
- :: Plasma physics

OUR PARTNER

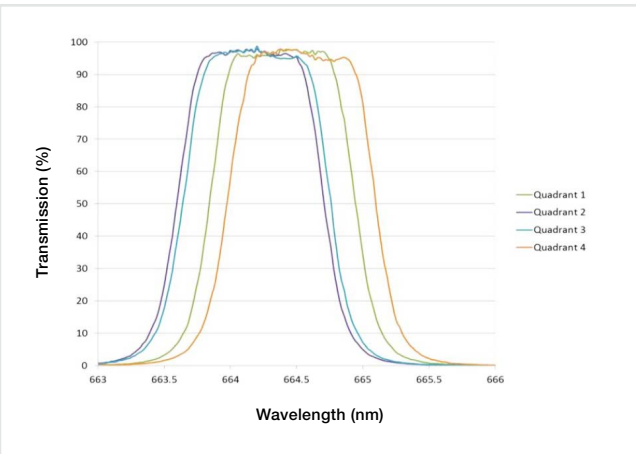




FROM DESIGN TO SPECIFIC ULTRA-NARROWBAND FILTER (UNBF)

- :: Fully customizable
- :: Example of 895.5/1 nm and 895.5/1.5 UNBF
- :: Transmission > 92 %
- :: Customized out of bandpass blocking
OD4 / OD6 from 700 – 1100 nm

◀ Example on the left shows two different designs, blue curve was realized



MODERN PLASMA COATINGS

- :: Highly reproducible square top filters with low ripple
- :: Low temperature dependence, e.g. for
532 nm 2.5 pm / K
- :: Exceptional transmission
- :: Large formats (up to 75 mm) with minimum variation
(center wavelength 0,06 %, FWHM 0,02 %)

CWL (nm)	FWHM (nm)	FWHM (%)	OD
317.5	1.5	0.472	6
354.717	0.15	0.042	5
410.3	1.1	0.268	5
532.079	0.17	0.032	5
656.1	1	0.152	4
828.007	0.5	0.060	5
1030.2	0.6	0.058	8
1064.164	0.4	0.038	5

EXAMPLES OF AVAILABLE UNBF

- :: Ultra-narrowband designs from UV to IR
with minimum 0.15 nm FWHM
- :: Blocking up to OD 8 over a broad spectral range
possible
- :: Filter bandwidth cannot be measured with
commercial available instruments

OUR FILTER TEAM IS HAPPY TO GIVE SUPPORT!



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LIGHT SOURCES FOR RESEARCH AND INDUSTRY

(B)Right Light Where It Needs to Be



MATCHING LIGHT SOURCES FOR YOUR APPLICATION

Bright fluorescence signals anchor in perfect spectral alignment of the light source, adequate dyes or reporters and a well considered set of optical filters.

Being a truly independent reseller, it is our goal to find the best spectral match for your specific application – your success is our motivation.

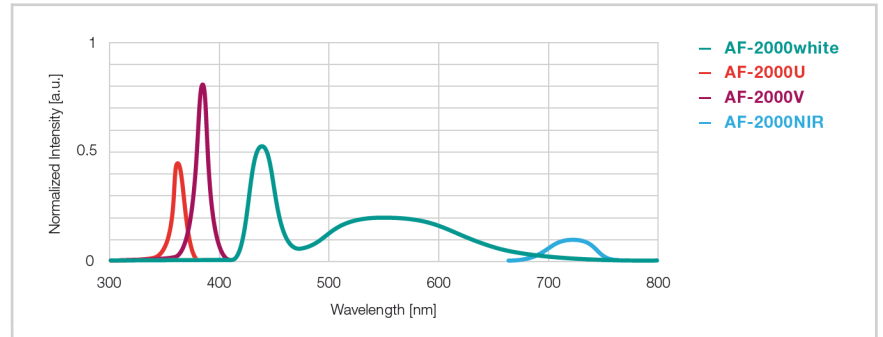
ADVANTAGES OF NEW GENERATION LIGHT SOURCES

- ✓ Extreme bright and stable light output
- ✓ Eco-friendly and safe (power-efficient, very long lifetime, mercury-free)
- ✓ Fast (TTL-) switching
- ✓ No heat-up times or shutters needed

BASIC WHITE LIGHT LED

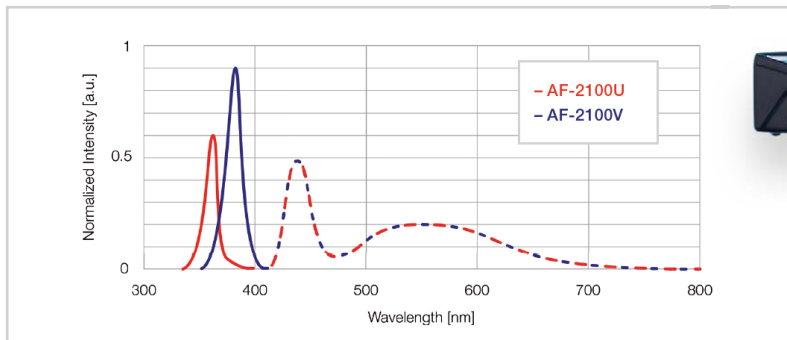
For Standard Fluorescence Applications

For standard fluorescence microscopy applications we recommend our *AF-2000* and *AF-2100* as low-price entry-level light sources and the *pE-300 ultra* as a intermediate solution to switchable color light sources.



AF-2000 SERIES

- :: Mono LED
- :: Direct microscope mount
- :: Passive cooling and electrically shielded housing
- :: Manual Intensity control and TTL trigger option
- :: Lifetime > 25.000 h and low energy consumption



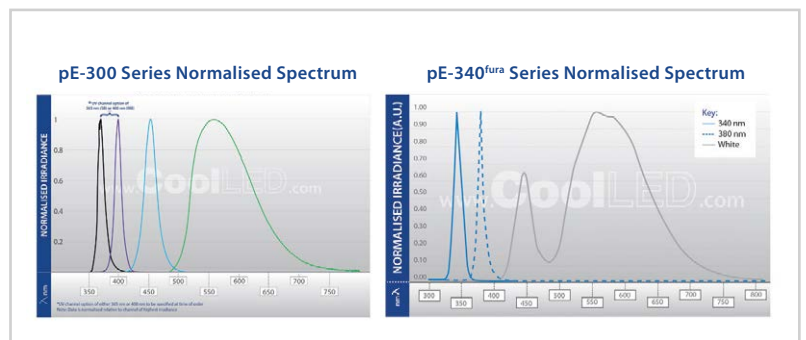
AF-2100 SERIES

- :: Dual LED
- :: Convenient manual intensity control
- :: Passive cooling and solid electrically shielded housing
- :: Direct mount for most microscopes
- :: Optimized for FISH and screening labs



COOLED PE-300 / 340 SERIES

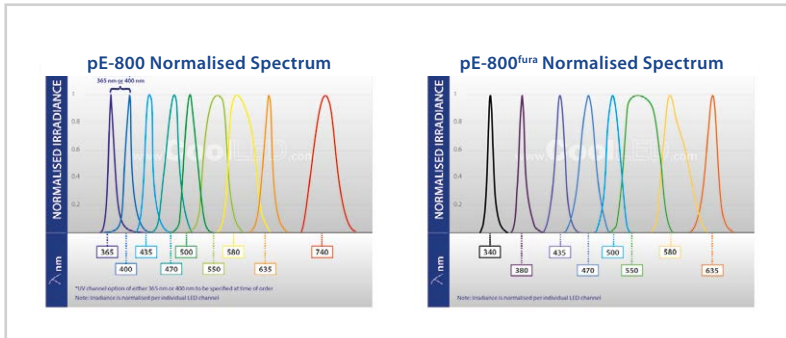
- :: Triple LED
 - :: Independent channel control (*white*) and addtl. bandpass filter holder (*ultra*)
 - :: Direct-mount or LLG-coupled
- Versions: *pE-300 lite* / *white* / *ultra* / *pE-340 fura*



SWITCHABLE COLOR LED

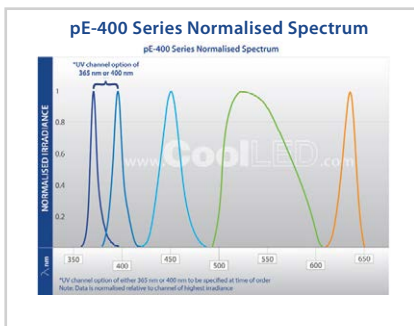
Fast Multiband Applications and Ratiometric Screens

Multi-Color LED light sources truly boost the readout speed in multiband fluorescence applications, as excitation colors can be switched within microseconds – unthinkable in classical filterwheel configurations. With optional bandpass filter mounts directly in the light source, the need for multiband exciters in the cube is eliminated, hence greatest possible spectral flexibility is given.



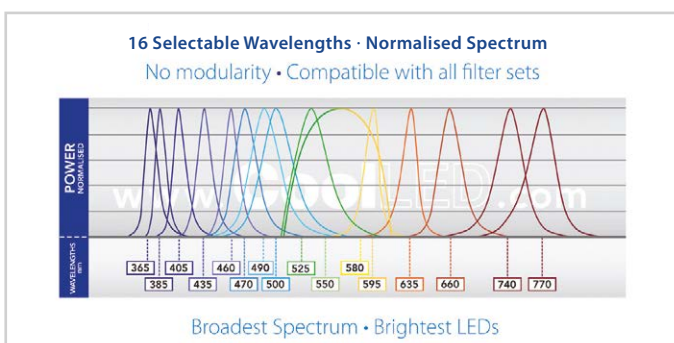
COOLED PE-800 SERIES

- :: 8 independently controllable LED channels
 - :: Broad spectrum from 340–740 nm, covering Fura2–Cy7
 - :: Removable inline excitation filter holders
- Versions: *pE-800* with 365 or 395 nm and *pE-800 fura*



COOLED PE-400 SERIES

- :: 4 powerful LEDs cover DAPI though YFP to Cy5
- :: Individual channel triggering (TTL, <math><10 \mu\text{s}</math>) and selection
- :: *pE-400 max* with bandpass filter holders

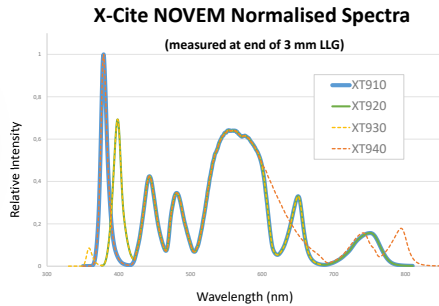


COOLED PE-4000

- :: Broad LED spectrum with 16 LEDs (365–770 nm) as 4 x 4 LED array for optimal multiband utilization
- :: Individual control of selected LED (intensity & TTL)
- :: Removable inline excitation filter holders

SWITCHABLE COLOR LED

Ideal for Multiband Applications and Ratiometric Experiments



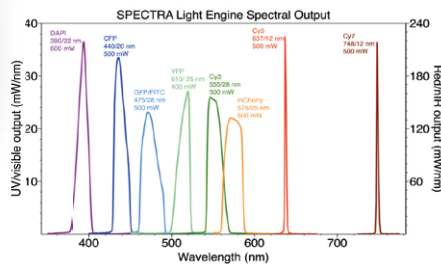
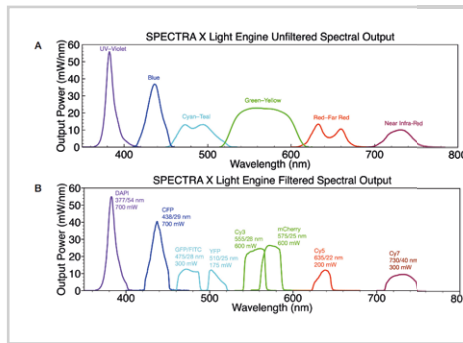
X-CITE NOVEM

- :: Spectral coverage from 340–800 nm with 9 LEDs
- :: Filter wheel combined with the patented hybrid drive for most precise and bright excitation of GYR dyes
- :: Extreme bright light output

LUMENCOR SPECTRA X

- :: Spectral coverage from 380 nm – 680 nm with 6 LEDs
- :: 6 filter positions for precise excitation band control
- :: Stable, feedback-loop controlled bright light output

NEW!



LUMENCOR SPECTRA III

- :: Spectral coverage from 340 nm (on request) – 745 nm
- :: Available with 8 LEDs or 6 LEDs + 2 laser hybrid concept
- :: Precisely defined excitation light with built in bandpass filters

OMICRON LEDHUB

- :: Modular LED light source (customize with 6 out of 19 available high-power LEDs between 340 and 950 nm)
- :: Very fast switching times
- :: Very solid built rackmount design



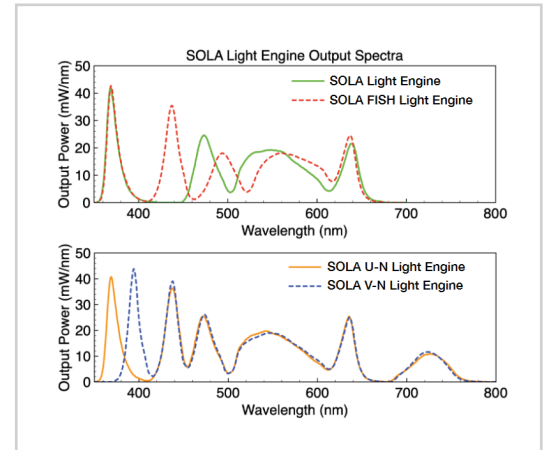
HIGH-POWER WHITE LIGHT LED

For Advanced Epi-fluorescence Microscopy

Multi-LED white light sources deploy 4, 5 or even 6 LEDs for an ultimate bright and spectrally more even white light output (i.e. fewer spectral gaps in the white excitation light). Due to their superior power, they are designed as standalone devices with energy and cooling management, coupled to the microscope via liquid light guides.

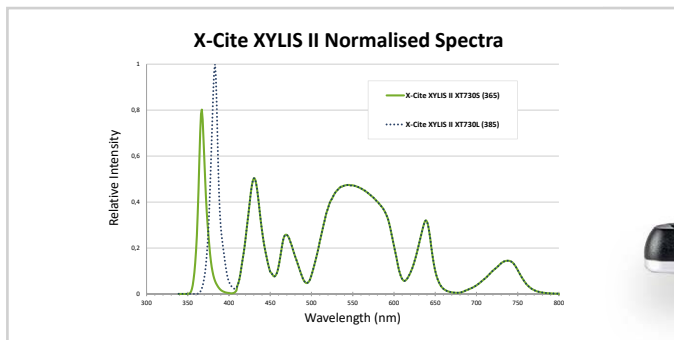


SOLA Light Engine PRODUCT MATRIX		SOLA	SOLA FISH	SOLA V-nIR	SOLA U-nIR
Manual Control		✓	✓	✓	✓
Electronic Control		✓	✓	✓	✓
Number of Sources		4	5	6	6
365 nm Ultraviolet Source		✓	✓		✓
335 nm Violet Source				✓	
735 nm near-IR source				✓	✓



LUMENCOR SOLA III

- :: Very bright evenly distributed white light
- :: Feedback controlled constant light output
- :: Manual and electronic control of light output on/off status and electronically controlled linear output intensity adjustment



X-CITE XYLIS II

- :: Powerful 6 LED fluorescence illumination with broad spectral coverage
- :: Patented 'hybrid drive' for brightest light output in the GYR range (500–600 nm)
- :: Improved housing and cooling management
- :: Full control by integration in Zeiss ZEN software

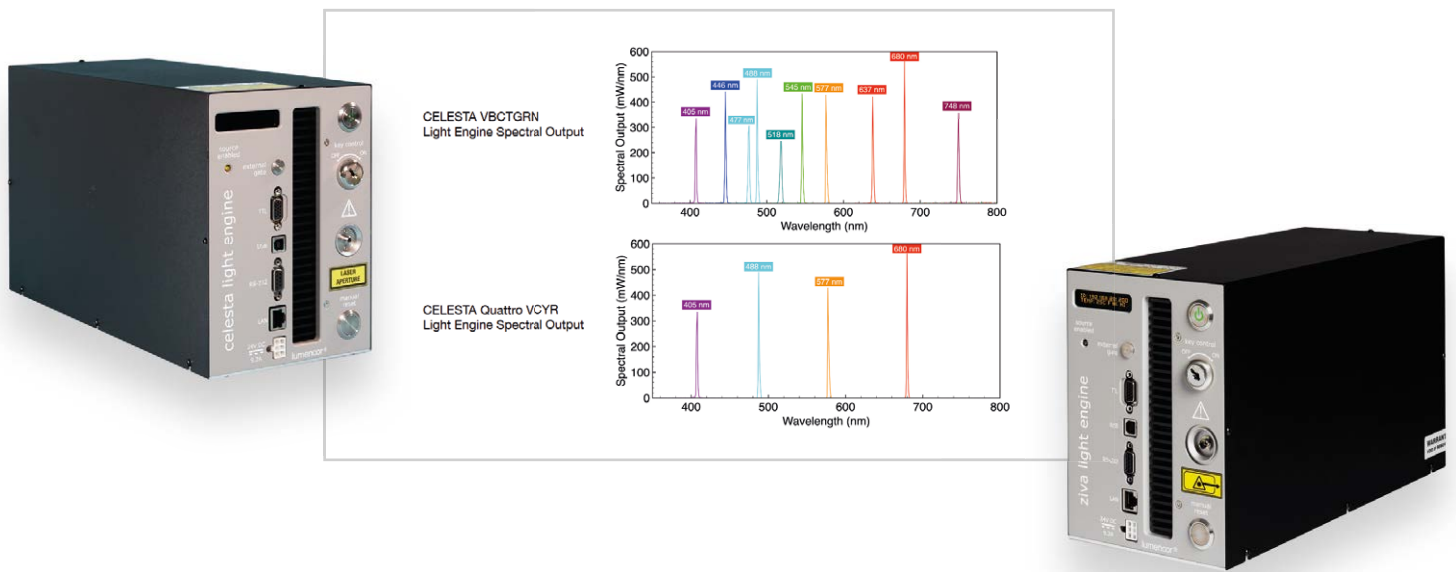
LASER LIGHT SOURCES

Ultimate Light Power for Demanding Applications

Laser light sources are typically being used in applications that require extreme spectral power densities, like spinning disk setups, confocal microscopy, SIM, STORM and other super-resolution or spectroscopic applications.

The Lumencor CELESTA light sources combines 7 independent, solid-state lasers with advanced electronic control to deliver unprecedented optical power and performance. The CELESTA quattro light sources provides the same levels of performance in an economical 4- or 5-laser format.

The Lumencor ZIVA uses special optics to couple its lasers to a way thinner fiber, resulting in an even higher energy density.



METAL-HALIDE LIGHT SOURCES

Metal-halide or shortbow light sources are meanwhile technically outdated and only requested to keep legacy microscope systems with vast old filter sets alive. They are very bright, but lifetime is short (appr. 200–2.000 h) and bulb-ageing related intensity loss makes quantification and comparable studies challenging. AHF however, keeps up support for these light sources and provides both new light sources and replacement parts.





IMAGE SPLITTERS

When time and resolution matter



GET MORE OUT OF YOUR SIGNAL

Image splitters are used to divide an image into two or three separate spatially equivalent components which can be displayed side by side on a single camera chip. Fields of application are: FRET, ratiometric calcium, voltage & pH imaging, Total Internal Reflection Fluorescence (TIRF), Single Plane Illumination Microscopy (SPIM), Simultaneous multi-fluorescent probe imaging incl. super-resolution and spinning disk.

FEATURES & BENEFITS

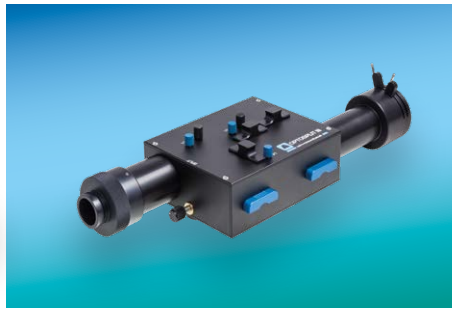
- ✓ Convenient and fast workflow
- ✓ No waste of time and photons
- ✓ Bypass without changing the optical path
- ✓ For sCMOS cameras with large sensors
- ✓ Fits to any standard microscope (C-mount)
- ✓ Easily interchangeable filter holders
- ✓ Image splitter & filter-setup from one source



CAIRN OPTOSPLIT II (BYPASS)

- :: Two way image splitter
- :: 1 or 2 images on a single camera
- :: Supports sensors up to 29.4 mm

ByPass version: Two way image splitter with bypass, supports sensors up to 31.9 mm



CAIRN OPTOSPLIT III

- :: Three way image splitter
- :: 1, 2 or 3 images on a single camera
- :: Supports sensors up to 29.4 mm
- :: Also useable with camera lenses



CAIRN TWINCAM

- :: Multiple camera image splitter
- :: Engineered for super resolution quality
- :: 2 cameras on 1 microscope port
- :: Supports sensors up to 31.9 mm diagonal



CAIRN MULTICAM

- :: Multiple camera image splitter
- :: For super resolution quality
- :: 1, 2, 3 or 4 cameras on 1 microscope port
- :: Supports sensors up to 25 mm diagonal



HAMAMATSU W-VIEW GEMINI

- :: One pair of dual wavelength images onto a single camera
- :: Optimized for sCMOS cameras with sensor formats up to 13 mm x 13 mm
- :: Easy switching between dual emission and bypass mode
- :: C-mount compatibility



HAMAMATSU W-VIEW GEMINI 2

- :: One pair of dual wavelength images onto two cameras
- :: For super resolution quality
- :: Ultra-low distortion (0.05%), high spatial uniformity (98%), high transmission (98 % @ 450 nm to 800 nm)
- :: Easy switching between dual emission and bypass mode
- :: C-mount compatibility



AKRIMA LAMBDA2

- :: Imaging of two channels on one camera chip
- :: Precise and ease to use
- :: Switching between bypass and splitting mode in seconds
- :: Aperture for the camera chip freely adjustable
- :: C-mount compatibility
- :: Holder for polarizing beamsplitter cubes available



FLUORESCENCE MONITORING

Check and correct fluorescence imaging systems with Argolight

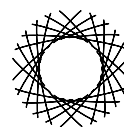


RELIABLE FLUORESCENCE IMAGING

Fluorescence-based systems fluctuate on a daily basis which can lead to analysis data with much uncertainty. That's why Argolight developed calibration slides that help you to check regularly crucial parameters of your fluorescence system (homogeneity, distortion, chromatic shifts, resolution, intensity, spectral response, repositioning etc.) in order to ensure precise and repeatable data.

YOUR BENEFITS

- :: Standardisation and quality control of fluorescence imaging systems
- :: Monitoring of photobleaching
- :: Time saving quality protocols
- :: Detection/prevention of system failure



ARGOLIGHT
A Precision Company

CALIBRATION SLIDES FOR FLUORESCENCE MICROSCOPES

The calibration slides of the second generation (V2) contain several extremely stable fluorescence patterns with precisely defined features. Each pattern is used to evaluate one or more parameters of your microscope and can be excited with any wavelength between 250 nm and 650 nm.



Argo-LM V2

For low magnification systems (e.g. widefield)

- ▶ 5 fluorescent patterns



Argo-HM V2

For high magnification systems (e.g. confocal)

- ▶ 16 fluorescent patterns



Argo-SIM V2

For algorithm-based super-resolution systems (e.g. SIM)

- ▶ 27 fluorescent patterns

SPECIFICATIONS

Dimensions:

75 x 25 x 1.5 mm

Excitation range:

continuum 250 – 650 nm

Usable for

wavelengths:

from 350 nm to 1100 nm

CALIBRATION SLIDES WITH POWERMETER

The Argo-POWER slides are additionally equipped with a compact and sensitive power sensor. There's no need to modify your setup. Its shape and thinness make it fit adequately inside your microscope. Argo-POWER sensors are calibrated and traceable to National French metrology institute (LNE) standards.



Argo-POWER^{LM} V2

For low magnification systems (e.g. widefield)

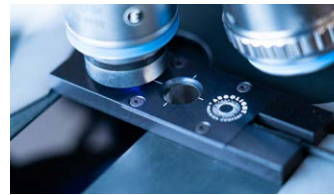
- ▶ 5 fluorescent patterns



Argo-POWER^{HM} V2

For high magnification systems (e.g. confocal)

- ▶ 16 fluorescent patterns



Argo-POWER^{SIM} V2

For algorithm-based super-resolution systems (e.g. SIM)

- ▶ 27 fluorescent patterns

SPECIFICATIONS

Dimensions:

75 x 25 x 6 mm

Excitation range:

continuum 250 – 650 nm

Usable for

wavelengths:

from 350 nm to 1100 nm

Realtime power

measurement:

from 10 μ W to 100 mW

SOFTWARE



All Argolight hardware comes with **DAYBOOK 3 software** which standardizes the analysis of your images and allows to compare results between various operators and systems.

CALIBRATION MICROPLATES



Argo-WP are designed to be used with fluorescence or multimode plate readers and provide several reference fluorescent patterns. Ideal for high-content screening (HCS), high-content analysis (HCA) or high-throughput screening (HTS).