CAVITAR
VALUE IN SIGHT

CAVILUX Laser Illumination

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CAVILUX Laser Illumination

Value in Sight

Diode-laser based illumination systems that unveil your processes with unparalleled clarity and precision.

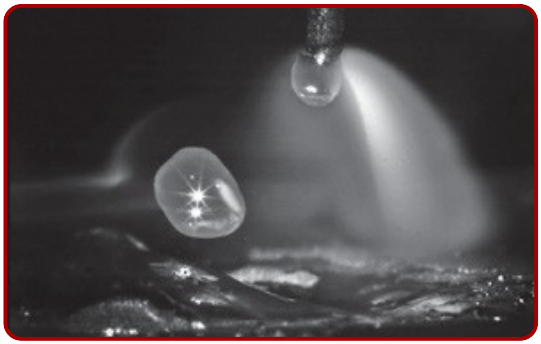
SCAN ME

Visualize the finest details with great clarity.

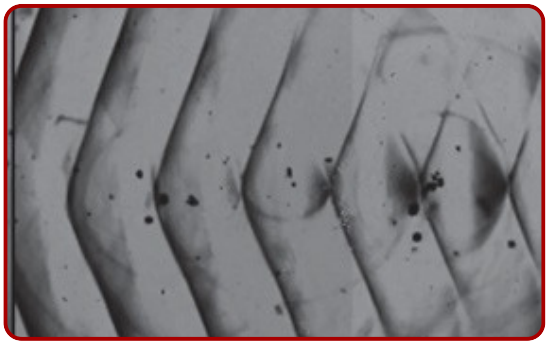
Capture ultra-fast phenomena without motion blur.

Gain deeper insights for groundbreaking research.

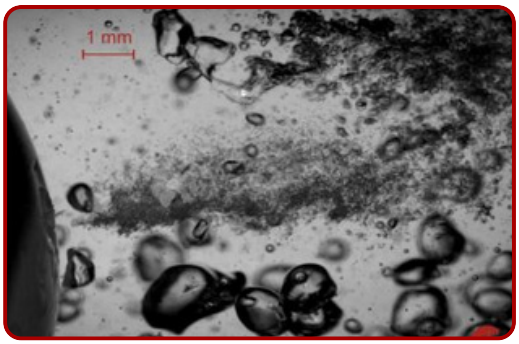
WELDING RESEARCH



SHOCKWAVE VISUALIZATION



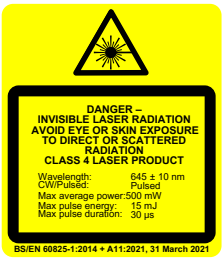
FLOW AND SPRAY IMAGING



SCHLIEREN IMAGING

CAVILUX Lasers

New features of CAVILUX systems



For over 20 years, CAVILUX systems have helped thousands of researchers and engineers around the world to reveal and understand the secrets of the most challenging processes.

In 2025, Cavitar introduced CAVILUX systems with new power levels and features.

New power levels

- SMART 600 W @ 650 nm / 1000 W @ 810 nm
- HF 300 W @ 650 nm / 800 W @ 810 nm

New features

- Separate fast inputs Trig IN and Sync IN
- All laser units and control units are readily compatible with each other
- 30 µs maximum pulse duration available for all systems
- Optional - Wavelength adjustment (Smart only), enables the use of ultra-narrow band-pass filters
- Optional - High-Speed mode duration of 1 s ,2 s or 30 s (excl. HF @ 640 nm) (*)
- New button for pointer laser enable / disable (HF only) (*)
- Universal CAVILUX Control Software for all systems (*)

(*) not available for UHS Control Unit

CAVILUX Smart

CAVILUX Smart is a versatile, powerful light source designed for high-speed imaging with applications in scientific research and industrial R&D.
Its ultra-short pulses eliminate motion blur, providing crystal-clear images in applications such as Schlieren, shadowgraphy, or material testing.

Ultra-Short Pulses (10 ns): Capture rapid events without motion blur.

Monochromatic & Low-Coherence Light: Ideal back illumination, free of chromatic aberrations or speckle.

High power (Up to 1 kW at 810 nm) – Obtain clear images of the brightest phenomena.

Wavelength adjustment (optional) - Enable the use of ultra-narrow band-pass filters

CAVILUX HF

CAVILUX HF is a high-power, fiber-coupled pulsed diode laser designed for high-speed imaging in academic research and industrial R&D.
Its combination of high power & high repetition rate enables capturing bright & sharp images, revealing the secrets of the most challenging processes.

High Power & Brightness – Up to 800 W coupled to a 1.5 mm fiber for intense illumination.

High duty cycle (2 % Max) – Supports long pulses at high repetition rates

Versatile Pulse Control – Pulse lengths from 50 ns to 200 µs, adaptable to any research need.

Ultra-High-Speed Compatibility – Frame rates up to 1 million fps for rapid process visualization.

CAVILUX UHS

CAVILUX Smart UHS and HF UHS are engineered for ultra-high-speed imaging at frame rates up to 20 MHz.
With precise ultra-short pulses, high power, and advanced synchronization features, they enable unparalleled image clarity of the fastest events in scientific and industrial research.

Optimized for Ultra-High-Speed Cameras – Supports frame rates up to 20 million fps.

Ultra-Short Pulses (10 ns) at High Frequencies – Crisp images free of motion blur.

Monochromatic & Low-Coherence Light – Eliminates chromatic aberrations and speckle.

Separate Trigger & Synchronization inputs– Easy and precise synchronization of events.

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Feature	CAVILUX HF	CAVILUX Smart	CAVILUX HF UHS	CAVILUX Smart UHS
System Contents	Laser unit, control unit, optical fiber, illumination optics, power supply, cables, storage case			
Software Interface	CAVILUX Control Software		No software	
Laser Units	1 to 4		1	
Sync Signal	5 V TTL			
Wavelength Options	650 nm (visible, red) 810 nm (invisible)			
Power Options	300 W @ 650 nm 500/800 W @ 810 nm	200/400/600 W @ 650 nm 300/500/1000 W @ 810 nm	300 W @ 650 nm 500/800 W @ 810 nm	200/400/600 W @ 650 nm 300/500/1000 W @ 810 nm
Laser Class	Laser Class 4 (BS/EN 60825-1:2014 + A11:2021)			
Min Pulse Duration (Limited Power)	50 ns	10 ns	50 ns	10 ns
Min Pulse Duration (Full Power)	100 ns	30 ns	100 ns	30 ns
Max Pulse Duration	30 µs (200 µs long pulse option available for HF810nm)			
Pulses Per Sync Signal	Up to 5		1	
Continuous Duty Cycle	0.03 %			
High-Speed Duty Cycle	2 %	0.1 %	100 %	
Max High-Speed Duration	Standard 10 s Optional 1 s, 2 s, 30 s (30 s not available for HF @ 640 nm)		30 µs total laser time	
Standard fiber	Glass fiber (core 1.5 mm)	Liquid fiber (core 3 mm or 5 mm)	Glass fiber (core 1.5 mm)	Liquid fiber (core 3 mm or 5 mm)
Adjustable Illumination	Yes (25 mm or 50 mm optics)			
Pulse Duration / Frequency Examples				
10 ns 50 ns 100 ns 1 µs 10 µs	Not Applicable 400,000 Hz (@ 2 % DC) 200,000 Hz (@ 2 % DC) 20,000 Hz (@ 2 % DC) 2,000 Hz (@ 2 % DC)	100,000 Hz (@ 0.1 % DC) 20,000 Hz (@ 0.1 % DC) 10,000 Hz (@ 0.1 % DC) 1,000 Hz (@ 0.1 % DC) 100 Hz (@ 0.1 % DC)	30 µs laser active time at frequency up to 5 MHz Examples: 600 pulses of 50 ns 300 pulses of 100 ns 30 pulses of 1 µs	30 µs laser active time at frequency up to 20 MHz Examples: 3000 pulses of 10 ns 300 pulses of 100 ns 30 pulses of 1 µs
Example Applications	• Welding, Additive MF • Ballistics & explosions • Flows & sprays • Materials testing	• Welding, Additive MF • Shadowgraphy • Flows & sprays • Schlieren	• Welding, Additive MF • Ballistics, Detonics • Flows & sprays • Materials testing	• Welding, Additive MF • Shadowgraphy • Flows & sprays • Schlieren

CAVITAR

Pioneered for Research by Researchers

- Low-coherence & Speckle-free
- See Through Heat
- See Through Brightness
- Avoid Motion Blur
- Suitable for Schlieren Imaging
- Adjustable Bursts of Pulses
- Precise Pulse Durations
- Scalable Up to 4 Lasers
- Suitable for PIV Imaging
- Modular System Design

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Designed, Engineered and Manufactured in Finland