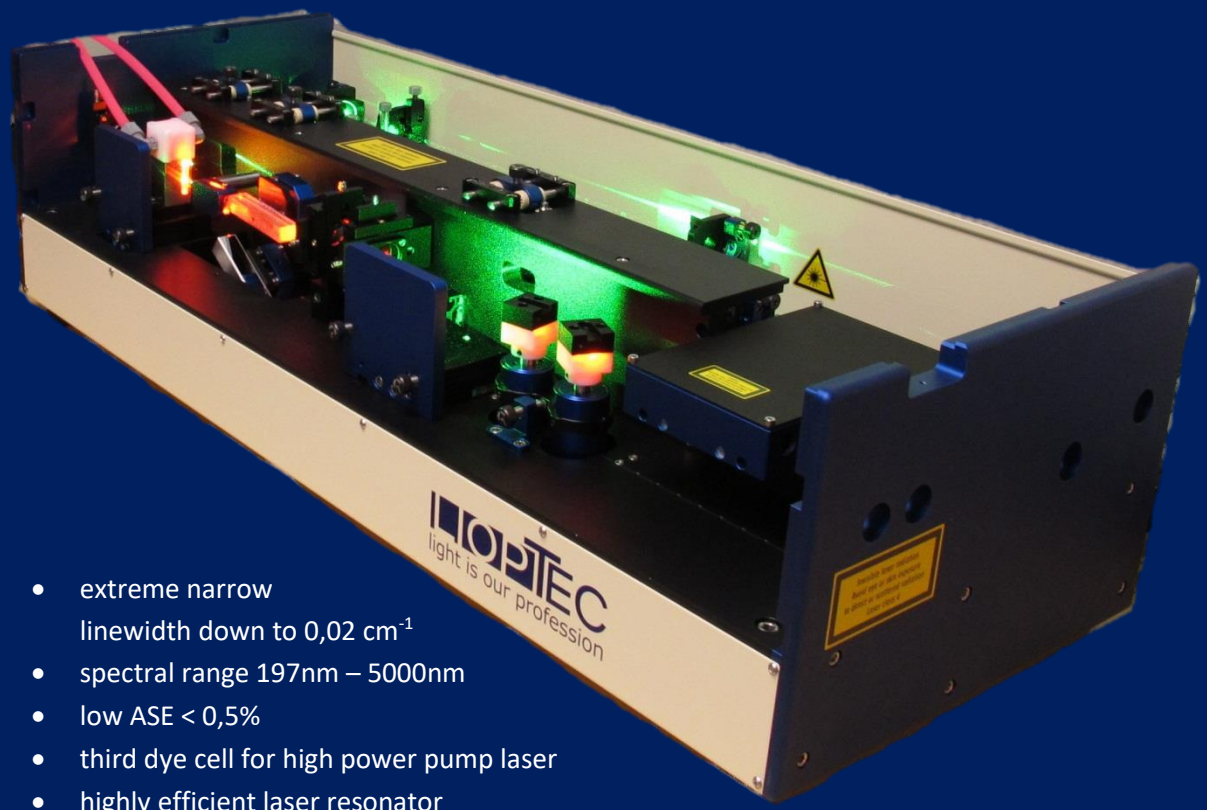
LIOPTEC
light is our profession

MADE IN GERMANY

Pulsed Dye Laser

LIOPSTAR & LIOPSTAR-E



- extreme narrow linewidth down to 0,02 cm^{-1}
- spectral range 197nm – 5000nm
- low ASE < 0,5%
- third dye cell for high power pump laser
- highly efficient laser resonator
- exchangeable grating
- near Gaussian beam quality due to Bethune cells
- eroded stainless steel case for oscillator and amplifier cells
- new state-of-the-art integrated electronics and user friendly LabView Software
- intelligent PI control for FCU autotracking unit
- temperature stabilized crystals
- USB port
- remote control via TCP / IP protocol
- smallest footprint

Application:

- laser induced fluorescence: LIF
- combustion and atmospheric studies
- Raman spectroscopy
- and much more
- photolysis
- light detection and ranging: LIDAR
- coherent anti-Stokes Raman spectroscopy: CARS

Options

frequency conversion units

- internal open loop frequency doubling with look-up-table
- internal open loop frequency tripling and mixing with look-up-table[1]
- autotracking[2] FCU available for second-harmonic generation (SHG), third-harmonic generation (THG)[1], sum- and difference frequency mixing (SFM, DFM)[1,3]
- intelligent PI-control corrects phase matching deviation of the look-up-table algorithm during wavelength scans and temperature changes
- high scan speed, up to 10 nm/min
- usable for repetition rates from < 1 Hz up to 100 kHz
- temperature control for doubling crystal
  internal BBO temperature control can be set up to 70°C

energy output

dye	UV/IR wavelength	pump energy @ 10Hz	dye laser	output energy
SHG 206 nm – 450 nm				
Coumarin 120	220 nm	280 mJ @ 355 nm	LIOPSTAR-N	> 5 mJ
Coumarin 307	250 nm	280 mJ @ 355 nm	LIOPSTAR-N	> 5 mJ
Rhodamine 6G	280 nm	400 mJ @ 532 nm	LIOPSTAR-N	> 25 mJ
DCM	320 nm	400 mJ @ 532 nm	LIOPSTAR-N	> 25 mJ
THG[1] 197 nm – 212 nm				
Rhodamine B	200 nm	400 mJ @ 532 nm	LIOPSTAR-N	3 mJ
Rhodamine 101	205 nm	400 mJ @ 532 nm	LIOPSTAR-N	6 mJ
DCM	210 nm	400 mJ @ 532 nm	LIOPSTAR-N	6 mJ
DFM[1,3] 1.4 µm – 5.0 µm				
DCM	1.6 µm	400 mJ @ 532 nm	LIOPSTAR-E-N	6 mJ
Pyridine1	2.0 µm	400 mJ @ 532 nm	LIOPSTAR-E-N	5.5 mJ
Styryl 9	3.4 µm	400 mJ @ 532 nm	LIOPSTAR-E-N	800 µJ
LDS 867	4.7 µm	400 mJ @ 532 nm	LIOPSTAR-E-N	100 µJ

[1] THG, SFM and DFM operation requires a LIOPSTAR-E with LSEH extension

[2] wavelength separation is required for autotracking operation

[3] for narrowband operation a seeder for the Nd:YAG pump laser is recommend

LIOPTEC
light is our profession

linewidth specifications			LIOPSTAR / LIOPSTAR-E
	grating	**tuning range**	**linewidth**
LIOPSTAR	1800 l/mm, 90 mm	370 nm – 900 nm	< 0.06 cm^{-1} @ 620 nm
LIOPSTAR	2400 l/mm, 90 mm	370 nm – 750 nm	< 0.06 cm^{-1} @ 570 nm
LIOPSTAR	3000 l/mm, 90 mm	370 nm – 610 nm	< 0.05 cm^{-1} @ 560 nm
LIOPSTAR-N	double 1800 l/mm, 90 mm	370 nm – 900 nm	< 0.05 cm^{-1} @ 620 nm
LIOPSTAR-N	double 2400 l/mm, 90 mm	370 nm – 720 nm	< 0.04 cm^{-1} @ 570 nm
LIOPSTAR-N	double 3000 l/mm, 90 mm	370 nm – 580 nm	< 0.03 cm^{-1} @ 570 nm

beam specifications		LIOPSTAR / LIOPSTAR-E
conversion efficiency: Nd:YAG pumped 355 nm	20% @ 405 nm 14% @ 460 nm	Exalite 404 Coumarin 47
conversion efficiency: Nd:YAG pumped 532 nm	25% @ 630 nm 28% @ 565 nm	DCM Rhodamine 6G
wavelength reproducibility	< 0.002 nm	
absolute accuracy	< 0.01 nm	
scan linearity	< 0.002 nm	
wavelength stability	< 0.001 nm/°C	
divergence	0.5 mrad	
polarisation	> 98 %	vertical
ASE-background	< 0.5 %	

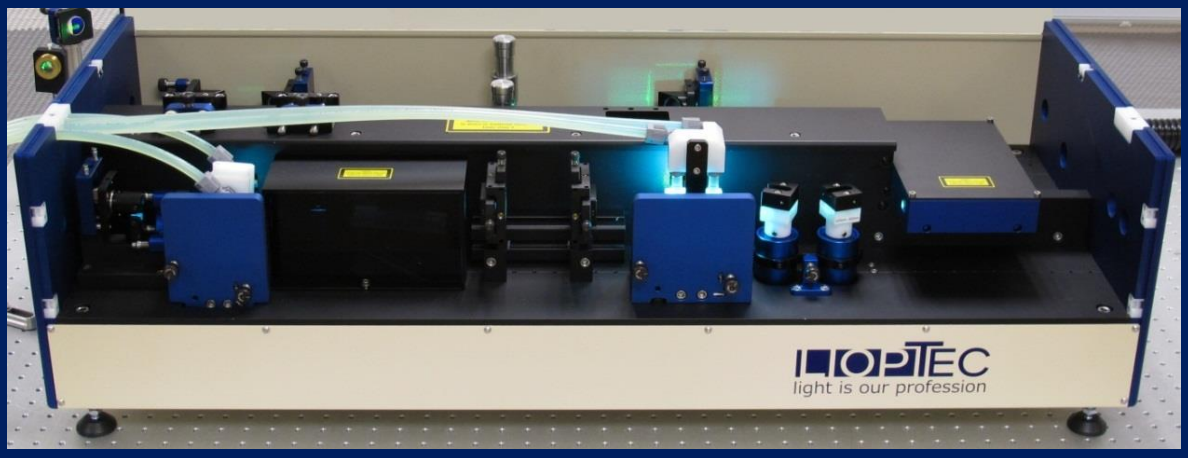
dimensions	LIOPSTAR / LIOPSTAR-E
LIOPSTAR	1040 mm x 400 mm x 300 mm ± 10 mm, 80 kg
LIOPSTAR-E	750 mm x 400 mm x 300 mm ± 10 mm, 60 kg
LSEH-Extension	750 mm x 400 mm x 300 mm ± 10 mm, 30 kg
beam input height	180 mm ± 10 mm
beam output height	200 mm ± 10 mm

requirements	LIOPSTAR / LIOPSTAR-E
pump laser pulse power	10 mJ … 1000 mJ (high power option), s-pol
voltage	110 V 6A / 220 V 3 A, 50/60 Hz, single phase
computer	Windows, one free USB port

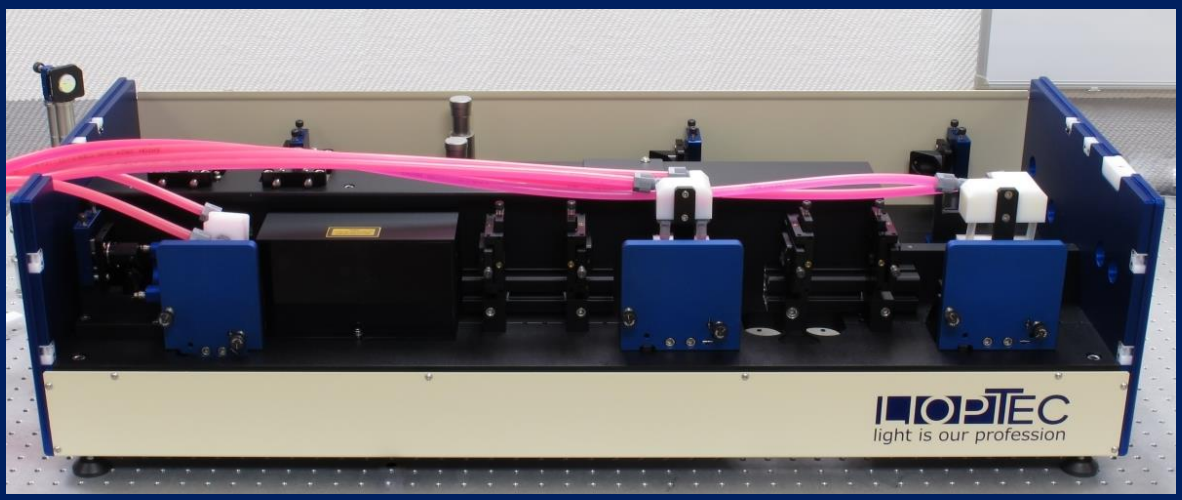
specification are subject to change without notice

LIOPTEC
light is our profession

LiopStar



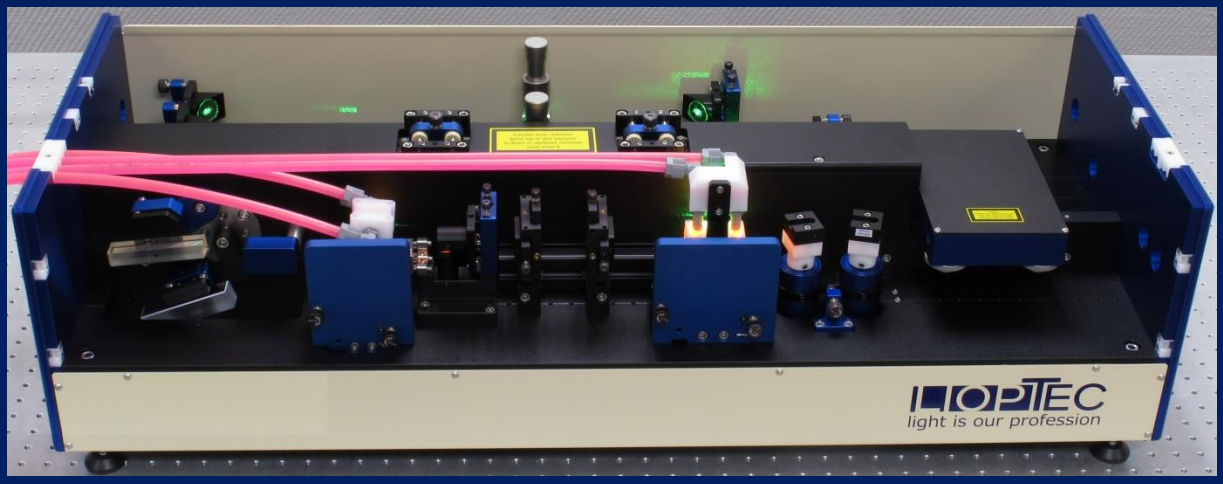
LiopStar with 3 dye cells for high power



LiopStar-E & LSEH

LIOPSTAR-HQ

high repetition rate dye laser



- low ASE < 0,5%
- repetition rates up to 100 kHz
- highly efficient polarization matched laser resonator
- flow optimized oscillator and amplifier cells
- amplifier cell in Brewster angle
- state-of-the-art integrated electronics and user friendly LabView Software
- USB port
- remote control via TCP / IP protocol
- smallest footprint

frequency conversion units

- internal open loop frequency doubling with look-up-table
- temperature stabilized BBO crystals
- high scan speed, up to 10 nm/min
- usable for repetition rates from < 1 Hz up to 100 kHz

Options

- “Boost” option, 2 BBOs in series, recommended for pump power >70W
- 3rd amplifier cell for high pulse energy operation
- temperature and flow monitoring

WWW.LIOP-TEC.COM

LIOPTEC
light is our profession

linewidth specifications			LIOPSTAR-HQ
	Grating	**tuning range**	**linewidth**
LIOPSTAR-HQ	1800 l/mm, 90 mm	430 nm – 900 nm	< 0.07 cm^{-1} @ 570 nm
LIOPSTAR-HQ	2400 l/mm, 90 mm	430 nm – 750 nm	< 0.06 cm^{-1} @ 570 nm

specifications			LIOPSTAR-HQ
Nd:YAG pumped 532 nm, 10 kHz, 10ns			
150 W	Rhodamine 6G DCM	>40 W @ 564 nm, (>25%) >35 W @ 640 nm, (>20%)	> 6 W @ 282 nm (0.6 mJ)* > 5.5 W @ 320 nm (0.55 mJ)*
90 W	Rhodamine 6G DCM DCM & LDS 698	>25 W @ 564 nm >25 W @ 640 nm > 25 W @ 655 nm	> 3.5 W @ 282 nm (0.35 mJ)* > 3.5 W @ 320 nm (0.35 mJ)* > 3.5 W @ 327.5 nm (0.35 mJ)*
50 W	Rhodamine 6G DCM	> 12 W @ 564 nm > 10 W @ 640 nm	> 1.7 W @ 282 nm (0.15 mJ) > 1.5 W @ 320 nm (0.13 mJ
Nd:YAG pumped 355 nm, 10 kHz, 10ns			
70 W	Coumarin 120 Coumarin 102	10.5 W @ 442 nm 10.5 W @ 488 nm	> 1.5 W @ 221 nm (0.15 mJ) > 1.5 W @ 244 nm (0.15mJ)
50 W	Coumarin 120 Coumarin 102	> 7.5 W @ 442 nm > 7.5 W @ 488 nm	> 1.1 W @ 221 nm (0.11mJ) > 1.1 W @ 244 nm (0.11 mJ)

wavelength reproducibility	< 0.002 nm	
absolute accuracy	< 0.01 nm	
scan linearity	< 0.002 nm	
wavelength stability	< 0.001 nm/°C	
Divergence	0.5 mrad	
Polarisation	> 98 %	vertical
ASE-background	< 0.5 %	

dimensions	LIOPSTAR-HQ
LIOPSTAR-HQ	1040 mm x 400 mm x 300 mm ± 10 mm, 80 kg
beam input height	180 mm ± 10 mm
beam output height	200 mm ± 10 mm

requirements	LIOPSTAR-HQ
cooling for dye solvent	800 Watt, resonator & amplifier system
Laboratory	dust-free air (flow box)
Voltage	110…230V, single phase, 50 Hz/ 60 Hz
Computer	single USB port
operating system	Windows XP/ Windows Vista/ Windows 7/ Windows 10

* with Boost option

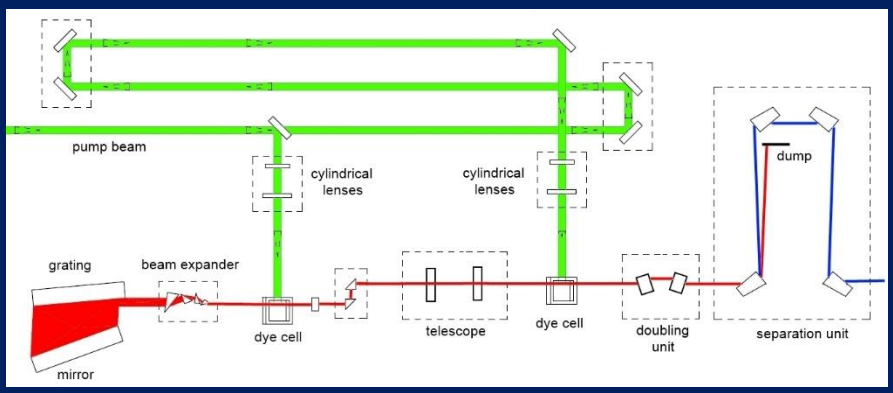
specifications are subject to change without notice

Amplifier cell in Brewster angle

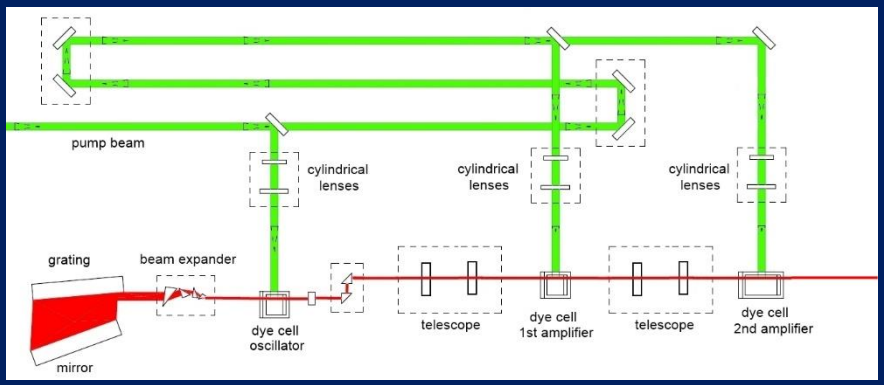
Due to the amplifier dye cell set up in Brewster angle, the reflections and the parasitic lasing are minimized. This leads to an overall higher performance of the laser output.

- Reducing of back reflections
- Reducing of parasitic lasing
- Reducing of ASE
- Higher conversion efficiency

LiopStar-HQ



LiopStar-HQ with 3rd amplifier



LIOP-TEC GmbH
Industriestrasse 4
42477 Radevormwald
Germany

phone: +49 (0)2195 689690
fax: +49 (0)2195 6896913
E-Mail: info@liop-tec.com
Web: www.liop-tec.com