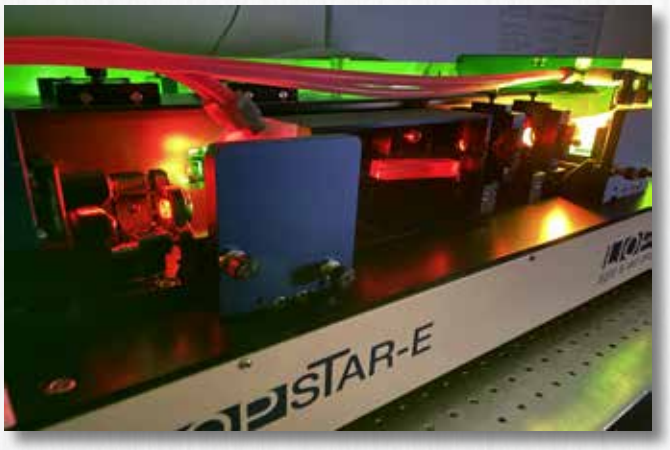
LIOPTEC
light is our profession

Pulsed dye laser

LiopStar & LiopStar-E

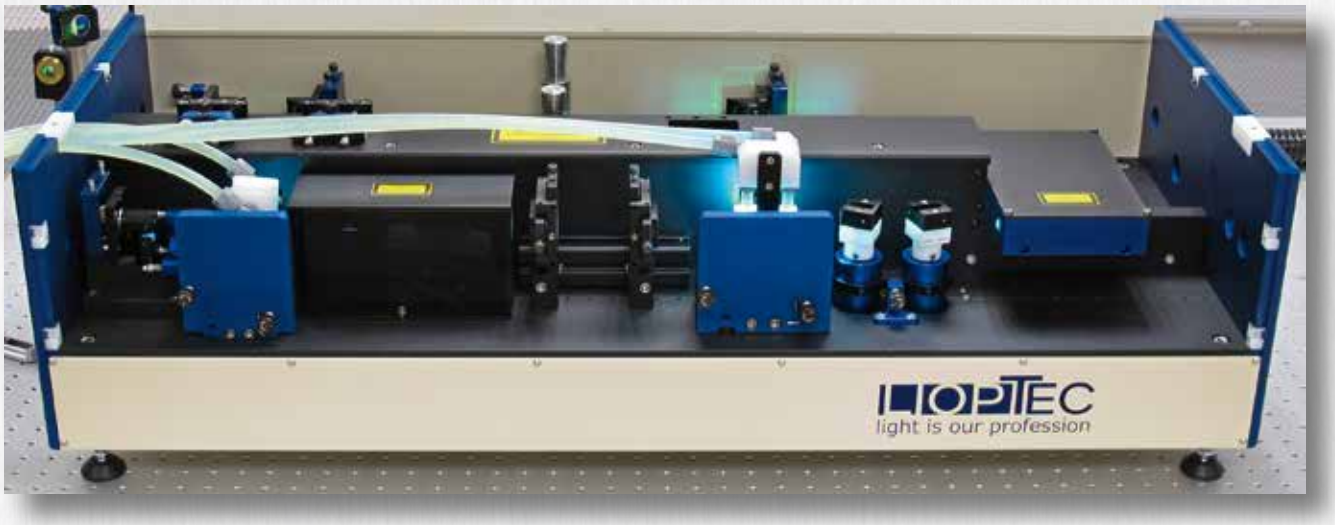
- extreme narrow linewidth down to 0,02cm-1
- spectral range 197nm-5000nm
- low ASE <0,5%
- third dye cell for high power pump laser
- exchangeable grating
- near Gaussian beam quality due to Bethune cells
- new state-of-the-art integrated electronics and user friendly Lab-View Software
- temperature stabilized crystals
- intelligent PI control for FCU auto-tracking unit
- mirrored design available for all LiopStar products
- USB port
- smallest footprint



Application

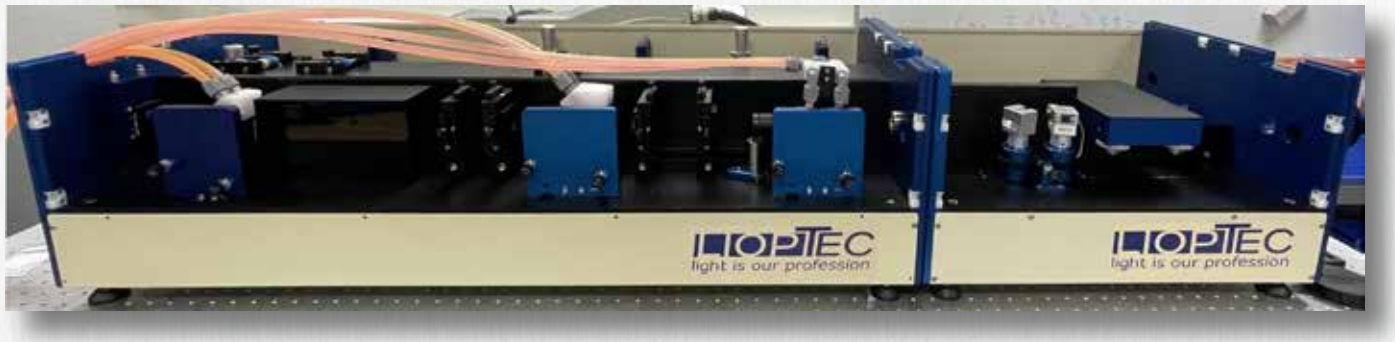
- laser-induced fluorescence: LIF
- photolysis
- combustion and atmospheric studies
- light detection and ranging: LIDAR
- Raman spectroscopy
- coherent anti-Stokes Raman spectroscopy: CARS
- and much more

Pulsed dye laser



- LiopStar

- LiopStar-E with LSEH



- LiopStar-P 3rd dye cell for high power with LSEH-S

linewidth specifications — LiopStar / LiopStar-E

	grating (90 mm)	tuning range	linewidth	conversion efficiency 532 nm Nd:YAG	conversion efficiency 355 nm Nd:YAG
LiopStar/ LiopStar-E	1800 l/mm	370 nm - 920 nm	< 0.06 cm^{-1} @ 620 nm	30 % @ 630 nm	15 % @ 460 nm
LiopStar/ LiopStar-E	2400 l/mm	370 nm - 760 nm	< 0.06 cm^{-1} @ 570 nm	30 % @ 566 nm	15 % @ 460 nm
LiopStar/ LiopStar-E	3000 l/mm	370 nm - 620 nm	< 0.05 cm^{-1} @ 560 nm	30 % @ 566 nm	15 % @ 460 nm
LiopStar-N / LiopStar-E-N	double 1800 l/mm	370 nm - 900 nm	< 0.05 cm^{-1} @ 620 nm	28 % @ 630 nm	14 % @ 460 nm
LiopStar-N / LiopStar-E-N	double 2400 l/mm	370 nm - 720 nm	< 0.04 cm^{-1} @ 570 nm	28 % @ 566 nm	14 % @ 460 nm
LiopStar-N / LiopStar-E-N	double 3000 l/mm	370 nm - 580 nm	< 0.03 cm^{-1} @ 570 nm	28 % @ 566 nm	14 % @ 460 nm

beam specifications — LiopStar / LiopStar-E

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
LSEH-S Extension	520 mm x 400 mm x 300 mm ± 10 mm, 20 kg
beam input height	180 mm
beam output height	200 mm

requirements — LiopStar / LiopStar-E

pump laser pulse power	10 mJ...1500 mJ (high-power option with 3rd dye cell), vertical
voltage	110 V 6A / 220 V 3 A, 50/60 Hz, single phase
computer	Windows / Linux, one free USB port

specifications are subject to change without notice

Pulsed dye laser

Options

Frequency conversion units

- internal open loop frequency doubling with look-up-table
- internal open loop frequency tripling and mixing with look-up-table1
- 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 change
- 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	output energie
SHG 206 nm - 450 nm			**LiopStar / LiopStar-E**
Coumarin 120	220 nm	280 mJ @ 355 nm	> 5 mJ
Coumarin 307	250 nm	280 mJ @ 355 nm	> 5 mJ
Rhodamine 6G	280 nm	400 mJ @ 532 nm	> 30 mJ
DCM	320 nm	400 mJ @ 532 nm	> 30 mJ
THG 197nm - 212nm			**LiopStar-E**
Rhodamine B	200 nm	400 mJ @ 532 nm	3 mJ
Rhodamine 101	205 nm	400 mJ @ 532 nm	5 mJ
DCM	210 nm	400 mJ @ 532 nm	6 mJ
DFM 1400 nm - 5000 nm			**LiopStar-E**
DCM	1600 nm	400 mJ @ 532 nm	6 mJ
Pyridine1	2000 nm	400 mJ @ 532 nm	5.5 mJ
Styryl 9	3400 nm	400 mJ @ 532 nm	0.8 mJ

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- LSEH

- DFM

[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

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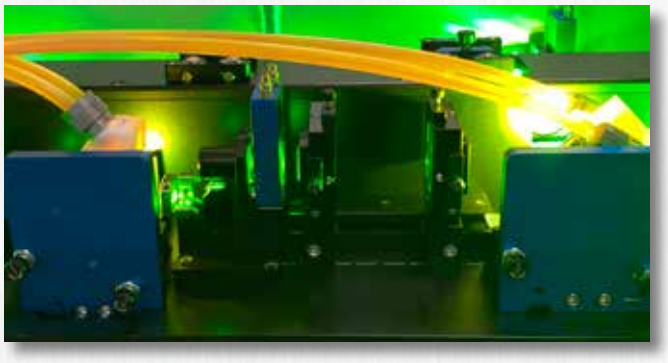
High repetion rate dye laser

LiopStar- HQ

- repetition rates up to 100 kHz
- can be pumped by high-power laser, up to 800 mJ/pulse
- low ASE <0,5%
- highly efficient polarization matched laser cavity
- flow optimized oscillator and amplifier cells
- New state-of-the-art integrated electronics and user-friendly Lab-View software
- USB port
- remote control via TCP / IP protocol
- temperature stabilized crystals
- intelligent PI control for FCU autotracking unit
- smallest footprint



Options

- Boost" option, 2 BBOs in series, recommended for pump power >70W
- 4 amplifier cell for high pulse energy operation

Frequency conversion units

- internal open loop frequency doubling with look-up-table
- temperature stabilized BBO crystals
- high scan speed, up to 10 nm/min

High repetition rate dye laser

- LiopStar-HQ

- LiopStar-E-HQ

- LiopStar-HQP

  Extension with 2 additional dye cells for high pulse energy operation

linewidth specifications			LiopStar-HQ
	grating	tuning range	linewidth
LiopStar-HQ	1800 l/mm, 90 mm	355 nm - 900 nm	< 0.06 cm^{-1} @ 620 nm
LiopStar-HQ	2400 l/mm, 90 mm	355 nm - 740 nm	< 0.06 cm^{-1} @ 570 nm
LiopStar-HQ	3000 l/mm, 90 mm	355 nm - 610 nm	< 0.05 cm^{-1} @ 560 nm

beam specifications		LiopStar-HQ
Nd:YAG pumped 532nm, 10kHz, 10ns, 90W	22 W @ 564nm (25%) > 2.2 W @ 282 nm	Rhodamine 6G
Nd:YAG pumped 532nm, 10kHz, 10ns, 40W	10 W @ 564 nm (25%) > 1 W @ 282 nm	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-HQ
LiopStar HQ	1040 mm x 400 mm x 300 mm ± 10 mm, 80 kg
LiopStar-E-HQ	750 mm x 400 mm x 300 mm ± 10 mm, 60 kg
LiopStar-HQP-Extension	1040 mm x 400 mm x 300 mm ± 10 mm, 80 kg
beam input height	180 mm
beam output height	200 mm

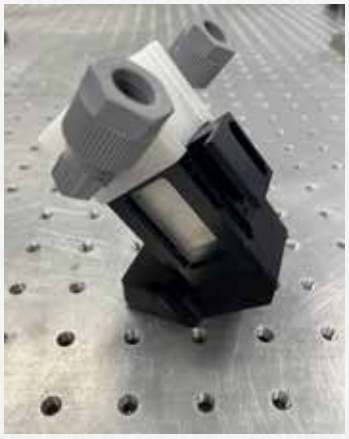
requirements	LiopStar -HQ
pump laser pulse power	10 W...150 W (high-power option with 4 dye cells), vertical
voltage	110 V 6A / 220 V 3 A, 50/60 Hz, single phase
computer	Windows / Linux, one free USB port
laboratory	dust free

specifications are subject to change without notice

Amplifier cell in Brewster angle

The Brewster-angle amplifier dye cell minimizes reflections and parasitic lasing. This results in an overall increase in the performance of the laser output.

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



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