Cobra-Stretch

AMPLIFIED PULSED DYE LASERS

The Cobra-Stretch Advantage

- Wide wavelength coverage from 190 nm to >11 μm
- Spectral linewidths <0.03 cm^{-1} with no intra-cavity etalon
- Small footprint of 770 mm X 494 mm
- Grating Lift (patent pending) option
- User friendly software fully LabView enabled
- High output energy, >240 mJ with Quanta-Ray® Nd:YAG at 800 mJ per pulse
- High quality beam profile with capillary cell option
- USB interface
- Touch screen remote

APPLICATIONS

- Laser induced fluorescence
- Lidar and remote sensing
- Combustion and atmospheric studies
- Laser spectroscopy
- Cavity ringdown spectroscopy
- CARS
- Photolysis

Spectra-Physics®
A Newport Corporation Brand

The new Cobra-Stretch Dye laser is Spectra-Physics' latest amplified pulsed dye laser system, German engineered by our partner firm Sirah GmbH for precision, stability and reliability. New features include optional grating lift, higher efficiencies, greater wavelength accuracy, and a smaller footprint. These new features are in addition to the integrated oscillator / pre-amplifier, quick change dye cuvettes, and integrated amplifier. Amplifiers can be upgraded to the enhanced beam, high pump energy EBP cells. External wavelength conversion units extend the tuning range from the deep UV to the near IR.

At the heart of the laser system is a newly redesigned grazing incidence resonator designed to utilize the grating's dispersion twice per oscillator round-trip, ensuring narrow linewidths with low ASE. This new resonator design allows for higher efficiencies, permitting as much as 240 mJ of tunable output energy. An optional second grating can be added to the resonator for ultra narrow linewidths below 0.03 cm^{-1} at 570 nm. The resonator allows narrow-line tuning over a broad tuning range without the need for an intra-cavity etalon, thus simplifying the measurement process without sacrificing performance.

The new resonator design also allows for the addition of a second grazing incidence grating. The gratings are mounted and calibrated on a single linear stage that is activated by a button on the new USB coupled touch screen remote. This Grating Lift option (patent pending) allows for the single dye laser resonator to cover the entire dye tuning range without Wood's anomaly holes or recalibration. The option is compatible with dual grating operation as well.

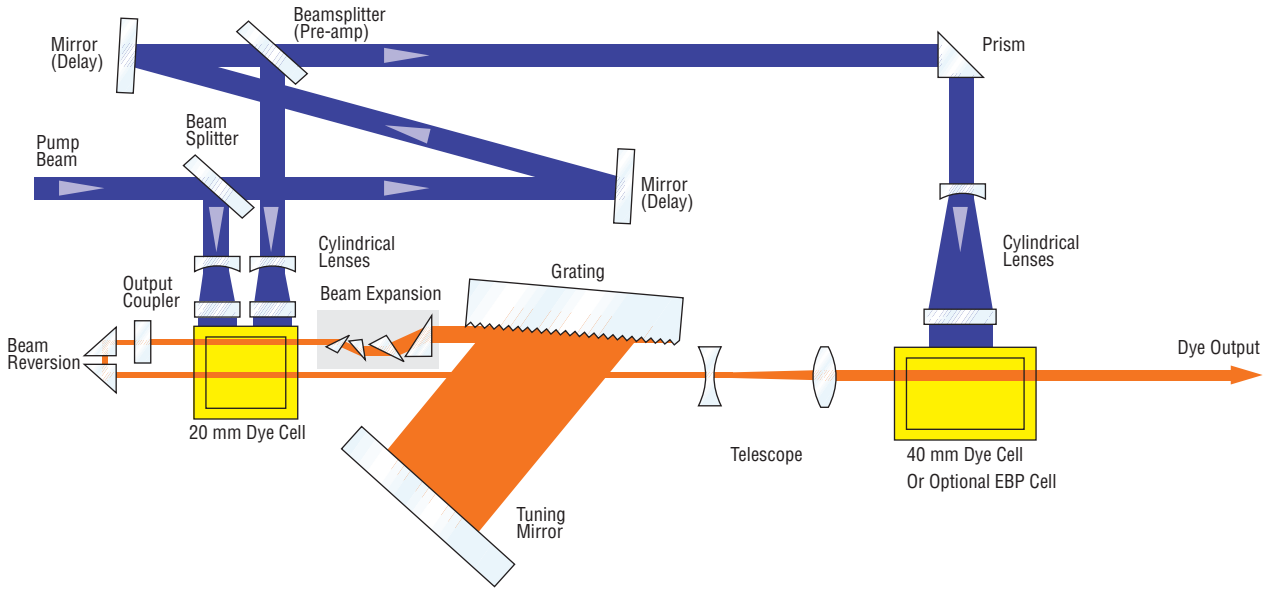
The laser's quartz dye cuvettes are held in place by state-of the-art cell mounts manufactured for stability and precision from high performance alloys and graphite-reinforced polymers. Designed for extreme ease of use, the mounted cuvettes and the entire dye circulator unit can be removed in seconds without tools and without interrupting the dye flow loop. This design is ideal for applications that require more than one type of dye. The quick change from one dye defined wavelength range to another saves time and eliminates the need for messy dye changes.

Dye flow rates for the standard circulator and cell assemblies are high enough to work up to 50 Hz with higher power pumps available for higher repetition rates. For additional versatility, the circulators operate with polar and non-polar solvents, as well as solvents of varying viscosities.

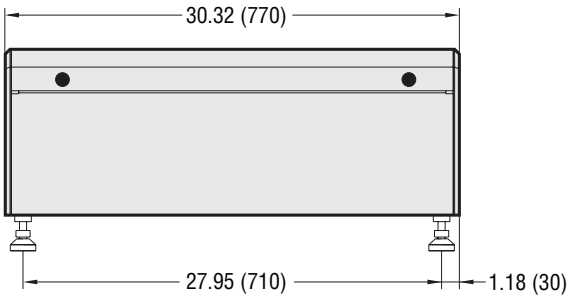
Reliability is inherent in the laser system design. All oscillator components are mounted on a solid block of low thermal expansion stainless steel, mechanically and thermally isolated from the outer laser housing. By removing virtually all mechanical and thermal stress from the oscillator block and by using opto-mechanics optimized for easy and reproducible operation, the dye laser's oscillator stage requires very limited user adjustment. This mechanical stability results in a wavelength resettability for the oscillators of <4 pm, a limit set primarily by the laser's spectral resolution.

Cobra-Stretch

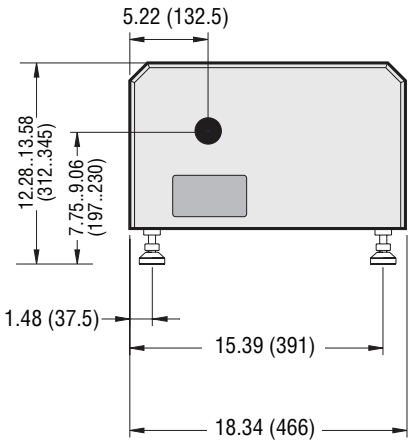
Cobra-Stretch Optical Layout



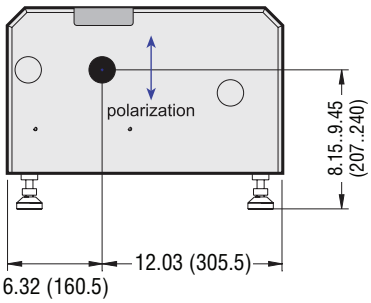
Cobra-Stretch Dimensions



Side View



Pump Laser Input End



Dye Laser Output End

Dimensions are in inches (mm)

Cobra-Stretch Specifications

Prism Model Linewidth Specifications

Model	Groove Density	Grating Length	Tuning Range	Linewidth		Efficiency
Cobra-Stretch-P	–	–	370–920 nm	150 pm	5 cm^{-1}[5]	30%[1]

Grating Models Linewidth Specifications

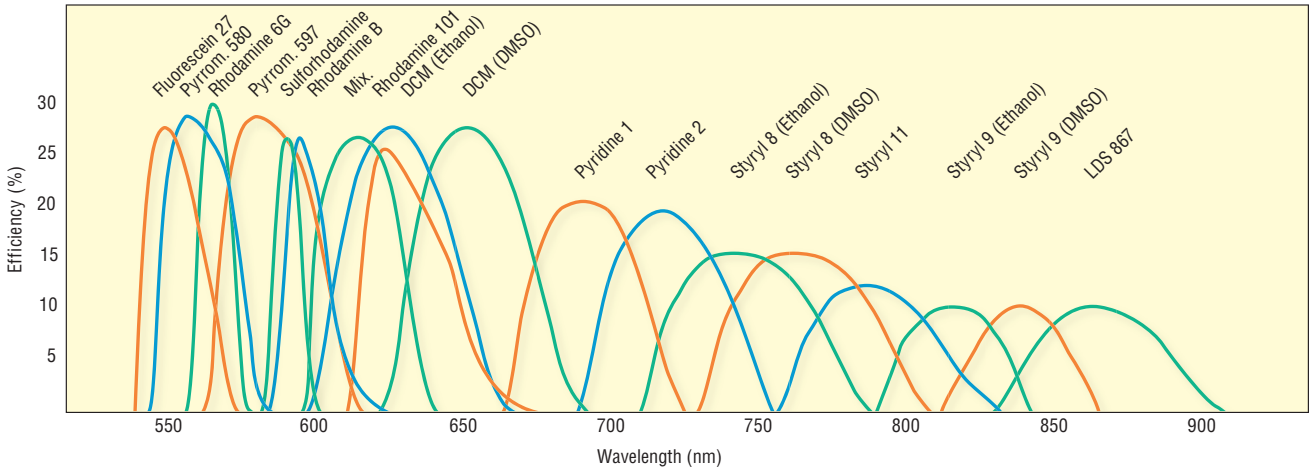
Model	Groove Density	Grating Length	Tuning Range	Linewidth		Efficiency With Amplifier
Cobra-Stretch-G	1800 lines/mm[4]	60 mm	400–920 nm	3.6 pm	0.10 cm^{-1}[1]	30%[1]
	2400 lines/mm[4]	60 mm	370–760 nm	2.7 pm	0.08 cm^{-1}[2]	30%[2]
	3000 lines/mm	60 mm	370–620 nm	2.0 pm	0.06 cm^{-1}[2]	30%[2]
Cobra-Stretch-LG	1800 lines/mm[4]	90 mm	400–920 nm	2.4 pm	0.06 cm^{-1}[1]	30%[1]
	2400 lines/mm[4]	90 mm	370–760 nm	1.8 pm	0.06 cm^{-1}[2]	30%[2]
	3000 lines/mm	90 mm	370–620 nm	1.4 pm	0.05 cm^{-1}[2]	30%[2]
Cobra-Stretch-D	1800 lines/mm[4]	2 x 90 mm	410–900 nm	1.7 pm[3]	0.05 cm^{-1}[1]	27%[1]
	2400 lines/mm[4]	2 x 90 mm	370–710 nm	1.2 pm[3]	0.04 cm^{-1}[2]	27%[2]
	3000 lines/mm	2 x 90 mm	370–580 nm	1.0 pm[3]	0.03 cm^{-1}[2]	27%[2]

Wavelength and Beam Characteristics	
Absolute Wavelength Accuracy	<20 pm (prism model: 0.5 nm)
Wavelength Resetability	<4 pm (prism model: 0.05 nm)
Wavelength Stability	<2 pm/°C (prism model: 10 pm/°C)
Divergence (typical)	0.5 mrad with main amplifier
Polarization	>98%, vertical
ASE	<0.5%
Pump Energies (with EBP cell) with amplifier	50–650 mJ (800 mJ) @ 532 nm 50–400 mJ (500 mJ) @ 355 nm
Requirements	
Voltage	110–230 V, single phase, 50 Hz/60 Hz
Computer	Single USB
Operating System	Windows 2000 / Windows XP / Windows Vista

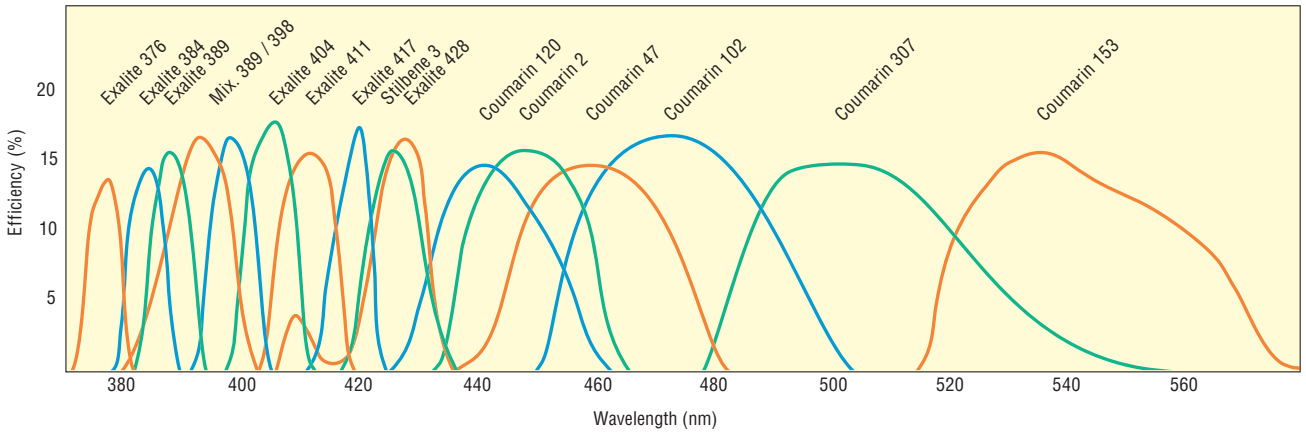
1. At 625 nm (peak DCM) pumped at 532 nm
2. At 570 nm (peak Rhodamine 6G) pumped at 532 nm
3. Exact linewidth depends weakly on wavelength; value given for 450 nm
4. 1800 lines per mm Woods Anomally occurs at 560–571 nm and 2400 lines per mm Woods Anomally occurs at 423–434 nm
5. For wavelengths <660 nm

Cobra-Stretch

532 nm-pumped Dye Tuning Curves



355 nm-pumped Dye Tuning Curves



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