Technical specifications for the dye laser

A tunable pulsed dye laser with a maximum of 10 Hz repetition rate is required with the following specifications.

1. Dye laser's Tunability:

The dye laser's fundamental tunability should be from ~ 400 to 900 nm. The dye laser should be able to give ~ 210 - 450 nm after necessary doubling/tripling/mixing of the fundamental wavelength. All the necessary crystals to cover the entire tunable wavelength region (~ 210 – 900 nm) should be provided with the necessary thermally stabilized housing. Appropriate beam walk compensators should be provided and the beam should not change its position either during doubling or scanning. In other words, the beam should be intact. The system should be provided with a very high precision auto tracker.

2. Energy efficiency:

> 25% @ peak of R6G and DCM dyes (532 nm pump)
≈ 15% @ peak of Coumarin 47 or equivalent dye (355 nm pump)

3. Pumping specifications:

The dye laser should be able to be pumped by both 532 nm and 355 nm wavelengths. Switching over from 532 nm pumping to 355 nm pumping should be possible with/without changing any optics in the dye laser. If the change of optics is necessary to pump the dye laser with 532 nm/355 nm wavelength, necessary optics should be provided. However, they should have the kinematic mounts to avoid any further alignment. If the dye laser is designed in such a way that switching from 532 nm pumping to 355 nm pumping is possible without changing any optics, then dual coated optics with necessary threshold should be provided. The dye laser's optics should be capable of handling the pump energies of at least 750 mJ @532 nm and 350 mJ@355 nm.

4. Line width:

The line width of the dye laser's output should be in the range of 0.08 - 0.05 cm^{-1}. The fundamental dye laser's tuning wavelength range should be achieved by one/two gratings. Change of gratings should not affect the alignment. If change of grating is necessary, the kinematic mounts should be preferred, to avoid any misalignment. Switching from one grating to another should be possible without any further alignment or minimal alignment in our laboratory itself.

5. Tuning mechanism:

The scanning of the dye laser output should be completely automatic; in other words, full auto-tracking with software control should be provided. A very high precision auto-tracker should be used for this purpose, as we will be scanning the complete range of the dye laser output with a resolution of 0.001 nm.

6. Wavelength separation:

A unit comprised of four pellin broca prisms should be used to separate the fundamental and harmonic (doubled/tripled) wavelengths. The beam should not walk after the wavelength separation. In other words, the output beam should be intact.

7. Interface: USB 2.0/ RS-232/ in the order of priority

8. Beam specifications:

a)	Pulse duration:	5-10 ns
b)	Line width:	0.1 - 0.05 cm^{-1}
c)	Beam Size:	3 to 6 mm
d)	Wavelength stability:	<0.002 nm/^{0}C
e)	Frequency Stability:	0.005 cm^{-1}/^{0}C/hr
f)	Wavelength reproducibility:	≤0.005 nm
g)	Wavelength accuracy:	≤ 0.02 nm
h)	Energy stability:	≤ ± 2.5 %
i)	ASE:	< 0.5 % within centre of the tuning range
j)	Polarization:	vertical
k)	Time jitter:	≤ 2 ns
l)	Divergence:	≤ 0.5 mrad
m)	Beam shape:	Circular/Gaussian

General specifications:

a) The laser should be installed in our laboratory by a technical expert of either the manufacturer or the supplier. A complete training should be given on operation, maintaninance of the laser. The technical expert of the dye laser should be able to integrate the pump laser (Pulsed Nd:YAG laser) of any manufacturer and complete the installation by demonstrating the quoted output energies in the UV/visible regions.

b) Suitable dye circulator with suitable dye cells (to attain a circular/Gaussian beam) should be provided with the system. An additional dye circulator should also be quoted as an optional item.

c) A minimum of 3 grams of the necessary dyes for the demonstration purpose should be provided with the system. Solvents will be supplied by us for the installation.

d) At least 12 dye filtes have to be supplied with the system.

e) Necessary optics with suitable opto mechanics to couple with the pump laser (Pulsed Nd:YAG laser of any manufacturer) should be provided. The threshold of the optics should be at least 5 J cm^{-2} or better as required.

f) The dye laser should have the facility to control all its parameters using an external laptop/PC. The necessary cables to do this should be supplied. The computer will be provided by us at the time of installation.

g) LabView drivers and necessary ASCII codes to control the laser externally should also be provided along with the laser's software. We should be able to control all the laser parameters using LabView/third party software by integrating the provided LabView/ASCII drivers.

h) Software for controlling the hardware and automatic scanning of the dye laser should be provided with the laser. LabView drivers and necessary ASCII codes to control the automatic scanning should be provided with the system to enable us to integrate the dye laser system with our LabView software.

i) We should be able to scan the entire wavelength region (~ 210-900 nm) in the step size of 0.001 nm. In this process, we should not see any abnormal jumps in the dye laser's output wavelengths. In simple words, the scanning should be a very smooth process.

j) A complete dye chart with the complete information about the concentrations of the dyes and the solvents to cover the entire range of wavelengths should be provided with the system.

k) All the necessary cables, power adapters and noise free BNC cables should be supplied with the laser.

l) 220VAC@50Hz, single phase power supply to control the laser is preferred.

m) At least two sets of safety glasses to work with the dye laser in the entire wavelength region should be provided.

n) A minimum of 2 years warranty for the complete system should be provided. An additional one year warranty should also be quoted as an optional item.

o) A list of references in India, where similar systems have been installed, **must be provided** and this will be taken very seriously while making the decision. **Your post sales service feedback will be certainly a deciding factor**.