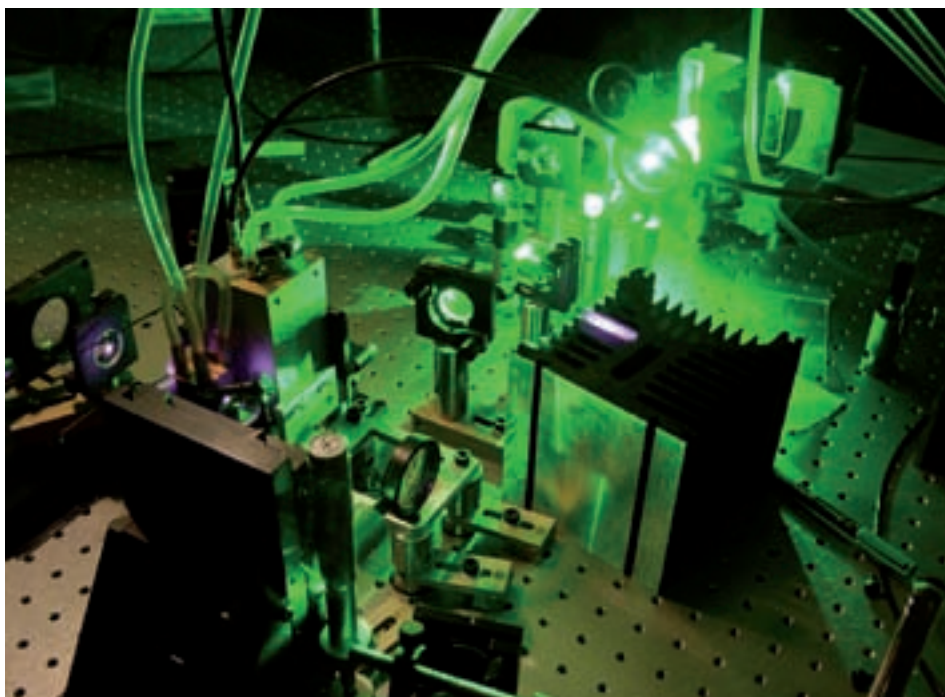


# Focus on CSIR research in Laser Systems

CSIR National  
Laser Centre



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The CSIR's laser systems group actively engages in current and cutting-edge research in the field of diode-pumped solid-state (DPSS) laser sources. This dynamic group, also comprising MSc and PhD students, designs efficient and high power DPSS laser systems. The use of novel laser architectures and gain media is investigated in order to optimise the laser performance.

Both experimental work and mathematical models are used to push these lasers well beyond the limits of currently-available technology. This work can be applied to lasers in various operating regimes and wavelength ranges.

Currently, the main focus of the research is on mid-infrared DPSS lasers. Mid-infrared ( $\sim 1,5 - 8,0 \mu\text{m}$ ) lasers are highly popular because they are far less harmful to the eye compared to lasers operating in the visible or near-infrared spectral region.

In addition, many characteristic molecular absorption lines are in this region, making these lasers useful for chemical spectroscopy and laser remote sensing of pollution. Due to the high absorption of this wavelength regime in water, mid-infrared lasers are also beneficial for medical applications.

The research conducted in novel DPSS lasers is mainly aimed at power and energy scaling of these lasers while

maintaining good beam quality of the laser output. This includes research into novel laser concepts and geometries, thermal handling, laser resonator design and numerical modelling of the laser.

Other areas of interest are special operating regimes, for example, high spectral purity and active control of laser parameters. In all areas, the emphasis is on simple, robust and compact architectures.

Applications of DPSS lasers are abundant in science, industry, the medical and military fields. Researchers work closely with clients in the various areas. Custom laser systems are developed according to the specific needs of the client.

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