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Development of high-power and high-energy solid-state lasers and amplifiers

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Abstract content (Max 300 words) **Formatting & Special chars**

An overview of laser source development at the CSIR National Laser Centre is presented.

A number of different laser sources, based on various architectures were developed to fulfill a diverse range of needs. These systems included ultra-compact short-pulse 1 micron lasers, Large Mode Area (LMA) mid-infrared fibre lasers, bulk solid-state lasers and amplifiers, as well as Optical Parametric Oscillators (OPOs).

The ultra-compact 1 micron lasers delivered multi-kW peak powers in nanosecond pulses at Pulse Repetition Frequencies (PRF) in excess of 100 kHz. This laser prototype was developed for use in ranging applications.

Development of 2 micron, high-power bulk lasers and amplifiers for use as OPO pump sources as well as free space propagation has also proven highly successful, culminating in the successful completion of a fieldable Ho:YLF laser and amplifier system, delivering up to 60 W of laser power in a near-diffraction limited beam.

We are also investigating mid-infrared parametric sources emitting in the 3 to 5 micron region. Sources in this wavelength region have applications in several fields, including medicine, optical communication, and defence. Results obtained thus far are very promising, with up to 14 W of output power demonstrated from a single-crystal OPO emitting at 4 micron.

In conclusion, we present our vision and future strategy for aiding both the South African Photonics research community as well as industry.

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N/A

Main supervisor (name and email) and his / her institution

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