

REMOTE

RUGGED MICRO-ECDL TECHNOLOGY FOR COLD ATOM APPLICATIONS IN SPACE

COMPACT & ROBUST EXTERNAL-CAVITY DIODE LASER IN THE BLUE

Optical clocks offer the promise of orders of magnitude improvement in temporal accuracy over the existing time standard based on caesium atoms. Precision timing is required for a wide range of applications including telecommunications, financial trading, navigation systems and security. However, optical clocks remain complex laboratory-bound systems.

Two of the most established optical clocks are based upon transitions in the Strontium neutral atom and in Strontium ions. Laser cooling of these species requires light at 461 nm and 422 nm respectively. Existing approaches rely on complex, inefficient frequency-doubled laser systems. In comparison, a system based upon a GaN laser diode in the blue can address these cooling transitions directly, significantly reducing system size, weight, power-consumption and complexity.

The external-cavity diode laser (ECDL) approach enables single-frequency operation to be achieved with Fabry-Perot laser diodes

whilst also offering prospects for wide tunability over the full gain spectrum, that is useful for targeting specific cooling transitions.

REMOTE is a compact, stable ECDL module based upon a GaN semiconductor gain medium. This first REMOTE product addresses transitions of the Strontium neutral atom around 461 nm that are key to laser cooling within optical clocks.

The flexibility of GaN allows REMOTE modules to be targeted at a range of wavelengths covering the whole of the blue end of the visible spectrum and into the green. We have already demonstrated equivalent REMOTE modules operating at the 422 nm transition required for Strontium ion clocks.

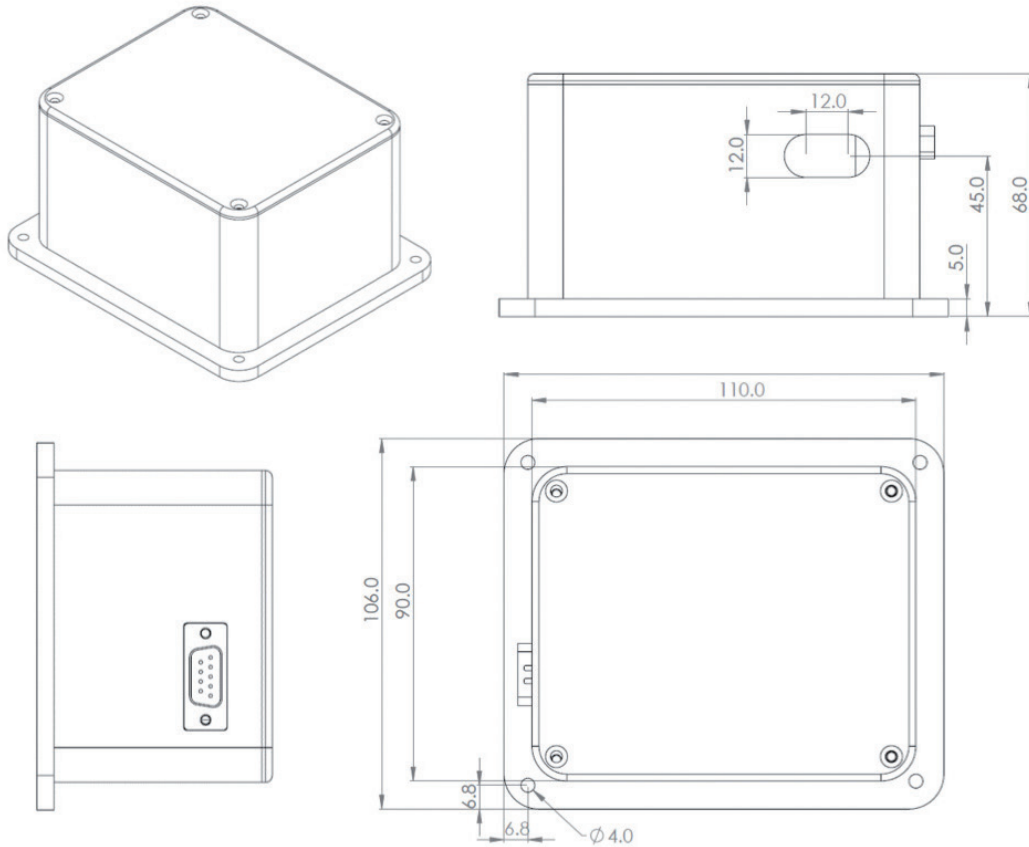
The 461nm REMOTE laser is the first product in Optocap's ECDL product line. Contact us at info@optocap.com for more details and to discuss your requirements for REMOTE and for narrow-linewidth lasers in general.

The REMOTE product has been developed in conjunction with Optocap's technology partners, Fraunhofer UK, at the Fraunhofer Centre for Applied Photonics, Glasgow UK, and TopGaN Lasers.



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Innovate UK



Parameter	Value
Wavelength	460.72 nm
Linewidth	< 500 kHz
Output power	>20mW
Beam diameter	<0.5mm FWHM
Beam divergence	<1mrad FWHM
Polarization	Linear, 100:1
Warm-up to stable operation	<10 minutes