

ALTER

TECHNOLOGY



REMOTE-780

RUGGED MICRO-EXTERNAL CAVITY DIODE LASER

COMPACT & ROBUST EXTERNAL CAVITY DIODE LASER

ONLY: 30 x 12.7 x 8.9 mm³

REMOTE-780 is a compact μ -External Cavity Diode Laser (μ -ECDL) optimised for Rubidium Quantum technology applications at 780.24 nm. REMOTE-Rb laser module is fabricated using Alter Technology UK's advanced packaging techniques that employ high reliability telecoms manufacturing and space qualified processes.

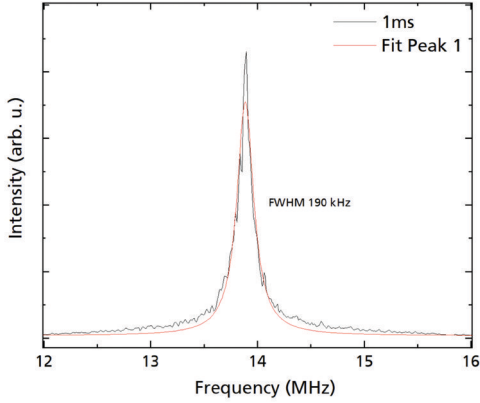
For Quantum Technologies to fulfil their potential requires orders of magnitude reduction in size, weight, power-consumption and cost (SWaP-C) compared to many of the current generation of laboratory

demonstrators. In addition, the instrument must be reliable in real-world environments where it will be exposed to vibrations, shocks and temperature changes during operation.

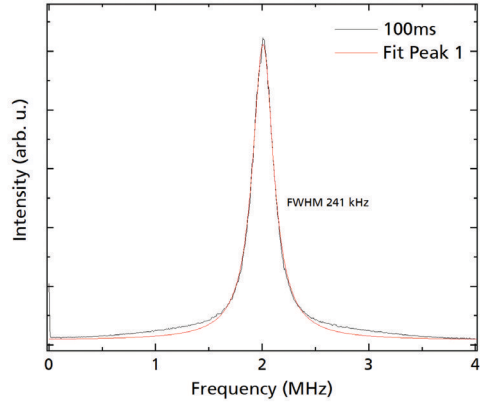
Our REMOTE technology meets these exceptional challenges by moving beyond the established norms of laboratory-based scientific lasers resulting in a miniaturised package that offers maximised stability and reliability in applications both in the lab and within robust portable instruments.

REMOTE KEY FEATURES	REMOTE KEY BENEFITS	REMOTE APPLICATIONS
<ul style="list-style-type: none"> • μ-External Cavity Diode Laser (μ-ECDL) optimised for 780.24 nm • Designed and manufactured for enhanced acoustic, temperature, alignment stability and narrow linewidth • Manufactured using space & telecoms qualified processes • Coefficient of thermal expansion (CTE) matched materials • High vibration stability: short cavity, in addition to no moving parts or piezos • Large free-spectral range enabling long-range injection current tuning 	<ul style="list-style-type: none"> • Size Weight Power and cost (SWAP-C) design and performance optimised • Hermetically sealed, robust, reliable and miniaturised laser module with integrated passive grating technologies • Only 30 x 12.7 x 8.9 mm³ • Alignment-free, very stable, reliable and rapid frequency tuning: across all of the Rb⁸⁷ and Rb⁸⁵ lines ~10 GHz wide hyperfine spectral features • Fast Injection current tuning • Typical linewidth: [1ms - 80 kHz], [100ms - 81 kHz] (when locking to Fabry-Pérot interferometer, >200 finesse 1.5GHz FSR) 	<ul style="list-style-type: none"> • Small rugged form factor, for both portable and lab environments • Quantum atomic laser cooling, trapping and repumping • Quantum clocks, time and frequency standards • Quantum gravimeters, gradiometers, metrology, inertial navigation... • Quantum computing, communications, QKD • Quantum optics: squeezed light,... • Bose-Einstein condensation • Polarization-sensitive and interferometric applications • Electromagnetic transparency and slow light

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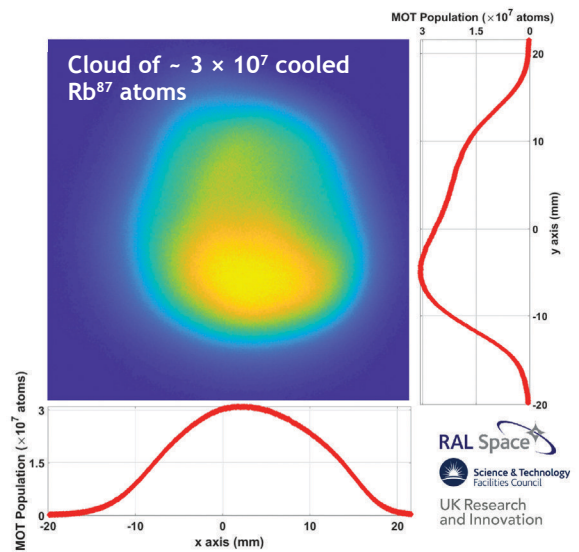


1 ms beatnote with Ti:Sapphire laser measured to have 110 kHz linewidth. Lorentzian fit has FWHM 190 kHz. REMOTE-Rb linewidth from this plot is 80 kHz @ 1 ms (locking to Fabry-Pérot interferometer, >200 finesse 1.5GHz FSR).



100 ms beatnote with Ti:Sapphire laser measured to have 160 kHz linewidth. Lorentzian fit has FWHM 241 kHz. REMOTE-Rb linewidth from this plot is 81 kHz @ 100 ms (locking to Fabry-Pérot interferometer, >200 finesse 1.5GHz FSR).

Parameter	Value
Wavelength	780.24 nm
Linewidth	< 100 KHz
Output power	> 100 mW
Beam diameter	< 1 mm FWHM
Beam divergence	< 2 mrad FWHM
Polarization	Linear 100:1
Warm-up to stable operation	< 10 minutes



NOTES

- Beatnote linewidth measurements obtained using a low noise current source
- Integrated temperature sensor for precision temperature control
- Fast local temperature control directly on the diode chip provides isolation from outside temperature variations
- Alter Technology UK follows a policy of continuous product improvement. Specifications are subject to change without notice
- Alter Technology UK offers a limited warranty for all FLAME systems

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