

# FLAME-780

## FREQUENCY-STABILISED LASER MODULES WITH INTEGRATED REFERENCE CELL

**COMPACT & ROBUST FREQUENCY-STABILISED LASER**

**ONLY: 60 x 40 x 16 mm<sup>3</sup>**

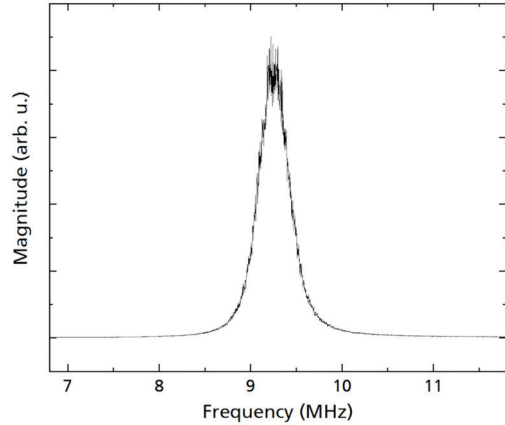
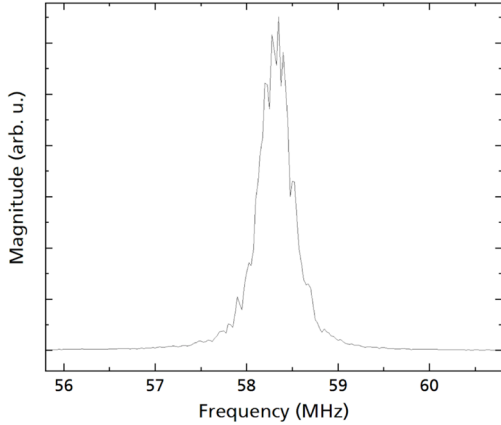
FLAME-780 is a compact, frequency stabilised laser module with integrated Rb vapour cell that allows locking to spectral features of an atomic reference. FLAME-Rb laser module is fabricated using Optocap's advanced packaging techniques that employ high reliability telecoms manufacturing and space qualified 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 FLAME 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.

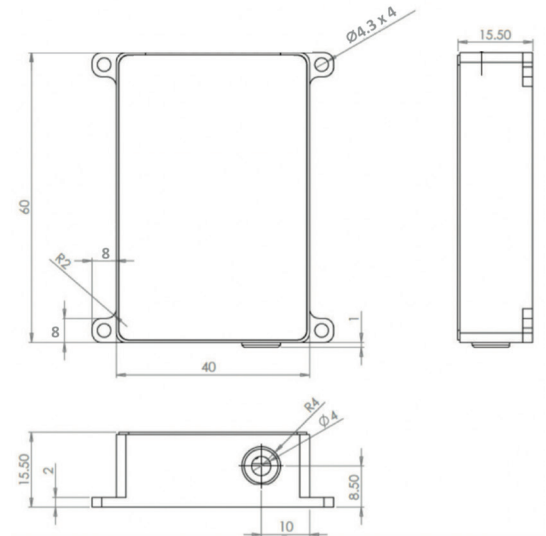
FLAME KEY FEATURES	FLAME KEY BENEFITS	FLAME APPLICATIONS
<ul style="list-style-type: none"> <li>• Frequency Stabilised Distributed Bragg Reflector (DBR) laser diode at 780.24 nm</li> <li>• Machined from a monolithic gold plated KOVAR block for enhanced acoustic, temperature, alignment stability and narrow linewidth</li> <li>• Manufactured using space &amp; telecoms qualified processes</li> <li>• Coefficient of Thermal Expansion (CTE) matched materials</li> <li>• Vibration Immune: short cavity laser diode, in addition to no moving parts or piezos</li> <li>• Large free-spectral range enabling long-range injection current tuning without mode-hops</li> </ul>	<ul style="list-style-type: none"> <li>• Size, Weight, Power and cost (SWAP-C) design and performance optimised</li> <li>• Hermetically sealed, robust, reliable and miniaturised laser with integrated Rb reference cell</li> <li>• Alignment-free, very stable, reliable and rapid frequency tuning: across all of the Rb<sup>87</sup> and Rb<sup>85</sup> lines ~10 GHz wide hyperfine spectral features</li> <li>• Mode-hop free tuning ~ 40 GHz</li> <li>• Fast Injection current tuning</li> <li>• Typical linewidth: [1ms - 540 kHz], [100ms - &lt;565 kHz]</li> </ul>	<ul style="list-style-type: none"> <li>• Small rugged form factor, for both portable and lab environments</li> <li>• Quantum atomic laser cooling, trapping and repumping</li> <li>• Quantum clocks, time and frequency standards</li> <li>• Quantum gravimeters, gradiometers, metrology, inertial navigation...</li> <li>• Quantum computing, communications, QKD</li> <li>• Quantum optics: squeezed light,...</li> <li>• Bose-Einstein condensation</li> <li>• Polarization-sensitive and interferometric applications</li> <li>• Electromagnetic transparency and slow light</li> </ul>



1 ms heterodyne measurement with Ti:sapphire laser (100kHz linewidth @1ms measured), beatnote Lorentzian FWHM 640 kHz. Lorentzian linewidth FWHM FLAME 540 kHz @ 1ms.

100 ms heterodyne measurement with Ti:sapphire laser, Lorentzian FWHM 665 kHz, Lorentzian linewidth FWHM FLAME <565 kHz @ 100ms.

Parameter	Value
Wavelength	780.24 nm
Linewidth	< 1 MHz
Output power	> 150 mW
Beam diameter	> 0.5 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
- Optocap follows a policy of continuous product improvement. Specifications are subject to change without notice
- Optocap offers a limited warranty for all FLAME systems

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**ALTER**



光技術をサポートする  
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