

Locked Laser System

Turnkey solution for Rb-based quantum application

The **Locked Laser System** is a fully integrated, frequency-stabilized laser delivering narrow-linewidth continuous-wave output **at 1560 nm and/or 780 nm** with absolute frequency referencing to atomic rubidium transitions. Based on telecom-grade fiber laser technology and efficient frequency conversion, it combines high spectral purity, excellent frequency stability, and high output power. Automated frequency locking and a compact rack-mounted architecture enable reliable turnkey operation for laser cooling and trapping, atom interferometry, quantum sensing, precision spectroscopy, optical timing, and quantum computing.



APPLICATIONS

- Laser cooling and trapping
- Atom interferometry
- Quantum sensing
- Quantum communication
- Precision spectroscopy
- Quantum computing

KEY FEATURES

- Target market – Rb atom applications (quantum computing, sensing, timing)
- Turnkey locked laser system providing absolute frequency stability of an atomic lock with accurate output frequency tuning
- Utilises Covision fiber-coupled waveguide technology to bridge the gap from robust telecom laser technology to 780 nm applications
- Dual 1560 nm and 780 nm output available
- User-controlled narrow-band frequency tuning of 780 nm output
- Option for fast switching of output power

Locked Laser System

Typical performance specifications⁽¹⁾

Specification	Locked Laser System
Output wavelengths	1560nm & 780nm ⁽²⁾
Output power	10mW (max) at 1560nm
	1W (max) at 780nm
Reference frequency	384.22799 THz ⁽³⁾
Frequency offset range (from reference frequency)	± 12.8 GHz ⁽⁴⁾
Frequency offset slow tuning range (while maintaining lock to reference frequency)	3 GHz ⁽⁵⁾
Frequency offset fast tuning range (while maintaining lock to reference frequency)	350 MHz ⁽⁶⁾
Linewidth	<10kHz at 780nm ⁽⁷⁾
Frequency stability	<100kHz at 780nm ⁽⁸⁾
Power stability	<1% ⁽⁹⁾
Modulated output (optional)	<100ns ⁽¹⁰⁾
Output extinction ratio	70dB at 780nm
780nm optical output	2m long PM780nm patch cable fiber with FC/APC connector
1560nm optical output	Chassis mount FC/APC connector
Form factor	19" rack mount

1) Specifications are subject to change without notice

2) 1560 nm monitor output (optional)

3) 87Rb F=2 to F'=2/3 cross over transition (other reference locks available at customer request)

4) User controlled offset (option for up to 60GHz offset)

5) 0.03 MHz/ms tuning rate

6) 0.5 MHz/ms tuning rate

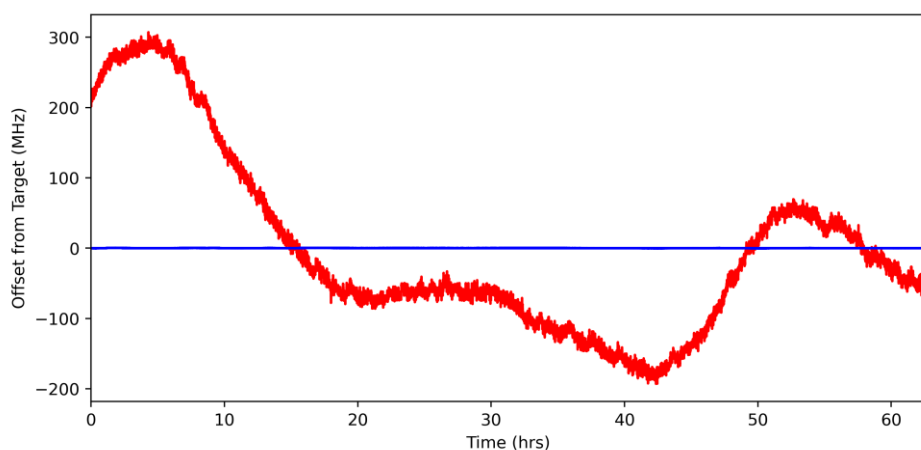
7) RMS @100ms

8) RMS @12hrs

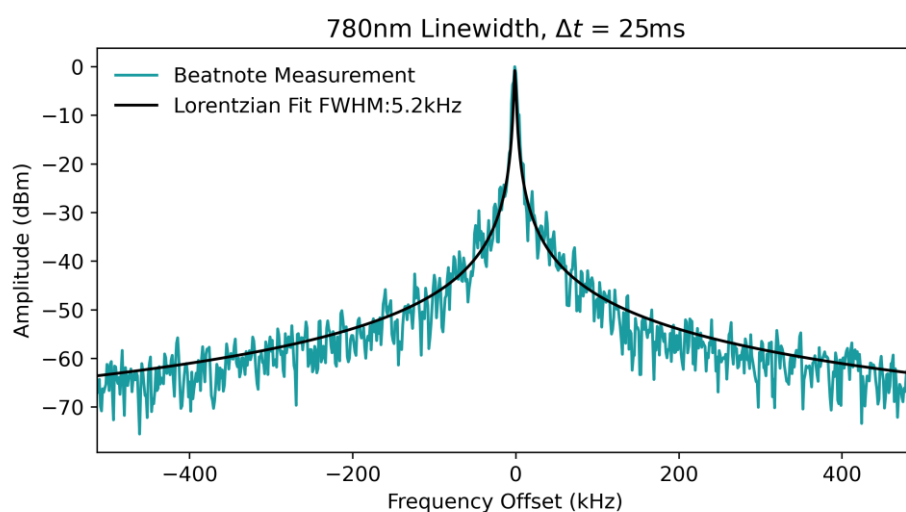
9) RMS @12hrs

10) External drive signal

Typical performance data



Locked vs unlocked frequency stability at 780 nm



Laser linewidth at 780 nm