

**EPIC Online Technology Meeting on
Photonics for Quantum Industry**
Monday 13 January 2025



The Chilas logo consists of a stylized sunburst icon with multiple rays emanating from a central point, positioned above the word "chilas" in a lowercase, rounded, purple font.

Chilas lasers: tuned to your quantum wavelength

Dimitri Geskus
CTO at Chilas B.V.

Characteristics of Hybrid integrated external cavity laser

3 main characteristics of hybrid integrated external cavity lasers:

High output powers

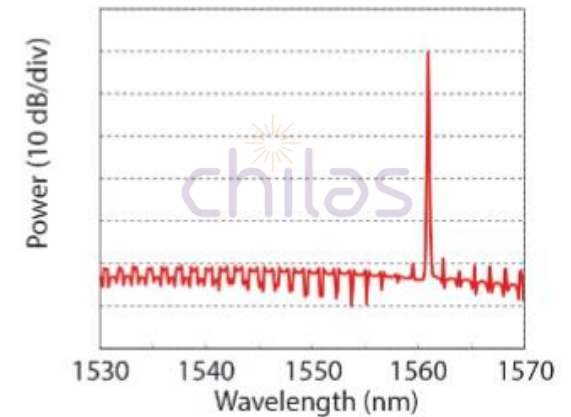
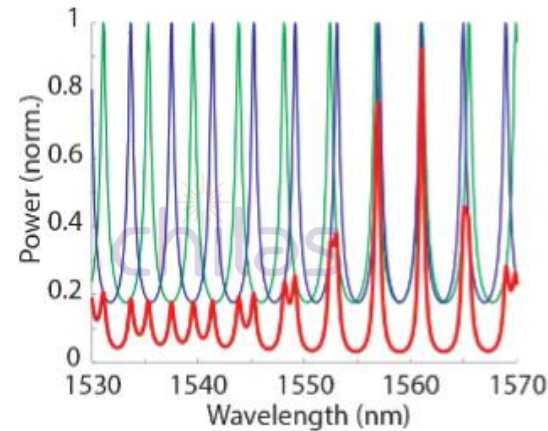
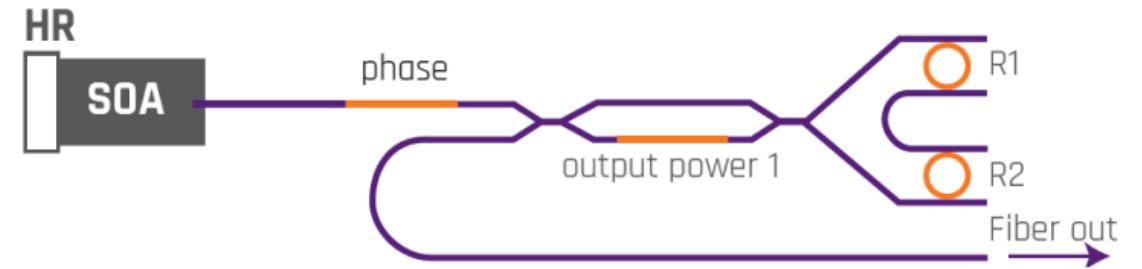
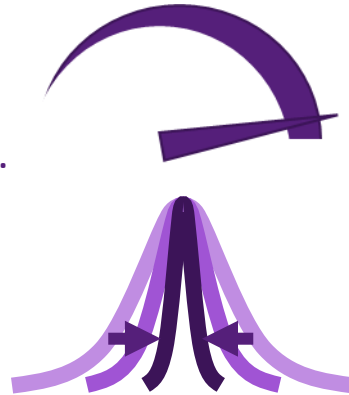
Provided by the **InP semiconductor optical amplifier (SOA)** gain medium.

Ultra narrow linewidth

Thanks to low loss **Si₃N₄ waveguide** circuit as external cavity.

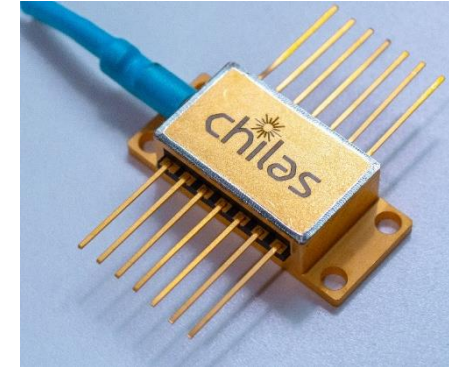
Broad tuning of the wavelength

Due to two coupled micro-ring resonators (MRRs) with slightly different FSR in the cavity exploiting the Vernier effect.

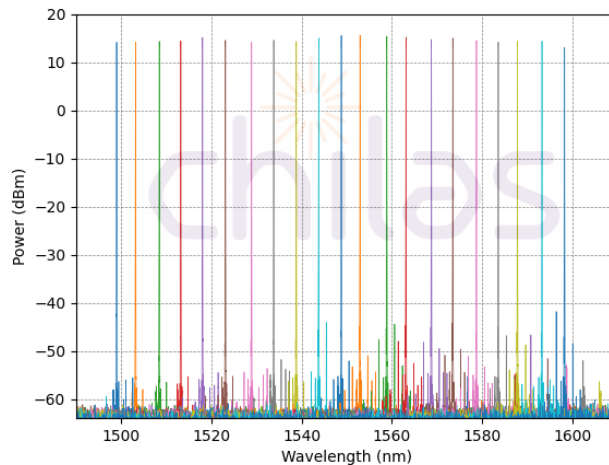


Chilas Featured Products

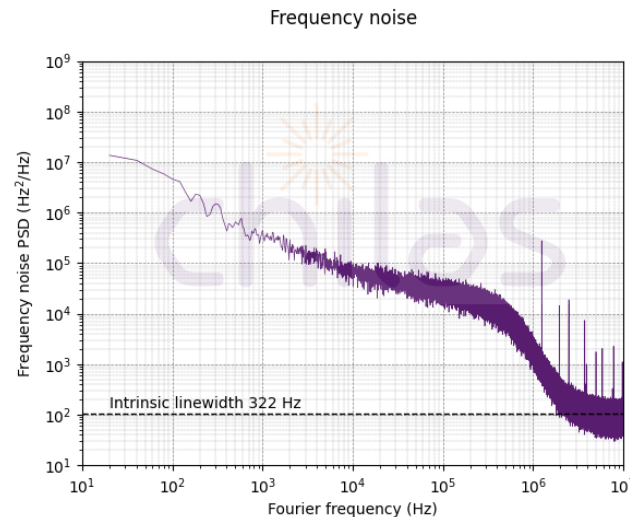
Product	Chilas POLARIS	Chilas ATLAS 100nm	Chilas COMET Swept source
Wavelength	Selectable ITU channel (50 GHz spacing)	1490nm – 1590nm	Full C-band (40nm/s)
Power	> 13 dBm	> 13 dBm	> 13 dBm
Linewidth	< 1 kHz	< 5 kHz	< 5 kHz



CT3 100nm spectrum

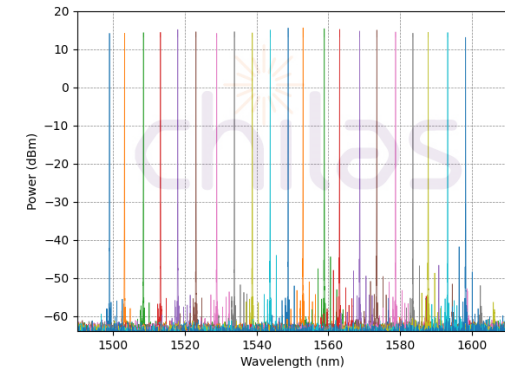
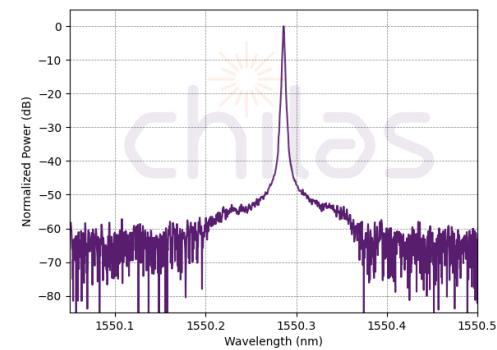
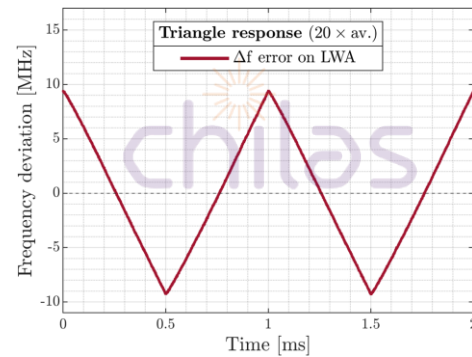
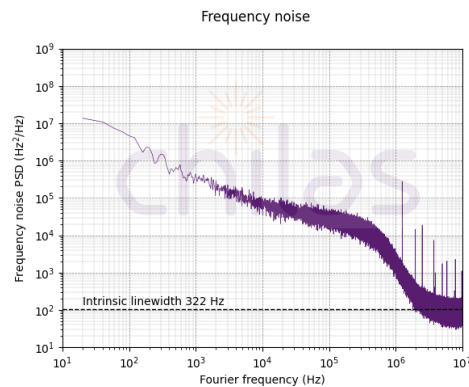


Narrow linewidth



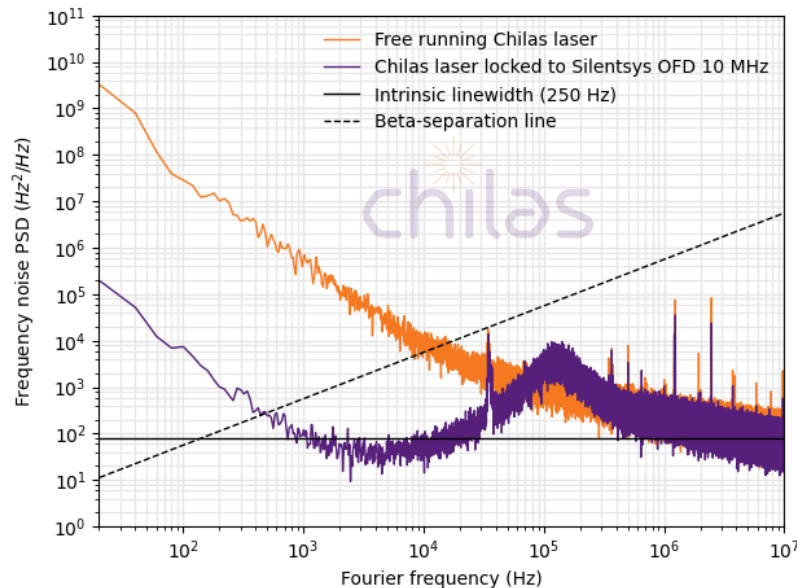
Characteristics - Applications

1. Ultra stable (locked) for **Quantum** applications.
2. Frequency modulated Continuous Wave (FMCW) operation for **LiDAR**.
3. Modehop-free (MHF) tuning, for **spectroscopy**.
4. Swept source applications such as **OCT & FBGS**.

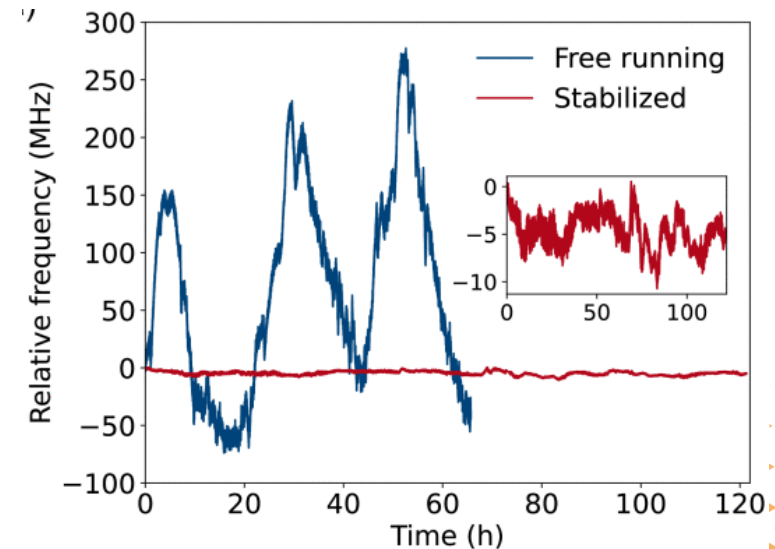


Wavelength locking/stabilization of lasers

- For atomic clocks or noise sensitive applications, such as sensors. Chilas lasers can be easily stabilized via the analog input.
- Free-running effective linewidth: 1.2 MHz
- Locked: 8.3 kHz over 20 ms
- Modehop free current tuning ~ 1 GHz



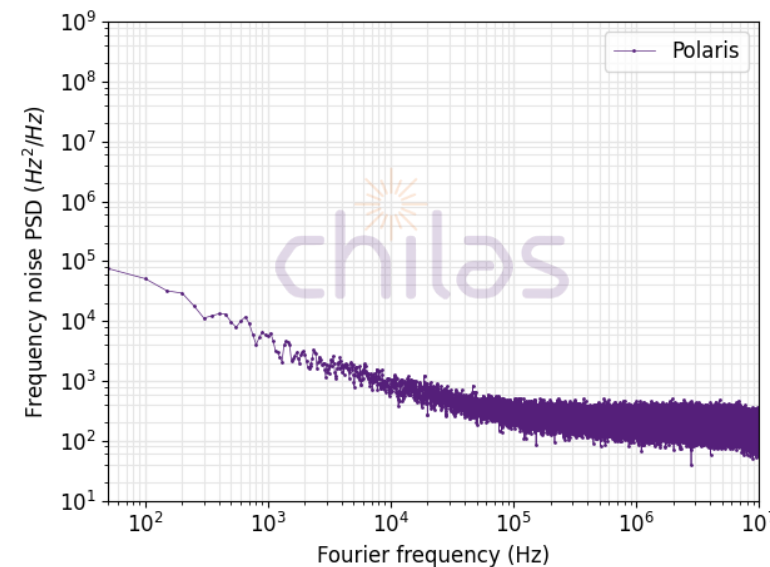
Long-term locking to an acetylene absorption line



A. van Rees, L. V. Winkler, et al, IEEE Photonics Journal 15, 5 (2023)

Quantum applications

- For photonic quantum applications we see 3 main groups:
- **Quantum key distribution/encryption**
 - At telecom wavelengths
 - **Chilas Polaris** and **Chilas Atlas** are stock items
 - **Chilas Polaris** is selectable wavelength, superior linewidth
 - **Chilas Atlas** tunes to multiple wavelengths, narrow linewidth
- Quantum sensing and
- Quantum computing
 - Both rely on atom/ion transitions
 - New wavelengths are important
 - **Chilas ATLAS** for new wavelengths
 - Chilas lasers are scalable



Quantum applications

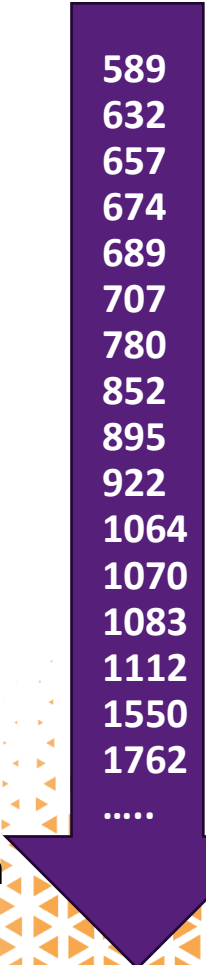
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Ion/Atoms:

- Strontium
- Calcium
- Ytterbium
- Rubidium
- Cesium
- Helium
- ... etc.

Wavelengths:



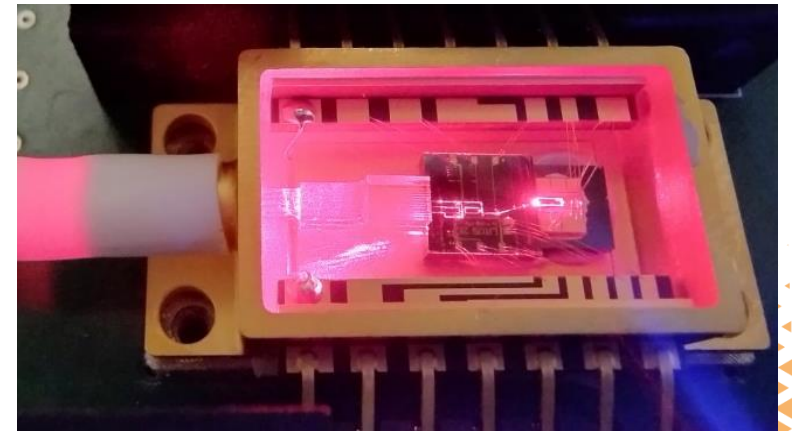
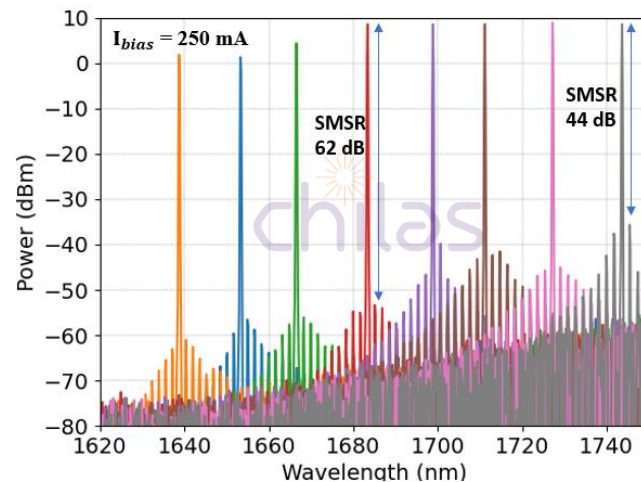
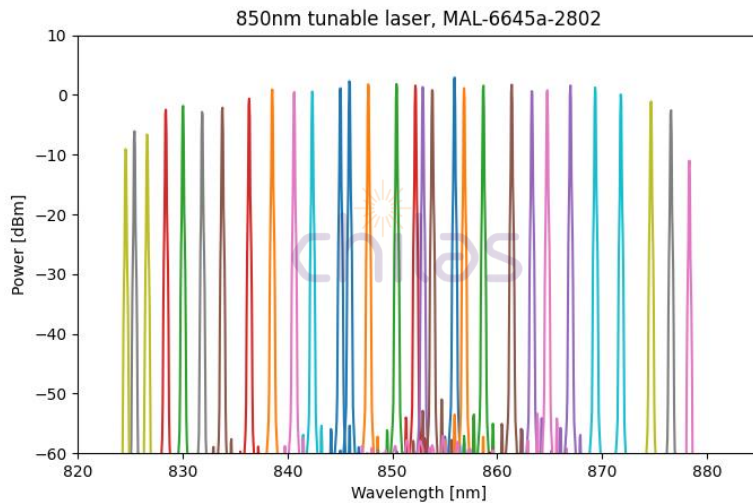
589
632
657
674
689
707
780
852
895
922
1064
1070
1083
1112
1550
1762
.....

Transitions:

- Pumping
- Repumping
- Cooling
- Transitioning
- Clock transition

Prototype lasers are available, other wavelengths on request!

Prototypes	Chilas VT3	Chilas BT3	Chilas UT3
Wavelength	680 nm / 690 nm / 707 nm / 780 nm	850 nm	1700 nm
Power	> 1 mW	> 3 mW	> 7 mW
Tuning range	+/- 10 nm	+/- 25 nm	+/- 50 nm



Anywhere between 400 nm - 2200 nm

What is your favorite wavelength?

Invite us to tune to your wavelength, find us at: info@chilasbv.com or via the **Contact form** on our website.



Subscribe to our Newsletter!

- Chilas plans to expand the wavelength portfolio in 2025
- What is your favorite wavelength?

Updates about Chilas Lasers #ChilasLASERS & other new products coming soon on our website!

Chilas lasers: compact, robust, wavelength agile and volume ready

