A breakthrough in metrology

The Stabila laser 1542 is an acetylene-stabilized fiber laser that exhibits both narrow linewidth, excellent long-term stability and high accuracy. The design maintains the short-term linewidth of a high-end fiber laser, and adds the long term stability and accuracy from a molecular transition of acetylene. The result is a high-performance laser source offering continuous trouble-free operation without user intervention.

Enabling next-level applications

Thanks to the Stabila laser 1542, affordable access to the high levels of performance needed for cutting edge scientific research, is now available. A diverse and growing range of applications include stabilization of frequency combs and length metrology. As a reference, the Stabila laser 1542 is an essential component for stabilization and line narrowing of lasers for spectroscopy or laser cooling on narrow-line atomic or molecular transitions, as well as in dual comb spectroscopy.
CALIBRATION SERVICES

DFM offers a wide range of calibration services within photonics, nanometrology, electrochemistry and acoustics as well as primary level calibration services for mass, length, CMM, and DC electricity.

All measurements are traceable to recognized national and international standards. A majority of our calibrations are performed under ISO 17025 accreditation.

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Specifications

Wavelength: ................................................. 1542.3843472 nm (vacuum)
Linewidth: .................................................. 300 Hz (short term)
Stability: ...................................................... ≤3 x 10^{-13} (ADEV ≥1 s)
Long-term accuracy: ...................................... ≤2 x 10^{-12} drift per year
Output power, locked: .................................... 10 mW (nominal)
Output power, unlocked: ............................... 100 mW (nominal)
Power requirements: ...................................... 100 – 240 VAC, 50 or 60 Hz
Dimensions: .................................................. 22 cm (H) x 52 cm (W) x 51 cm (D)

Technology

At the heart of the Stabiλaser 1542 is a compact ultra low-noise fiber laser stabilized to the acetylene $^{13}$C$_2$H$_2$ P(16) ($\nu_1 + \nu_3$) transition at $\lambda = 1542.3837$ nm, corresponding to the frequency $f = c/\lambda = 194 369 569 384$ kHz (laser output is shifted 80 MHz due to internal modulation). The laser meets the conditions of the CIPM recommendation on standard frequencies and can be used as a primary standard with an uncertainty of 5 kHz. The proprietary optical design and control software ensure both autonomous operation and a high quality laser output. The Stabiλaser 1542 is available in a 19 inch chassis and is controlled by an external PC.

Proven record

Professor Michael Drewsen, Aarhus University, Denmark, explains: “We have applied Stabiλaser 1542 as a frequency reference for a frequency comb for over a year now. The ease with which the comb teeth are short-term stabilized to sub-kHz linewidths, as well as the long term absolute accuracy-drift have impressed us very much. The stability of Stabiλaser 1542 is simply amazing.”