DFM
Danish National Metrology Institute

ABOUT DFM

DFM is the Danish National Metrology Institute. DFM develops and maintains selected national standards.

DFM provides metrology services and technology primarily to high-tech companies within the pharmaceutical, photonics and advanced manufacturing industries.

DFM is a signatory to the CIPM-MRA arrangement that ensures mutual recognition of measurements worldwide.

DFM is ISO 9001 certified.

Stabiλaser 1542

A breakthrough in metrology

The Stabiλaser 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 Stabiλaser 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 Stabiλaser 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.

CONTACT DFM

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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.

CONTRACT RESEARCH

DFM offers metrology related contract research such as development of new measurement technology, assistance in obtaining accreditation and other areas where specialized metrology competences are required

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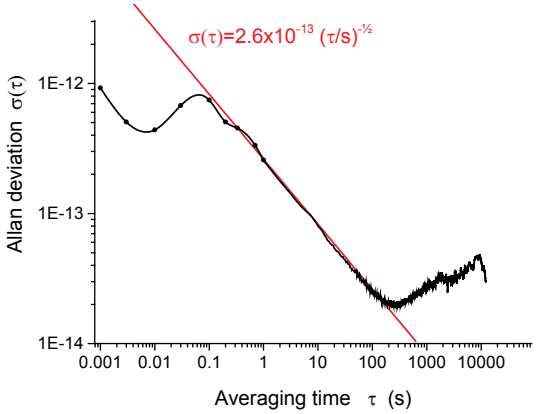
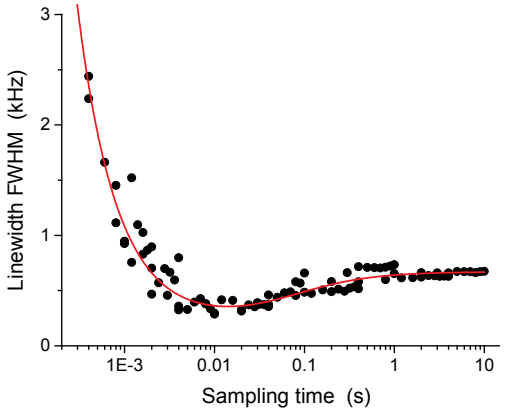
Specifications

Wavelength: ..... 1542.3837 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)



The figure shows a typical Allan Deviation (ADEV) plot for a Stabiλaser 1542.



The Stabiλaser 1542 linewidth vs. sampling time, Fourier limited at short times.

Technology

At the heart of the Stabiλaser 1542 is a compact ultra low-noise fiber laser stabilized to the acetylene $^{13}C_2H_2$ P(16) (v1 + v3) transition at λ = 1542.3837 nm, corresponding to the frequency f = c/λ = 194 369 569 384 kHz. The laser meets the conditions of the BIPM 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*."

Contact DFM to get more information on the Stabiλaser 1542, and discover how the Stabiλaser 1542 can be put to work in your application.

LASER RADIATION

INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION
CLASS 3B LASER PRODUCT