Wavelength Meter

Sensitive and compact device with a large spectral range for high speed measurements of pulsed and continuous lasers

< 200 kHz
Measurement Resolution

UNRIVALED ACCURACY AND SPEED

Measurement Speed
> 75 kHz
The HighFinesse/Angstrom wavelength meters are the unsurpassed high-end instruments for wavelength measurement of pulsed or continuous laser sources. They deliver the superb absolute and relative accuracy required by cutting edge scientific research, as well as industrial and medical applications. The unmatched precision of the WS8 series and all of our other wavelength meters is achieved by using non-moving Fizeau interferometers in a unique geometric configuration. To allow even higher stability and precision, temperature and pressure effects are compensated.

The wavelength meters are connected to the PC via a USB interface and are ready for use as soon as the software delivered with the device is installed. A compact, thermally insulated housing holds the optical elements as well as the electronics. The design enables the integration of additional options, allowing customized solutions to specific applications even years after purchase.

Enter a new world of accuracy!

*For more details, please consult our website

The optical unit consists of Fizeau-based interferometers which are read out by photodiode arrays. We achieve remarkable high accuracy and stability by using exclusive, non-moving optics.

The light is coupled into the device via a fiber and then collimated by a mirror, before entering the solid-state Fizeau interferometers. The interference pattern is imaged by a cylindrical lens onto CCD photodiode arrays. This recorded pattern is transferred to your computer via a high-speed USB connection which allows data acquisition rates of up to 76 kHz.

The software fits and compares the pattern to a previously recorded calibration to calculate the wavelength. One significant advantage of our Fizeau-based wavelength meters, compared with other available instruments, is the absence of mechanical moving parts. This ensures the high reliability of accuracies up to 2 MHz (absolute) and ensures the outstanding robustness HighFinesse wavelength meters are noted for. The design enables the precise measurement of not only continuous lasers, but also pulsed laser sources, which broadens the application range even further.

Another key benefit is the simplicity of our wavelength meters. Simply connect the USB cable and run the program supplied. That’s all it takes!
## Product Overview

### Technical Data

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<td>360 × 200 × 120</td>
<td>360</td>
<td>0.6</td>
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<td>100</td>
<td>100</td>
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<td>500</td>
<td>400</td>
<td>200</td>
<td>100</td>
<td>100</td>
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### Power supply

- High-speed USB 2.0 connection
- Power consumption < 2.3 W, power provided directly via USB cable
- IR-II, IR-III: external power supply included; IR-I, WS7 and WS8 external power supply only

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Up until now our multichannel switches have always been limited in either the wavelength range for single mode switches, or accuracy for multimode switches. Our new PCF switches solve this problem. Using endlessly single mode photonic-crystal-fibers (PCF) allows us to produce a switch that offers single mode operation for all wavelengths. Using the PCF switch it is possible to switch between light-sources at any wavelength within the device’s measurement range and maintain the full accuracy. Combining the PCF switch with other options such as PID control opens new possibilities.

Sold exclusively with the WS8 the PCF switches are available in two-channel (standard), four-channel, and eight-channel configurations.

The HighFinesse/Ångstrom WS8 wavelength meter and PCF switch: enter a new world of accuracy!

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1) According to 3σ criterion, but never better than 20% of the laser linewidth
2) With multi mode fiber
3) ± 2 nm around calibration wavelength (Outside of this range, the accuracy is 5 MHz, extra also supplied)
4) ± 200 nm for WS6-600 IR-III
5) 200 MHz for WS6-200 IR-II
6) ± 20 nm around calibration wavelength (Outside of this range, the accuracy is 5 MHz, extra also supplied)
7) Not better than 5% of the linewidth
8) Depending on PC hardware and settings, highspeed models up to 64 kHz available
9) The CW power interpretation in [µW] compares to an exposure of 1s (generally the energy needs to be divided by the exposure time to obtain the required power)
10) μJ interpretation for pulsed lasers, CW signals need more power in [µJ] since the exposure is limited at IR-III device
11) Each device in multi-mode can measure lasers with a linewidth up to 10% of the corresponding FSR
12) For IR devices: 10/100
13) For IR and IR-III devices: 6/60, for IR-II devices: 16/60
14) IR-II: external calibration source needed, e.g. SLR-1532
15) IR-devices: external calibration source needed, e.g. SLR-1532
16) IR-III: 100)
17) For IR-I and IR-II devices: 16/16, for IR-III devices: 8/80
18) ± 2 nm around calibration wavelength (Outside of this range, the accuracy is 5 MHz, extra also supplied)
19) 100 kHz for special ranges on request
20) Photonics/CrystalSwitches can be used up to 200Wm. Please contact HighFinesse if you want to use over 200Wm.
21) IR-II: 16 MHz

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**Note:** This document provides general information only and may be subject to change at any time without prior notice.
Fastest Wavelength Meters

Our WS Fast series features ultra high speed measurement rates, the fastest commercially available!

- **Measurement range** (QE > 60%)
  - WS6-600 VIS Fast: 380 – 1050 nm
  - WS6-600 IR Fast: 980 – 1650 nm
  - WS6-200 IR Fast: 980 – 1650 nm
- **Absolute accuracy**
  - WS6-600 VIS Fast: 600 MHz
  - WS6-600 IR Fast: 600 MHz
  - WS6-200 IR Fast: 200 MHz
- **Quick coupling accuracy**
  - WS6-600 VIS Fast: 20
  - WS6-600 IR Fast: 4
- **Wavelength deviation sensitivity**
  - WS6-600 VIS Fast: 3000 kHz
  - WS6-600 IR Fast: 3000 kHz
  - WS6-200 IR Fast: 3000 kHz
- **Measurement rate**
  - WS6-600 VIS Fast: 24000 Hz
  - WS6-600 IR Fast: 24000 Hz
  - WS6-200 IR Fast: 24000 Hz
- **Minimum exposure time**
  - WS6-600 VIS Fast: 41.6 µs
  - WS6-600 IR Fast: 6 µs
  - WS6-200 IR Fast: 6 µs
- **Maximum exposure time**
  - WS6-600 VIS Fast: 3.5 ms
  - WS6-600 IR Fast: 9 ms
  - WS6-200 IR Fast: 9 ms
- **Minimum required input energy and power**
  - WS6-600 VIS Fast: 7 µW / 0.29 nJ @ 532 nm
  - WS6-600 IR Fast: 1 mW / 6 nJ @ 1532 nm
  - WS6-200 IR Fast: 1 mW / 6 nJ @ 1532 nm
- **Fizeau interferometers (FSR)**
  - WS6-600 VIS Fast: 76 kHz in the 980 – 1650 nm wavelength range
  - WS6-600 IR Fast: 76 kHz in the 980 – 1650 nm wavelength range
  - WS6-200 IR Fast: 76 kHz in the 980 – 1650 nm wavelength range

Readout rates can be up to 24 kHz in the 380 – 1050 nm and even up to 76 kHz in the 980 – 1650 nm wavelength range. Fast swept laser sources can be precisely characterized with these wavelength meters.

OEM and customizations

While our standard housings are well suited for lab conditions there are cases where our devices are subjected to extreme conditions. For these instances we can work with the customer to design a housing suitable for their requirements. In the past these have included an increased protection from environmental influences and increased shock resistance. Contact us for user defined functions or OEM applications! The unmatched accuracy of our wavelength meters is used to actively stabilize the seed laser of a Laser Guide Star system (right). This guarantees that the yellow laser light is exactly on resonance with the atomic transition to enable the LGS to shine bright!

Standalone Wavelength Meter

HighFinesse / Ångstrom wavelength meters are also available in an industry standard 3U 19-inch case, allowing easy integration into existing rackmount systems. A standalone version allows full use of the device without the need for a connection to a PC. Measurements can be recorded directly onto the device internal storage or externally. They can be stored easily on USB flash drives, HDD/SSDs, or accessed the wavelength meter via SCPI client. This modification is available for all wavelength meter models (except FAST series).

Features
- Turnkey Wavelength Measurement
- Longterm Graph
- Relative Power Measurement
- Network: SCPI via Ethernet
- Linearity Estimation (Option)
- External Trigger (Option)
- PID Laser Control (Option)
- Multichannel Switch (Option)
HighFinesse Ångstrom optical spectrometers LSA and HDSA are designed to analyze the multi-line or broadband spectrum of light sources like cw and pulsed lasers, gas discharge lamps, super luminescence diodes, and LEDs. They are suitable to analyze the spectrum of telecom signals, resolve Fabry-Perot modes of a gain chip, and produce a spectral measurement of gas absorption.

HighFinesse Precision Current Sources have been developed for experiments and quantum technologies in the areas of Cold atom physics and solid-state-physics. The linearly regulated BCS (Bipolar Current Source) and UCS (Unipolar Current Source) series deliver highly stable, low noise source currents for high precision magnetic field control. The current output is floating or is on a user defined potential. Ultrafast response to control signals and trigger functions, clear grounding, connection and signal isolation schemes make the integration of the current sources into complex experimental systems easy.

HighFinesse Linewidth Analyzers (LWA) are specialized high-end devices for measuring and analyzing the spectral shape of various laser sources. Through the use of two measurement modes, the LWA can analyze both very narrow laser lines down to 100 kHz as well as broader spectra up to 1 GHz. They feature an extremely high resolution and accuracy in determining the linewidth of the respective laser source and its spectral lineshape. The LWAs are ideal for optimizing the stability of laser setups.