Wavelength Meter

Sensitive and compact wavemeter with a large spectral range for high speed measurements of pulsed and continuous lasers.
The HighFinesse/Ångstrom 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 wavemeters is achieved by using non-moving, temperature controlled Fizeau-interferometers in a unique geometric configuration.

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!
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 and PCF switch: enter a new world of accuracy!
Upgrade Options

Upgrade options expand the capabilities of our wavelength meters to match individual requirements of cutting edge research and measurements.

In order to measure the frequencies of more than just one laser at a time, an opto-mechanical switch is used. The combination of our high-speed wavelength meters with one of the quickest fiber switches (MEMS) available allows up to eight channels to be measured almost simultaneously. Exposure time and other parameters can be defined independently for each light source. You can choose between singlemode or multimode fiber switches, depending on the required accuracy level of your measurements.

With the PID option it is possible to stabilize the frequency of a laser connected to the wavemeter using a software based proportional-integral-derivative controller (PID controller). Unlike analog PID stabilizations, the PID option provides software based signal processing, allowing the laser to be stabilized to a specific user defined frequency. This makes it extremely useful in experiments where the laser frequency has to be actively regulated or varied to fit changing experimental conditions, such as laser cooling, atomic detection, trapping and spectroscopy. Combined with the MC option the wavemeter can be used to stabilize multiple lasers simultaneously. The regulation speed and quality and absolute accuracy match the measurement speed, relative accuracy and absolute accuracy of the wavemeter respectively. The measurement speed is not affected by the regulation.

The linewidth estimation of a singlemode laser source is performed by a special algorithm which eliminates the interferometer’s instrument response function. The algorithm enables the estimation of the linewidth several times better than the spectral resolution of the instrument.

The diffraction grating option allows the analysis of emission spectrum to an accuracy of 6 GHz. This option the wavemeter can be used to stabilize multiple lasers simultaneously. The software automatically searches the spectral section where the laser emission line is located and displays it on the screen. In combination with the additional Fizeau interferometer array this allows wide range applications with a single device.

The unmatched absolute accuracy of the HighFinesse WS-Ultimate series is used to actively stabilize the seed laser of the LGS system. This guarantees that the frequency doubled yellow laser light is exactly on resonance with the atomic transition to enable the LGS to shine bright!

— Picture courtesy: ESO/Y. Beletsky

While our standard devices will suit the needs of most standard application requirements there are always exceptions. In these cases we are happy to work with our customers to provide individually optimized solutions.

Custom FSR
Due to the adaptable design of the wavemeters, the interferometer can be customized according to the customer’s specifications. For instance, using different coatings trades off some of the measurement range for an increased finesse and sensitivity. For customers seeking to measure broadband lasers the free spectral range of the Fizeau can be changed. This allows for the measurement of significantly broader light sources while almost retaining the overall accuracy.

OEM & Standalone
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, up to 100G (see MERLIN device on the left). We can also offer the wavemeter in an industry standard 3U 19-inch rack-mount case allowing easy integration into existing rack-mount systems. A stand-alone version of the wavemeter allowing full use of the device without needing a connection to a PC will be available in the near future.

Highspeed (70 kHz)
Our WS Fast series features ultra high speed measurement rates. Read out rates can be up to 24 kHz in the 330 – 1180 nm and even up to 70 kHz in the 950 – 1750 nm wavelength range. Fast swept laser sources can be precisely characterized with these wavemeters.

For further information please contact our offices!
HighFinesse optical spectrometers LSA and HDSA are designed to analyse the multi-line or broadband spectrum of light sources like cw and pulsed lasers, gas discharge lamps, super luminescence diodes, semiconductor laser 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.

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