

## Integrated Wavemeters

Most applications involving the Matisse 2 lasers require very precise manipulation of the laser's frequency. This includes tuning the Matisse to a specific wavelength, scan the laser over a defined frequency range, or fix the output to a special wavelength.

A variety of integrated wavemeters is available for the Matisse 2 lasers that provide turn-key ready solution to these tasks. These wavemeters give real-time feedback on the laser's wavelength thus allowing fully automatized control of the Matisse 2 laser system.

The wavemeters are based on multiple Fizeau-interferometers that result in a unit so compact it is integrated into the original Matisse housing. At the same time high spectral resolution of the device is achieved.

State-of-the-art electronics allows the evaluation of hundreds of measurements per second. Hence, fast execution of all wavemeter related tasks is ensured. Wavemeters with different spectral resolution may be integrated into the Matisse 2 laser housing.

## Specifications

	<b>IWM-3000</b>	<b>IWM-600</b>	<b>IWM-200</b>
Absolute accuracy	3000 MHz	600 MHz	200 MHz
Measurement resolution	1000 MHz	100 MHz	50 MHz
Maximum measurement rate	600 Hz	600 Hz	400 Hz

## General Characteristics

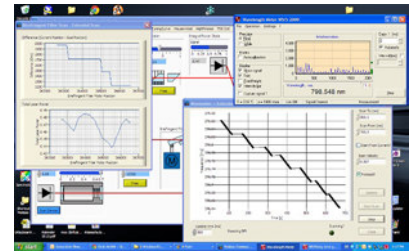
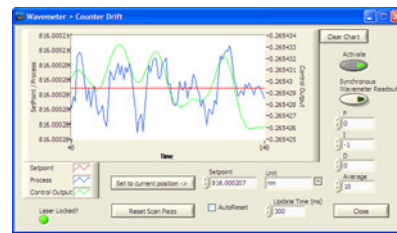
Measurement range	350 .. 1120 nm
Computer	USB 2.0 (high speed) connection

## Go To Wavelength

The Matisse 2 lasers incorporate a stack of optical filters, which together select a single cavity mode. Setting these filters to achieve output at a specific wavelength requires the careful execution of a number of optimizations. This task is fully automatized when an Matisse 2 wavemeter is present. The only user inputs required is the desired wavelength and whether the laser should have maximal scanability to the short or long wavelength range.

During the wavelength setting process, the status of the procedure is displayed in real-time in a pop-up window. After the full execution of the procedure all elements are set to optimal configurations such that the Matisse2 laser has maximum output and optimal stability. The accuracy of the procedure is determined by the accuracy of the wavemeter.

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## Extended Scan

The standard, mode-hop free scan range of the Matisse 2 laser is limited to approximately 50 GHz. This limit is imposed by the finite displacement of the scan-piezo.

In order to achieve larger scans, one needs to stitch together small mode-hop free scans. This requires a reset of some of the frequency selective elements in between the small scans.

Based on the wavelength readout from the

wavemeter, at the end of each 50 GHz stretch the position of each of the frequency selective elements is checked against the next scanning range and accordingly set such that the next scan commences at the point where the previous scan ended.

In this manner the Matisse 2 laser can be scanned over long ranges in 50 GHz sections, without the need to manually reset or realign any component.

## Counter Drift

The Counter Drift feature available with the integrated wavemeters can counteract the wavelength drift that is inevitable to any laser having electric transducers as part of its wavelength tuning system.

The Counter Drift uses the readout of the wavemeter as reference to keep the Matisse 2 laser fixed at a specific wavelength by engaging a PID control loop which acts upon the scan-piezo.



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Heinrich-Hertz-Straße 11  
D-41516 Grevenbroich

phone +49 21 82.82 98 18-0  
fax +49 21 82.82 98 18-40