gentec-eo

LASER COMPONENTS®

BEAM PROFILING

Overview of the different models

BEAM PROFILING CAMERAS

Profiling a laser beam is a convenient complement to the measurement of its power or energy because it provides very useful additional information, like spatial energy or intensity distribution, beam widths, centroid, ellipticity and orientation, that may help you determine if your laser-based systems are operating optimally.

The Beamage is the most cost-effective USB3.0 Beam Profiling Camera on the market. It is available for UV to IR wavelengths and in 2 sizes. It comes with an intuitive and complete software that features an array of useful tools and functions. Its calculations are ISO compliant.

MAIN SPECIFICATIONS

	BEAMAGE-4M	BEAMAGE-4M-IR	BEAMAGE-4M-FOCUS
Wavelength range			
Camera only	350 - 1150 nm	1495 - 1595 nm	350 - 1150 nm
With UG11-UV filter	250 - 370 nm	---	---
With B3-IR-Filter	1250 - 1350 nm	---	---
Pixel count	4.2 MPixels	4.2 MPixels	4.2 MPixels
H x V	2048 x 2048	2048 x 2048	2048 x 2048
Sensor size	11.3 x 11.3 mm	11.3 x 11.3 mm	20.5 x 20.5 mm
Frame rate (full frame)	6.2 fps	6.2 fps	6.2 fps

BEAM QUALITY MEASUREMENT

The performance of a laser in practical applications is critical in the design of optical systems and focusing applications, and it can be quantified by measuring M2, the laser beam quality factor, which indicates how close a laser is to being an ideal Gaussian beam.

The Beamage-M2 acquires a sequence of beam profile measurements to automatically perform beam quality measurements within a few seconds. It is equipped with the largest optics on the market for easy alignment and fast measurements that you can trust. Its software is both intuitive and ISO compliant.

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ACCESSORIES
Specifications

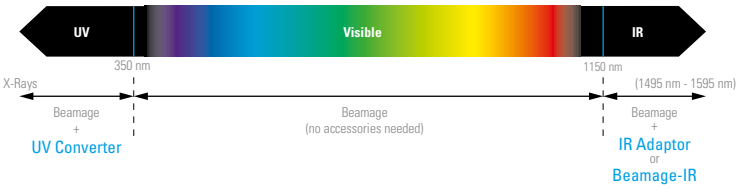
IF YOUR **LASER SPECIFICATIONS EXCEED THE LIMITS** IN TERMS OF

- **WAVELENGTH**
- **BEAM SIZE**
- **LASER POWER**

YOU CAN MANAGE THEM WITH THE ACCESSORIES PRESENTED BELOW

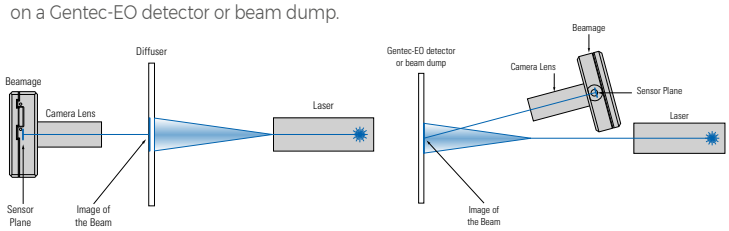
MANAGE THE WAVELENGTH

Since CMOS sensors are not sensitive to every frequency of the electromagnetic spectrum, we offer several wavelength management solutions to enhance the capabilities of the Beamage beam profiling cameras.



MANAGE THE BEAM SIZE

A simple solution is offered to those who need to profile beams that are larger than the CMOS sensor (> 11.3 mm x 11.3 mm). This solution is a beam reducing optical component called camera lens. It works either by indirectly imaging the transmission of the beam after it has passed through a diffusing element or by directly imaging the beam that is incident on a Gentec-EO detector or beam dump.



MANAGE THE LASER POWER

CMOS sensors have low saturation levels as well as low damage thresholds. It is thus very important that you control your laser power to get the best measurement possible and avoid damaging the Beamage camera.

- For laser power under 1 W, you can attenuate the beam with ND filters
- For laser power up to 1000 W, you can sample a small fraction of the beam with a BA optical sampler

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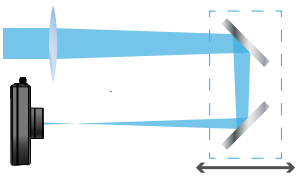
BEAMAGE-M2

Automated M^2 measurement system

AUTOMATED MEASUREMENTS



Inside the BEAMAGE-M2, a computer-controlled motorized rail allows precise positioning of two mirrors, which in turn allow a 400 mm beam path difference. At each position of the translation stage, a beam profile is acquired and the beam diameter is measured. The automation of the translation stage allowed by the software is the key to a fast measurement.

KEY FEATURES

- **LARGE APERTURES**
  The only M^2 system on the market equipped with a complete set of 50mm (2") optics. Also, the sensor is 11.3 x 11.3mm
- **SIMPLE ALIGNMENT**
  Two beam-steering mirrors are included for quick and easy alignment of your laser into the system.
- **COMPACT**
  The low-profile ingenious mechanics make it easy to fit the device on any optical table
- **ISO COMPLIANT**
  The calculations are fully compliant to the ISO 11146 and 13694 standards
- **FAST ACQUISITION**
  Make a complete, ISO-compliant measurement in only 20 seconds with the ROI feature and in less than a minute with full-frame acquisition
- **FLEXIBLE & INTUITIVE SOFTWARE**

PRACTICAL ALIGNMENT TOOL

Each BEAMAGE-M2 system includes an alignment tube that helps you set up the system faster. Simply use the two alignment mirrors to center your laser beam onto both irises, and you will be ready to start measuring in no time!

The fluorescent material around the pinholes also helps to align beams that are in the NIR range without having to use an IR viewer.

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BEAMAGE-M2

Specifications

	BEAMAGE-M2
SENSOR TECHNOLOGY	Beamage-4M included
EFFECTIVE APERTURE	Ø 48 mm optics - 11.3 x 11.3 mm sensor
MEASUREMENT CAPABILITY	
System wavelength range	350 - 1100 nm
Attenuation range	3 Flip-mount attenuators for 8 levels of attenuation: no attenuation, ND0.5, ND1, ND2, ND1.5, ND2.5, ND3, ND3.5
Beam diameter range [a]	55 µm to 11.3/3 mm
Translation stage	
Mechanical travel range	200 mm
Effective optical path range	400 mm
Lens focal length	5 AR-coated lenses included: 200 mm, 250 mm, 300 mm, 400 mm and 500 mm
Typical M^2 accuracy [b]	± 5%
Typical M^2 repeatability [b]	± 2%
Applicable light sources	CW and quasi-CW
Typical measurement time	45 s with full-frame acquisition
DAMAGE THRESHOLDS [c]	
Maximum average power	1 W with ND filter
Maximum density (1064 nm)	CW: 10 W/cm² ; Pulsed: 0.1 J/cm²
PHYSICAL CHARACTERISTICS	
Dimensions	
Main enclosure	357 mm (L) x 165 mm (W) x 135 mm (H)
Total (including external mirrors)	602 mm (L) x 193 mm (W) x 172 mm (H)
Optical axis height	86 mm
Weight	6.6 kg
Power supply	48 VDC, 1.25A out
SOFTWARE	
Displays	2D, 3D, XY, Beam Tracking and M^2
Beam diameter definitions	$D4\sigma$ $1/e^2$ along crosshairs (13.5%) FWHM along crosshairs (50%) Custom (%)
Beam quality definitions	Laser beam quality M^2: M^2_x, M^2_y (ISO compliant) Beam Propagation Factor: BPP_x, BPP_y Width at waist: W_x, W_y Waist location and offset: Z_x, Z_y, ΔZ Divergence angle: θ_x, θ_y Rayleigh length: Z_{Rx}, Z_{Ry} Astigmatism
Printing and reports	Full report in print-ready format
ORDERING INFORMATION	
Product page	

Specifications in the table above are for the use with a Beamage-4M beam profiler (included in the Beamage-M2 kit)

a. At the Beamage sensor
b. Depending on the beam quality and optical configuration
c. With ND4 filter at the Beamage

PRODUCT GUIDE 2023

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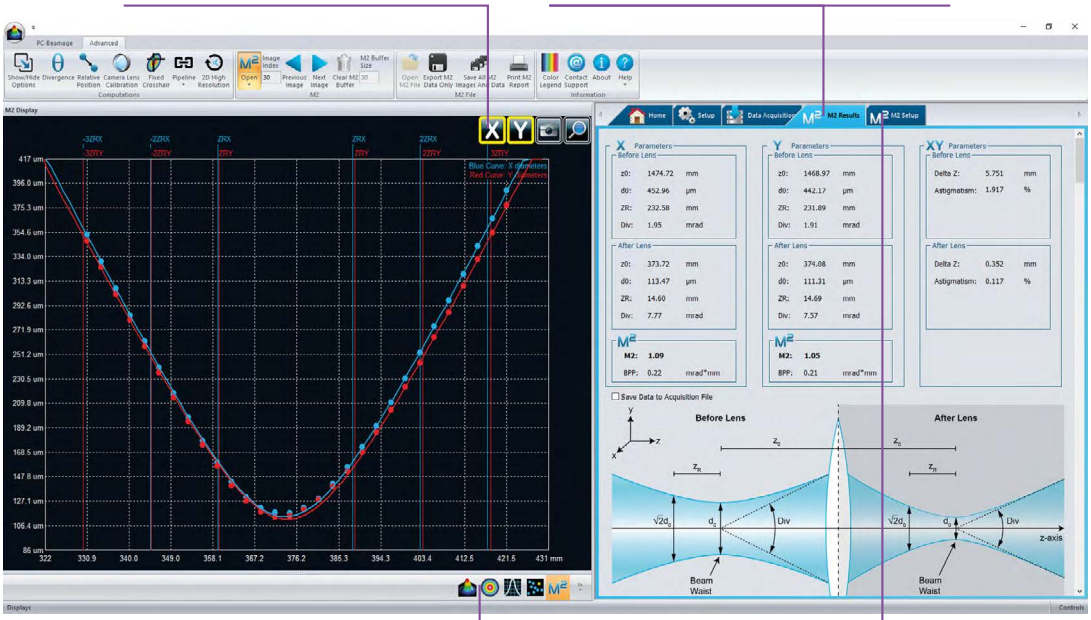
BEAMAGE-M2

Software features

Select which set of Rayleigh range boundaries to display on the graph: X, Y or both

M2 Results tab:
View and understand all the measured parameters quickly, for both the initial laser beam and the beam inside the BEAMAGE-M2 system



Switch to 3D or 2D displays to see each of the measured profiles

M2 Setup tab:
Control your acquisition parameters

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BEAMAGE-M2

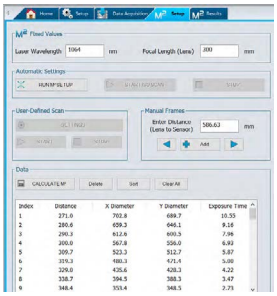
Software features

ISO COMPLIANCE MADE SIMPLE

With the "RUN M2 SETUP" button, the software automatically defines new parameters for a more precise M^2 measurement. The "ISO SCAN" data set complies with the ISO-11146 M^2 measurement standard, being spread between $-3Z_R$ and $+3Z_R$.

The automatic settings are updated after each calculation, considering the values of Z_0 and Z_R from the latest measurement.

By default, the results graph always shows the calculated positions of the first three Rayleigh distances on each side of the waist.



FULL CONTROL ON YOUR DATA

During an M^2 scan, each of the measured profiles is saved and the flexible software gives you complete control on your acquired data.

- View each acquired profile in 2D display or 3D display.
- Add measurement points to a data set at the position of your choice with the "ADD" button.
- Remove unwanted profiles from your data set & recalculate the measurements.

FAST ATTENUATION

Add or remove attenuation with the flick of a finger. The software adjusts the exposure time at each frame during an acquisition, and advises the user on the required attenuation.

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