

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

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.



ACCESSORIES

Specifications



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

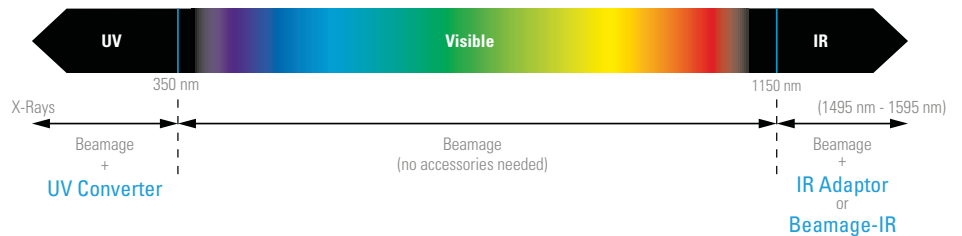
- > **WAVELENGTH**
- > **BEAM SIZE**
- > **LASER POWER**

YOU CAN MANAGE THEM WITH THE ACCESSORIES PRESENTED BELOW

MANAGE THE WAVELENGTH



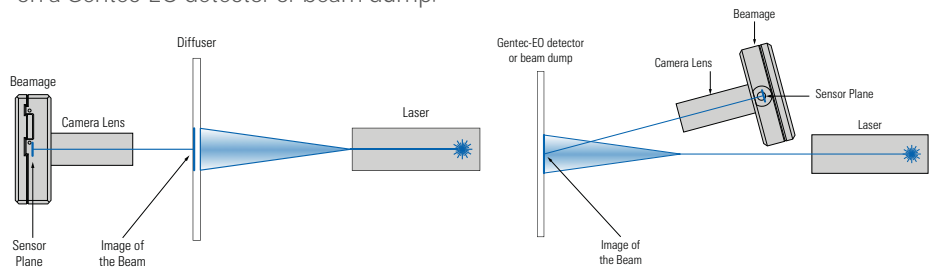
Since CMOS sensors are not sensitive to every frequency of the electromagnetic spectrum, we offer several wavelength management solutions to enhance the capabilities of the Beamage beam profiling cameras.



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

BEAMAGE

CMOS beam profiling cameras



KEY FEATURES

- > **USB 3.0 FOR THE FASTEST TRANSFER RATES**
Up to 10X faster than regular USB 2.0 connections
- > **HIGH RESOLUTION**
4.2 Mpixels resolution gives accurate profile measurements of very small beams
- > **LARGE APERTURES**
 - 11.3 x 11.3 mm for the Beamage-4M
 - 20.5 x 20.5 mm for the Beamage-4M-FOCUS
- > **AVAILABLE WITH IR COATING**
Beamage 4M-IR cameras have a special phosphor coating for IR wavelengths (1495-1595 nm)
- > **ISO COMPLIANT**
D4 definition of diameter, centroid, ellipticity and orientation are ISO 11146:2004 and 11146:2005 compliant
- > **EXTERNAL TRIGGER**
To synchronize the camera with a pulsed laser

INTUITIVE SOFTWARE INTERFACE

Easy to navigate interface, with many displays and control features:

- 2D, 3D and XY Displays
- Background Subtraction Function
- Unique "Animate" Function
- Gaussian Fit
- Semi-Log Graph

ACCESSORIES



Stand with delrin post



BA series optical attenuators



Stackable ND filters (0.5, 1.0, 2.0, 3.0, 4.0 & 5.0)



UV and IR filters



Pelican carrying case



Fiber adaptors & connectors (FC, ST and SMA)



UV converters & IR adaptors



USB-A to USB-C adaptor

BEAMAGE

Specifications



	BEAMAGE-4M	BEAMAGE-4M-IR	BEAMAGE-4M-FOCUS
SENSOR TECHNOLOGY	CMOS	CMOS (with phosphor coating)	CMOS (with fiber optic taper)
EFFECTIVE APERTURE	11.3 x 11.3 mm	11.3 x 11.3 mm	20.5 X 20.5 mm ^a

MEASUREMENT CAPABILITY

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
Minimum measurable beam	55 μm	70 μm	120 μm
RMS noise	1000:1 (60 dB)	1000:1 (60 dB)	1000:1 (60 dB)

DAMAGE THRESHOLDS

Maximum average power	1 W with ND filter	1 W with ND filter	1 W with ND filter
Maximum density (1064 nm)	10 W/cm ² 0.1 J/cm ²	10 W/cm ² 0.1 J/cm ²	10 W/cm ² 0.1 J/cm ²

SOFTWARE

Displays	2D, 3D, XY and Beam Tracking
Display Features	2D: Print Screen, Reset View, Show/Hide Beam Diameter 3D: Print Screen, Reset View, Top View XY: Save Data, Zoom, Gaussian Fit, Semi-Log, Show/Hide Cursor, Show/Hide FWHM, Show/Hide 1/e ² Beam Tracking: Save Data, Print Screen, Reset View, Zoom
Beam Diameter Definitions	D4σ (ISO compliant), 1/e ² along crosshairs (13.5%) FWHM along crosshairs (50%) Custom (%)
Buffer Controls	Open File, Save Current Data, Save All Data, Previous/Next Image, Clear Buffer, Animate
Printing and Reports	Full Report in Print Ready Format (2D, 3D, XY, Measures, Parameters) Print Screen in BMP format (2D and 3D)

PHYSICAL CHARACTERISTICS

Sensor size	11.3 x 11.3 mm	11.3 x 11.3 mm	11.3 x 11.3 mm
Sensor area	1.28 cm ²	1.28 cm ²	1.28 cm ²
Effective aperture	Same as sensor	Same as sensor	20.5 x 20.5 mm
Dimensions (not including filter)	61H x 81.1W x 19.7D mm	61H x 81.1W x 19.7D mm	61H x 81.1W x 46.5D mm
Weight (head only)	138 g	138 g	235 g

ORDERING INFORMATION

Compatible stand	STAND-D-233	STAND-D-233	STAND-D-233
Product page			

a. With a typical pixel multiplication factor (PMF) of 1.8.

BEAMAGE

Software features

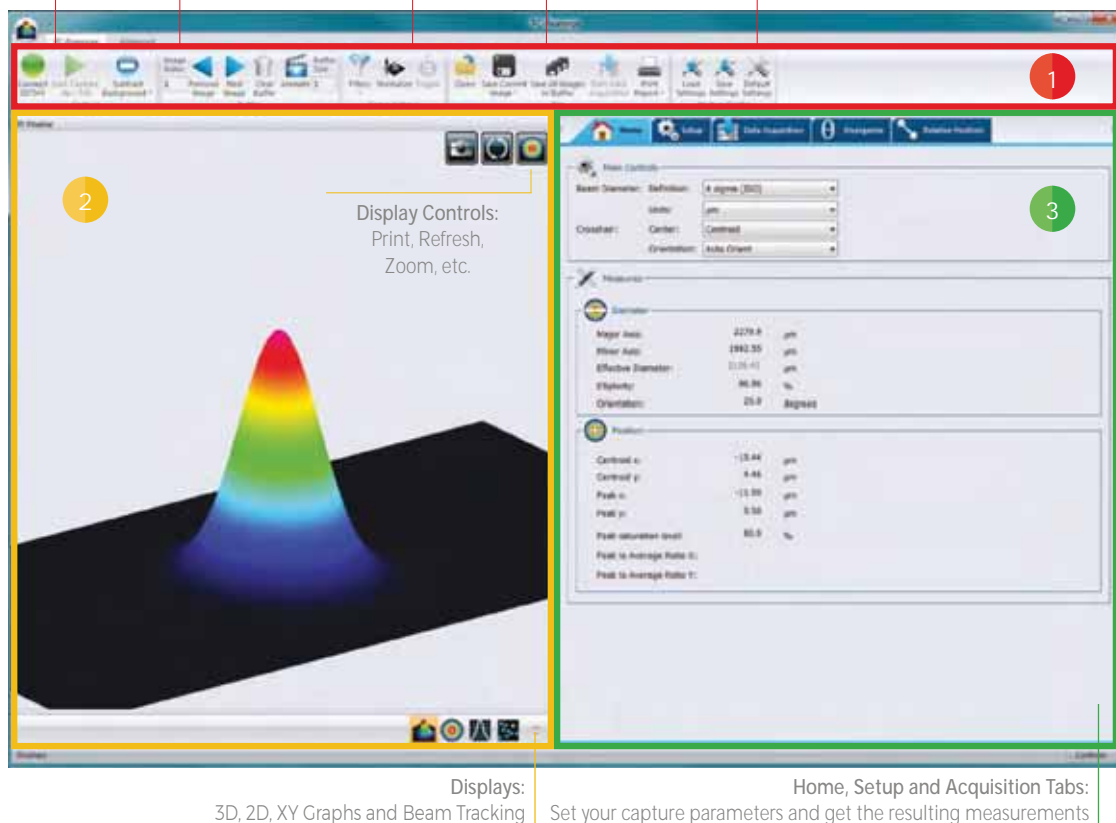
Capture Controls:
Start/Stop,
Subtract Background

Buffer Controls:
View Data Offline

Data:
Computation

File Controls:
Save and Open Data

Startup Configuration:
Save and Load Settings



1

MAIN CONTROLS

The upper part of the software includes all the main controls in a ribbon format. These controls are grouped by family: Capture Controls, File Controls, Buffer Controls, M2 Controls and Data Computations. The last includes very useful filters and a normalization function.

2

DISPLAYS

The left-hand side of the software is the display panel. Four displays are available: 3D, 2D, XY (cross-sectional graphs along the crosshairs) and Beam Tracking. The desired display is selected by clicking on the corresponding icon at the bottom of the panel. Print screen controls are available for the 3D, 2D and Beam Tracking displays. They allow the user to save an image of the current view in BMP format.

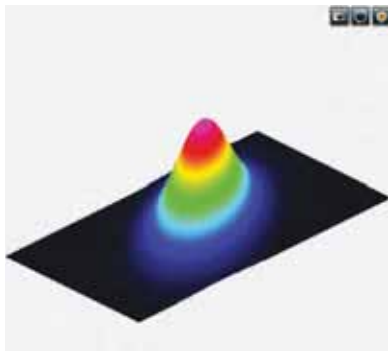
3

HOME AND SETUP TABS

The right-hand side of the software contains the Home, Setup and Data Acquisition tabs. The Home tab allows the user to select the main controls for his measurements (Beam Diameter Definition, Crosshair Center and Orientation) and displays the resulting measurements below. The Setup tab allows the user to set the measurement parameters (Exposure Time, Image Orientation and Averaging, Active Area, etc.) and the Data Acquisition tab allows the user to save measurements with or without full images, to enter the Sampling Rates and a Total Duration for the Acquisition. More tabs with advanced controls are available when clicking on the Show/Hide Options button in the Computations panel.

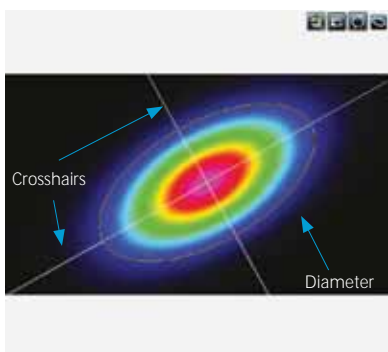
BEAMAGE

Software features



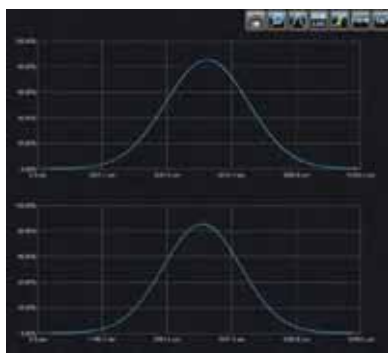
3D DISPLAY

The 3D display shows the actual shape of the beam. It is possible to easily zoom, pan and rotate the image. The Reset button puts the data back in its original configuration. This display also features a Print Screen button to save the latest image in BMP format.



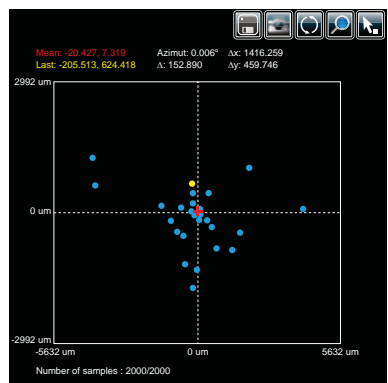
2D DISPLAY

The 2D display features the crosshairs (set to the major and minor axis or along a specific angle) and the measured diameters of the beam. These diameters vary with the chosen definition (4-sigma, FWHM, 1/e², etc.) and the display can be turned ON or OFF. The Print Screen button allows to save a picture of the current screen in BMP format.



XY DISPLAY

The XY display plots cross-sectional graphs of the beam along the crosshairs. This display features many useful tools like zoom, cursor, and FWHM and 1/e² level bars. It is also possible to display the graphs in semi-log format to enhance the details in the low intensity parts of the beam.



BEAM TRACKING DISPLAY

The Beam Tracking Display allows the user to visualize the variation of the beam's centroid position on the sensor. This display shows the latest calculated position as well as the previous ones, until the user resets the view. The display also shows the mean position of all computed values and gives information regarding position stability for both X and Y axes. This tool is great to monitor the beam pointing stability over time.

