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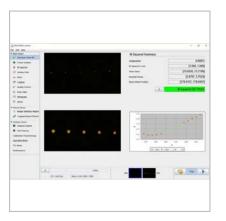
Beam Waist Analyzer Camera BWA-CAM 20/20™

The Beam Waist Analyzer Camera BWA-CAM 20/20 laser beam analyzer system and software enables "real-time" laser beam measurement, analysis and monitoring of high power CW and pulsed lasers. The system complies with the international standards ISO 11146-1 (2005) and ISO 13694 which relate to lasers and laser related equipment and laser beam spatial metrics.

The BWA-CAM 20/20 (patent pending) is the world's first, easy to use, ISO compliant, real-time M^2 measurement system. Measuring the M^2 of a laser with this system is as easy as measuring power from a laser. The user simply centers the system to the laser beam; make it more or less perpendicular to the beam; enter a few basic values: laser wavelength, effective focal length of the lens being used and the distance from the lens to the front of the BWA-CAM 20/20 and the measurement is ready. The same sort of steps taken to measure laser power. No further alignment or adjustments needed. The measurement is made in a fraction of a second for a single pulse if it is a pulsed laser.

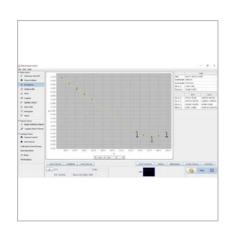
In every laser application, the laser beam profile provides valuable information for the most efficient use of the laser. By monitoring the laser beams spatial profile, circularity, centroid, astigmatism and M^2 values, you have early warning of any problems with the laser and entire beam delivery optical system. This relates to increased quality, process reliability, and reduced scrap.





The Laser Beam Analyzer system is modular in design and can be configured for most applications and laser wavelengths. The design contains no "moving components" and provides instantaneous measurements and analysis of the laser beam and all active optical elements.

The smallest spot is located about midway in the series of spots (see image to the right). Once the multiple spots, each one a spatial crossection along the beam waist, are nearly horizontal, the software automatically tracks and sizes the ROIs for accurate ${\sf M}^2$ measurement.



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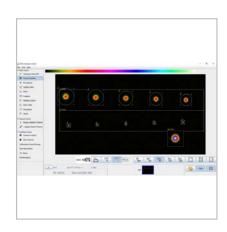
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The Beam Waist Analyzer Camera (BWA-CAM) can measure the laser beam waist metrics for any focal length of >100 mm or more without a focus adapter. Lens systems with focal lengths <100 mm will require an optional focal length adapter which mounts into the entrance port of the BWA-CAM or optionally use the short body BWA-CAM.



Beam Waist Analyzer Camera (BWA-CAM 20/20) Features

M² measurement	real time with no moving optics or hardware
Rayleigh range	<200 microns to >48mm
First and third rayleigh range on one	sensor with a patent pending intensity filter
Auto tracking of ROI's	software auto sizes and tracks all ROI's
QC measurement	all beam quality metrics monitored and flagged for external interlocking control
Extended report generations	ISO report generator of all beam quality metrics
Extended logging capabilities	all beam quality metrics
Attenuation	6 to >10 OD attenuation built-in
Optional high power attenuator	for power levels to 30 kilowatts
Alignment	easy setup, alignment and calibration
Focal lengths	≥30 mm (with short body camera option)





Beam Waist Analyzer Camera (BWA-CAM 20/20) Specifications

Sensor	CMOS Chip, 2/3" (2MP), 1" (4MP), 1" (~9MP)
Resolution	2048 x 1088; 2048 x 2048 and 4112 x 2176 monochrome
Pixel size	5.5 µm x 5.5 µm (2 and 4MP) and 3.45 µm x 3.45 µm (~9MP)
Active sensor area	11.26 mm x 5.98 mm; 11.26 mm x 11.26 mm and 14.18 mm x 7.5mm
Scanning system	global shutter
Sensor SNR	< 2.5 bit (Gain 0 dB)
Gray level	8 bit (12 bit for 9MP sensor)
Frame rate	< 50 fps
Trigger	Auto or external (using POE or Hirose connector)
Power consumption	< 3.6 W and < 4.5 W for ~ 9MP sensor
Connection	GigE Power Over Ethernet (POE)
Camera housing dimensions (I x w x h)	106.3 x 76.2 x 69.9 mm ³
Camera housing weight	476 g
Temperature range	-5 to 65 °C
Relative humidity (non-condensing)	5% to 95%
Wavelength range	190 to 1100 nm
Built-In attenuation	4.0 to >10.0 OD

CE certified