TECHNICAL NOTE

CHOOSING YOUR BEAMAGE-M2 SYSTEM

When ordering a Beamage-M2, it is important to take into account the specifications of the laser in order to ensure optimal performance and to prevent any damage to the camera's sensor. Here is a list of all the relevant parameters that need be considered when choosing the appropriate model for your application.

SPECIFICATIONS TO CONSIDER BEFORE ORDERING

1. WAVELENGTH

Since the measurements are made using a Fabry-Perot Interferometer, working with various wavelengths requires having different coatings on the Fabry-Perot etalon pair. Therefore, we offer multiple versions of the Beamage-M2 to cover the following wavelength ranges:

MODEL	WAVELENGTH RANGE
Beamage-M2-325/425	325-425 nm
Beamage-M2-400/750	400-750 nm
Beamage-M2-700/1100	700-1100 nm
Beamage-M2-355.532.1064	355, 532 and 1064 nm

Note that M^2 measurements outside the 325 - 1100 nm range are not currently possible with the Beamage-M2.

2. FOCUSING LENS

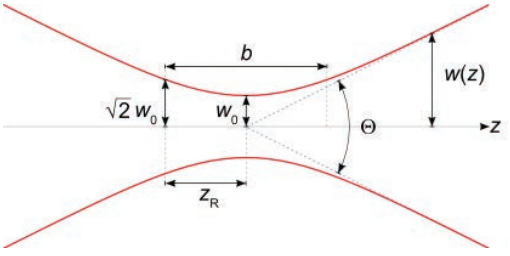
A convergent focusing lens must be used with our Beamage-M2 when measuring the beam quality of your laser. If you already have a lens in your laser system, then we'll need to know its focal length. For reasons that will be explained later, it will need to be greater than 100 mm.

3. BEAM WAIST AND RAYLEIGH RANGE

The divergence of a laser beam is defined as the increase in radius along the direction of propagation from an optical aperture. The minimum radius of a laser beam (ω_0) is located at the beam waist. It is therefore not possible to focus a beam to a diameter smaller than its waist.

The Rayleigh Range (Z_R) is defined as the distance from the beam waist to the point where the area of the beam is doubled. It is thus a good indicator of the focus depth of a laser beam, since it calculates the propagation distance for which the beam will stay collimated.

We will use both of these values to determine if the Beamage-M2 system is appropriate for your application.



TECHNICAL NOTE

4. BEAM SIZE AND TYPE

The beam size is important in order to select the appropriate focusing lens and also because it will determine the amount of power reaching the CMOS sensor. For very small beams, further attenuation may be necessary to avoid exceeding the saturation level of the camera (about 10 W/cm^2). For larger beams, you may have to adjust your focal length.

Another thing to consider is the "beam type" or, specifically, how close it comes to an ideal Gaussian distribution. The nearer it comes to a Gaussian beam, the more easily it is focused and measured.

5. LASER POWER OR ENERGY

When attempting to measure M^2 for pulsed lasers, it is important to consider the pulse width and the repetition rate. Pulse width and energy will determine the peak power. If the peak power is too high, you could damage the CMOS sensor. The repetition rate and energy will determine the average power that the sensor receives, which needs to stay below the sensor's saturation level of 10 W/cm^2 (at 1064 nm). For CW lasers, we will simply need to know the output power to verify against the saturation level of the sensor.

6. SPACE REQUIREMENTS

To be able to measure the propagation parameters of your laser beam with Beamage-M2, the laser output must be focused on the CMOS Sensor. Since our Beamage-M2 module is about 100 mm long, measurements are possible for optical setups that include a lens whose focal length is 100 mm or greater.

Your total optical setup will be on the order of 100 mm (±10 mm) plus the focal length of the lens you use (see our M^2 setup photo on the first page).

IN RESUME

Before contacting us to place an order or ask for help to select your Beamage-M2 system, you will need to compile the following parameters specific to your application:

1. Wavelength(s)
2. Focusing Lens of your laser system (if any)
3. Beam Waist (including position) and Rayleigh Range of your laser
4. Beam Size and Type (how close your beam is to a Gaussian)
5. Laser Power or Energy:
   a. For Pulsed lasers: Pulse Width, Repetition Rate and Pulse Energy
   b. For CW lasers: Power
6. Space Requirements

Contact your Gentec-EO representative with these specifications and we will be happy to find you the best solution for your application.
For more information, you can also read the Beamage-M2 user manual available on our website.