### **TECHNOTES**

### **RAYLEIGH RANGE**

#### DETERMINATION OF THE RAYLEIGH RANGE

Beam path of focused beam.



For a Gaussian beam the depth of focus is defined by the Rayleigh range  $2 \cdot z_R$  in which the beam waist diameter  $\emptyset_{spot}$  does not increase more than a factor of 1.41.

$$2z_R = rac{2\cdot\pi\cdot \emptyset_{spot}^2}{4\lambda}$$

 $\lambda$  = wavelength in  $\mu$ m

 $Ø_{\text{spot}}$  = beam waist diameter in  $\mu$ m

#### **EXAMPLE**

Spot size:  $Ø_{spot} = 7.1 \ \mu m$ Wavelength:  $\lambda = 780 \ nm$ Rayleigh range:  $2z_R=20.3 \ \mu m$ 



## **TECHNOTES**

This is a printout of the page <u>https://sukhamburg.com/support/technotes/fiberoptics/coupling/focusingsm/rayleigh.html</u> from 6/10/2025

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