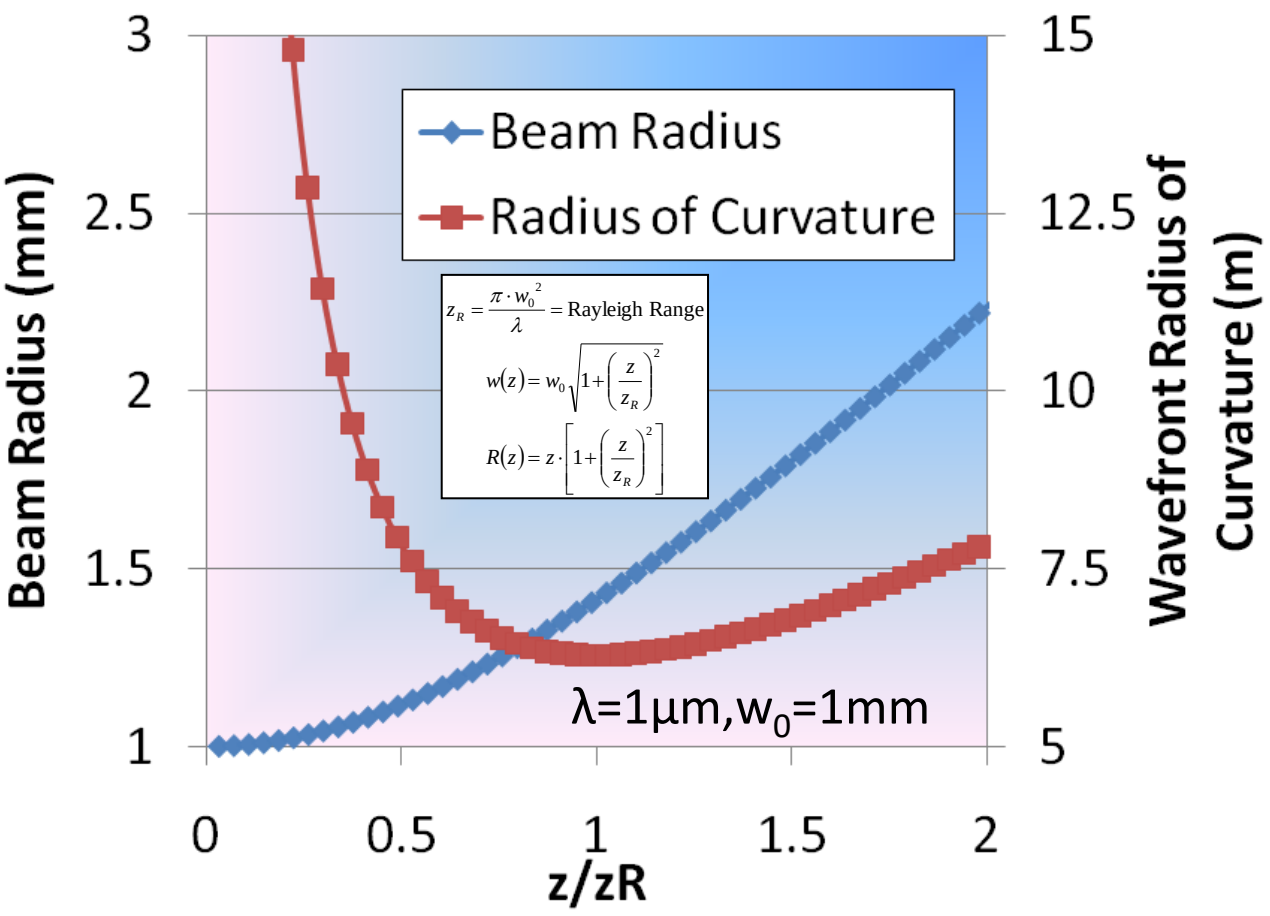
Lasers

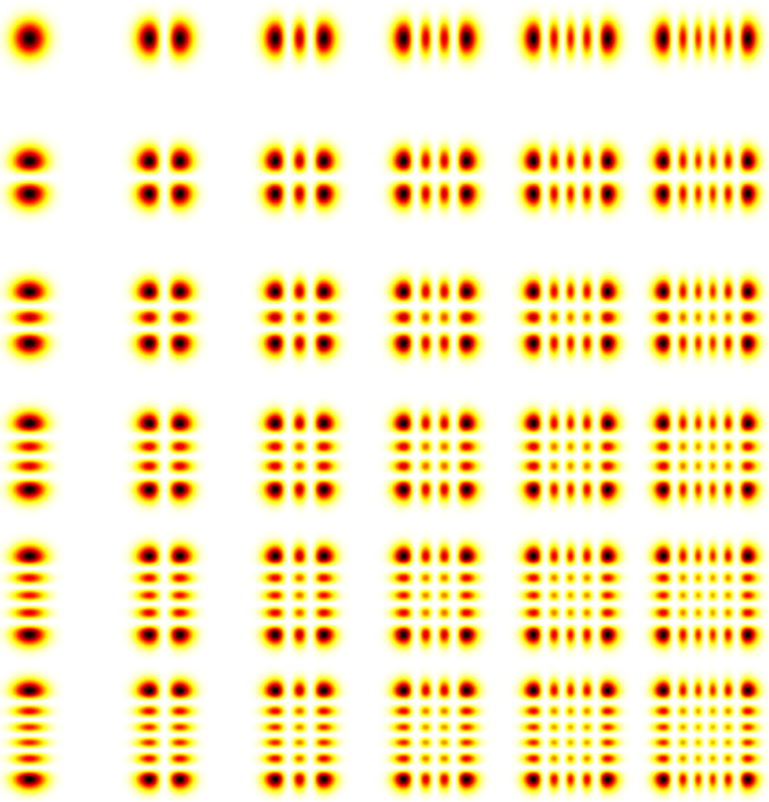
Gaussian Beam Parameters

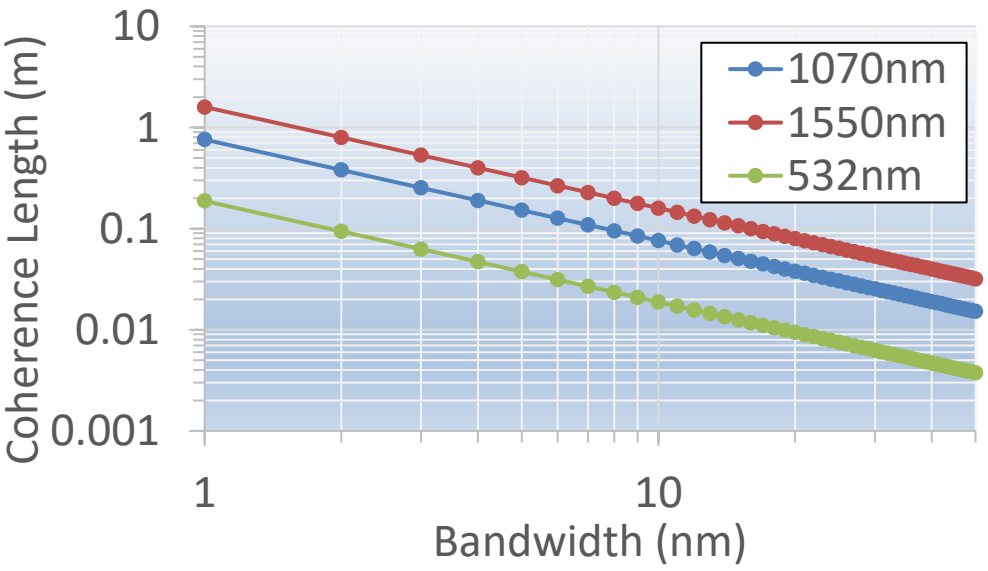


Common Laser Wavelengths

Wavelength (nm)	Gain Medium
1319, 1064	Nd:YAG
1047	Nd:YLF
1030	Yb:Glass
633	HeNe
532	Doubled Nd:YAG
10,600	CO_2
1550	Er:Glass

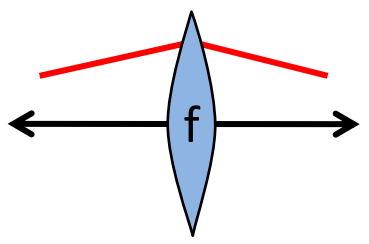
Hermite-Gaussian Laser Modes





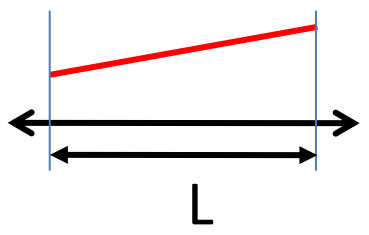
Common ABCD Ray Matrices

$$\begin{bmatrix} 1 & 0 \\ -1/f & 1 \end{bmatrix}$$



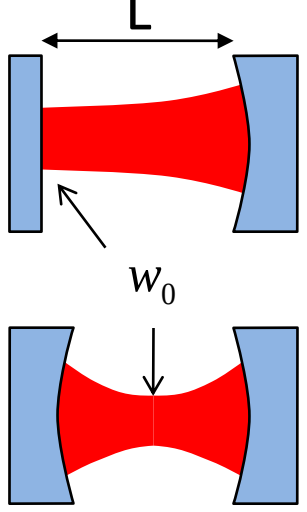
$$\frac{1}{q} = \frac{1}{R} - j\frac{\lambda}{\pi w^2}$$

$$\begin{bmatrix} 1 & nL \\ 0 & 1 \end{bmatrix}$$



$$q' = \frac{Aq+B}{Cq+D}$$

Stable Resonator TEM_{00} Mode Size



$$w_0 = \sqrt{\sqrt{L(R_1 - L)}\frac{\lambda}{\pi}}$$

$$w_0 = \sqrt{\sqrt{\frac{L}{2}\left(R_1 - \frac{L}{2}\right)}\frac{\lambda}{\pi}}$$