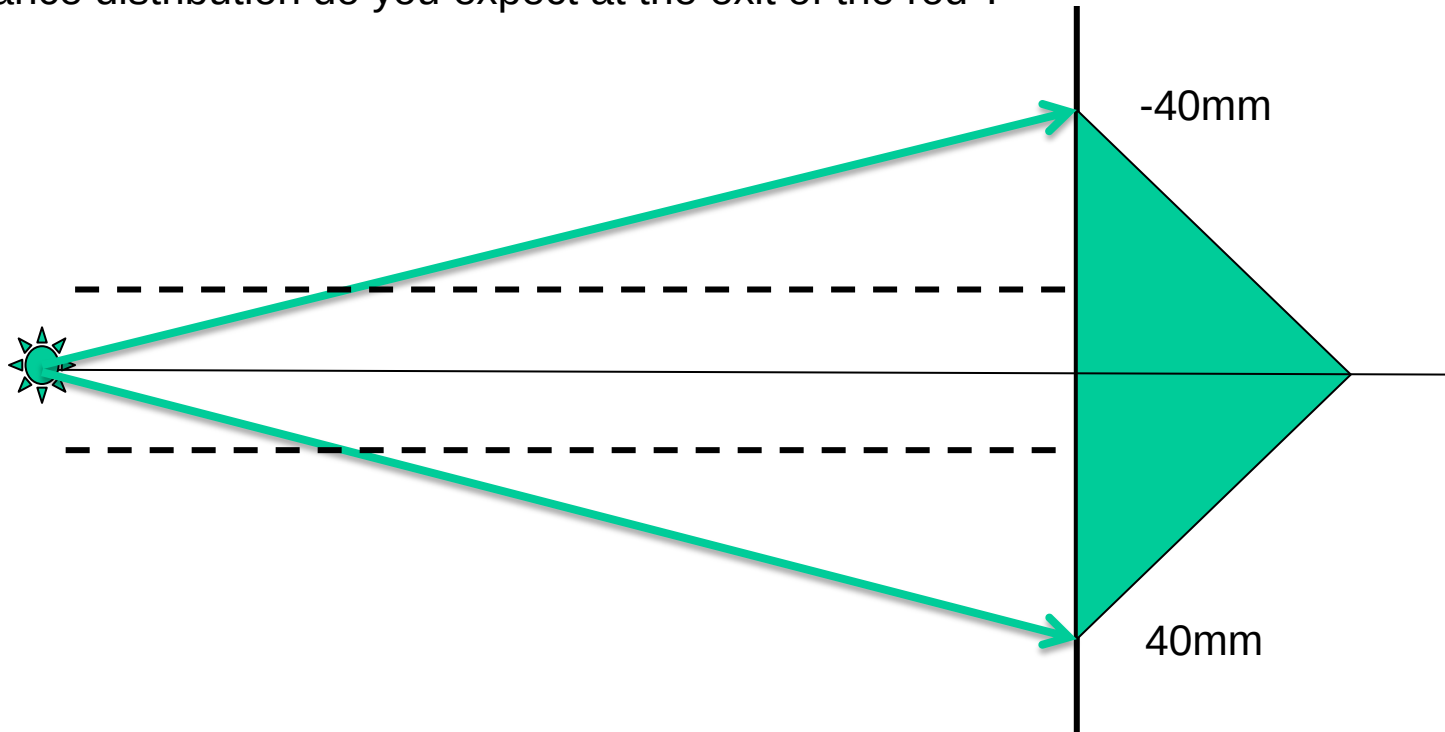


Exercise #15: Rod homogenizer



You have designed a homogenizer rod of 10mm width and 100mm length. The light distribution at a distance of 100mm without the rod is illustrated below. What irradiance distribution do you expect at the exit of the rod ?



Exercise #16: Single stage array homogenizer



Consider an input light field of 20mm x 20mm with intensity variation of 20%. Layout a single stage optical array (p, f), which shall be used in combination with an integrator lens of F=100mm, such that a quadratic illumination of 10mm x 10mm is achieved with a uniformity of about 1%.

Hint: Try to figure out the number of channels, and the channel width p

$$w = \frac{F}{f} \cdot p$$

Exercise #17: Double stage array homogenizer



Consider a **single** optical array homogenizer with the following parameters:

Array-pitch: $p=1\text{mm}$
foc. length f microlenses $f=5\text{mm}$
foc. length F integrator lens $F=100\text{mm}$

$$w = \frac{F}{f} \cdot p$$

- 1.) Calculate the size of the illuminated field
- 2.) How much will this field shift for an input beam tilt of $\theta=50\text{mrad}$
- 3.) Now consider a **double array homogenizer**
 - What is maximum tilt or divergence which is accepted by the system ?
 - What will happen for larger angles ?
 - How can you increase the acceptance angle ?