



Description of the optical arrangement for the "top-hat" beam shaper TH-004

The optical scheme for TH-004 should use collimated gaussian incident beam, as presented on the Fig. 1. Diameter of the beam on the lens should be $D_{inc} = 12.0$ mm at the level of about $1/e^2 = 0.14$ of intensity normalized to maximum intensity (not total power), wavelengths $10.6 \mu\text{m}$.

Output spot in the form of top-hat circle with diameter about $D_{out} = 0.4$ mm should appear at the distance $L = 63.5$ mm from the planar surface of the plano-convex lens. The intensity distribution at distances $< L$ should feature intensity decrease at edges of spot (a bit similar to gaussian), the intensity distribution at distances $> L$ should feature intensity increase at the edges of the output spot ("overcorrected").

In the case that the incident laser beam is not perfectly collimated or has diameter a little bit different from 12.0 mm, the best top-hat might appear at a bit different distance along optical axis.

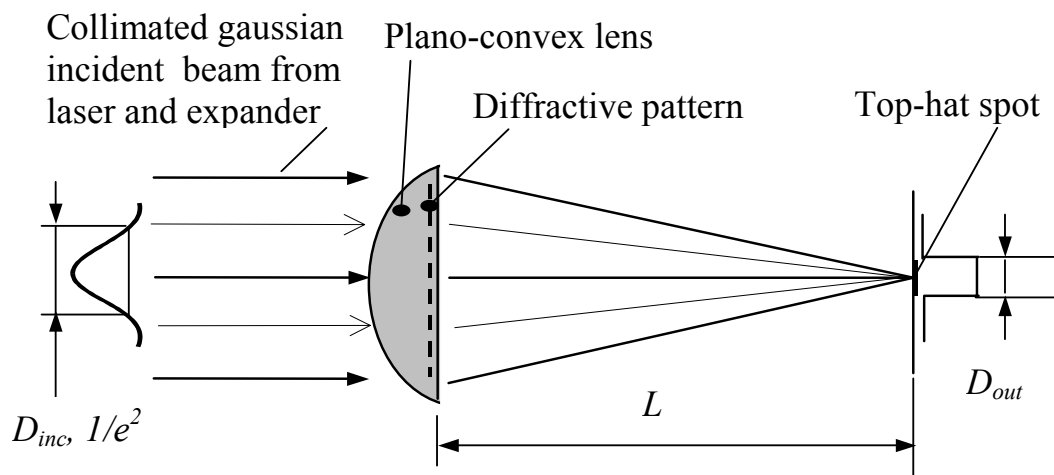
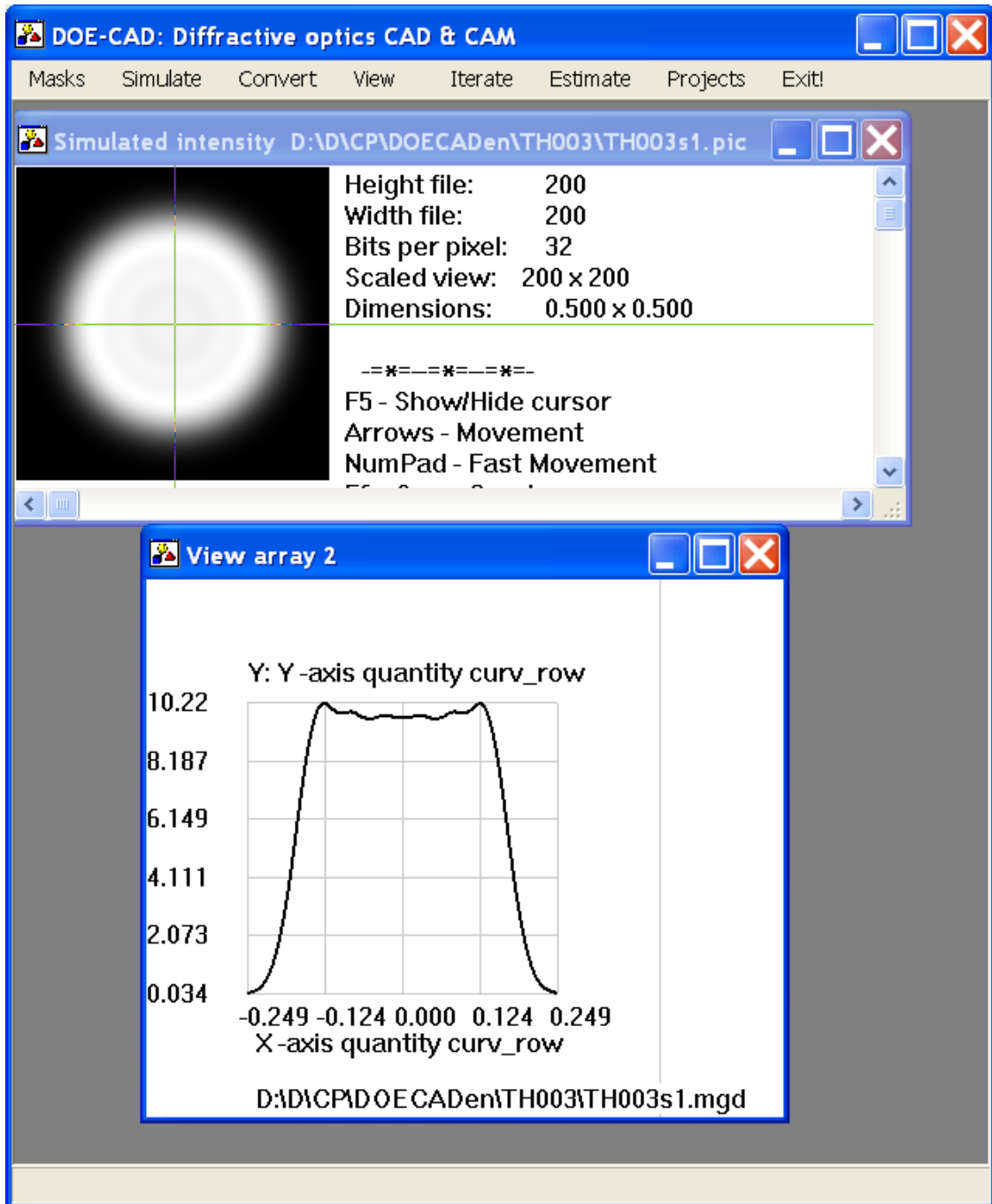


Fig. 1. Optical arrangement for TH-004

$$D_{inc} = 12.0 \text{ mm}$$

$$L = 63.5 \text{ mm}$$

$$D_{out} = 0.4 \text{ mm}$$



$\lambda=10.6 \mu m$

$L=63.5 mm$

Lens ZnSe: $R=90.754$, $CT=3.251$

Output spot diameter :

0.35 mm FWHM , eff 86%

0.40 mm $1/e^2$, eff 96%