

Funded by
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OPTIMAL workshop

Free form VR lens array To Boost Display Brightness

PRESENTED BY ARTHUR RABNER, HYPERVISION LTD

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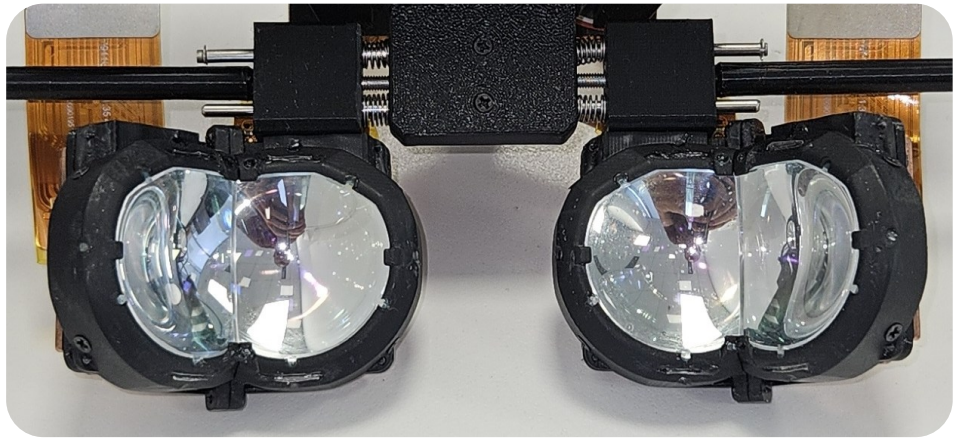
Hypervision – Visual Engines for VR/MR

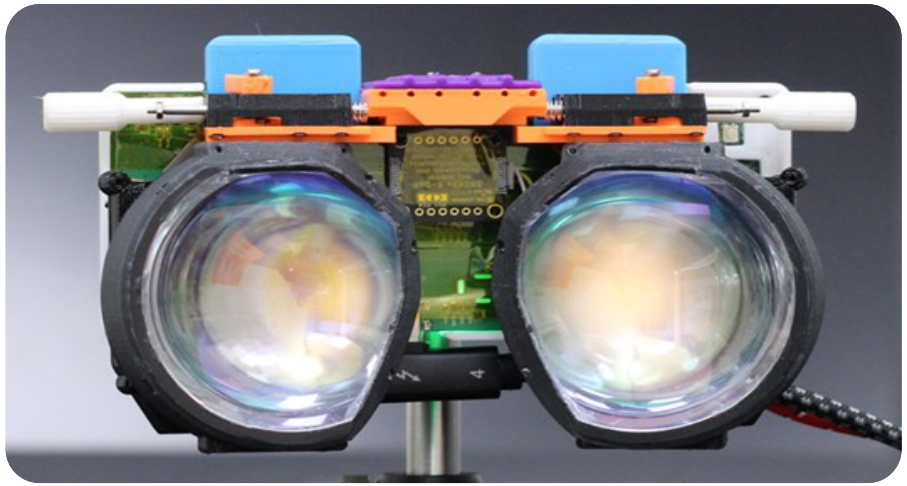
Who We Are:

Hypervision LTD is a deep-tech startup dedicated to overcoming human vision challenges in Virtual Reality (VR) and Mixed Reality (MR). We specialize in developing high-end Visual Engines that enhance productivity and enjoyment in VR/MR environments.



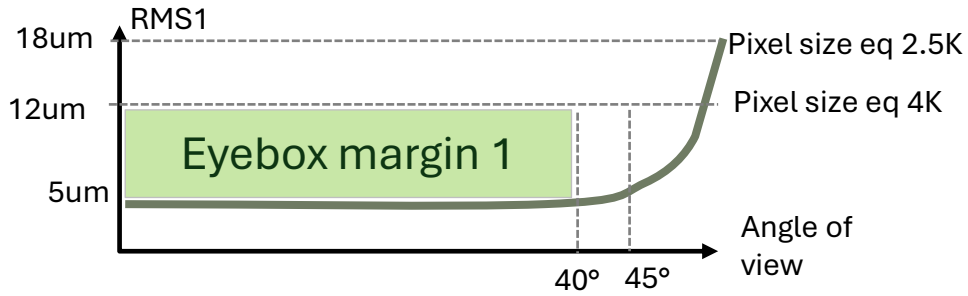
What We Do:

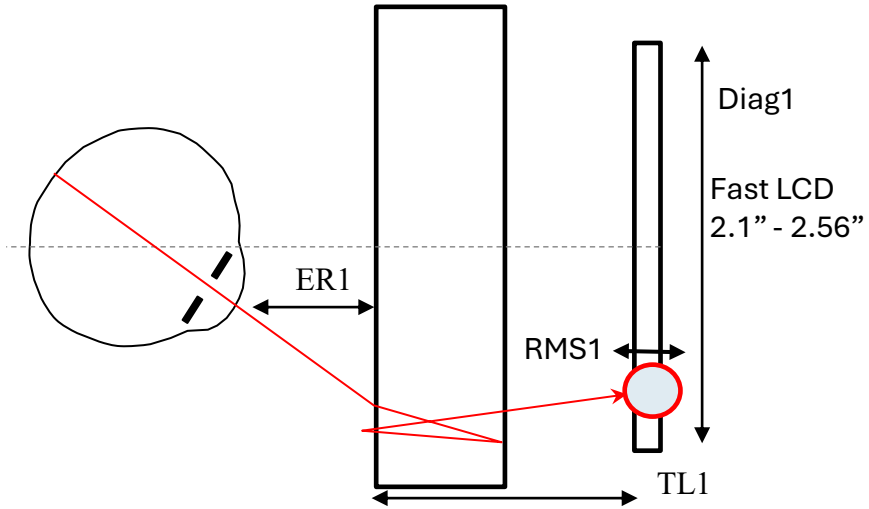
- Advanced Visual Engines design & manufacturing - already adopted by several VR/MR Companies
- R&D to Resolve fundamental challenges of VR/MR Industry



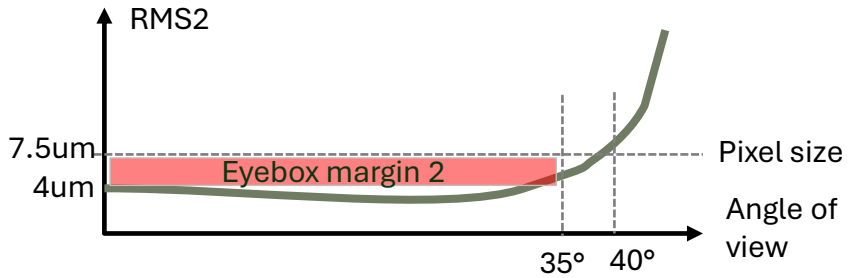
Challenge – VR Displays Brightness

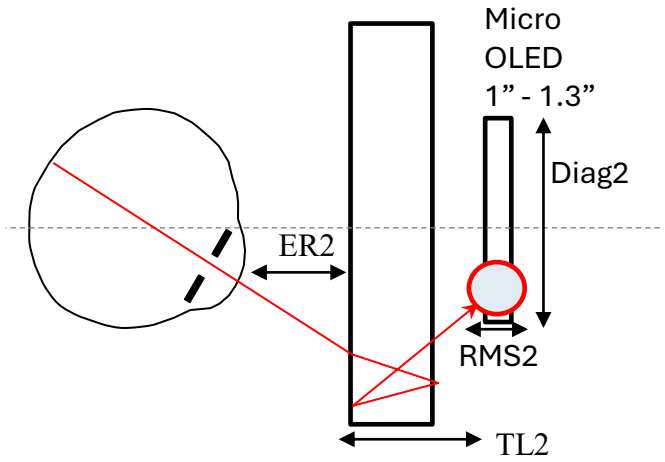
LCD Based Approach





Micro-OLED based Approach

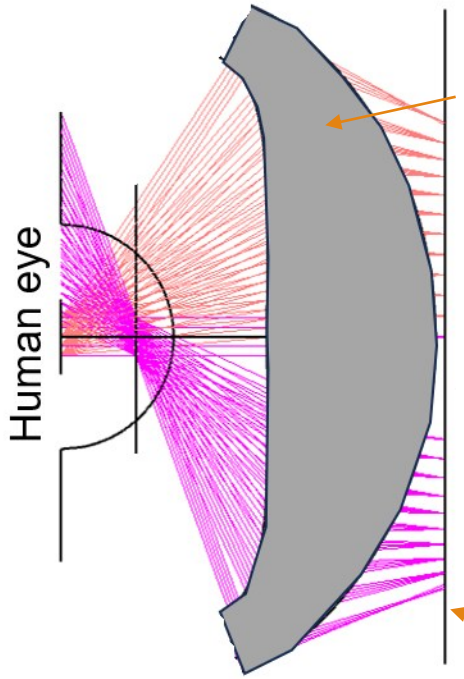




Trade-offs between LCD and micro OLED

Fast LCD based Visual Engine

uOLED based Visual Engine



HO140 /HO126
pancake
modules

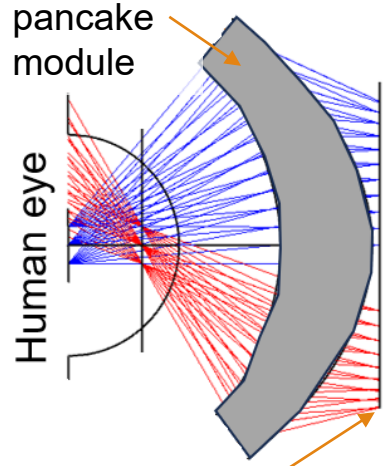
Fast LCD
2.1” – 3”

VR
Best Solution

uOLED Pros:
- Compactness (1/8 Volume)
- 4K Resolution => 40ppd +

fLCD Pros:
- Big eyebox
- Low Cost (vs expensive uOLED)
- Huge FoV
- VAC & Brightness Boost solutions

HOuD
pancake
module

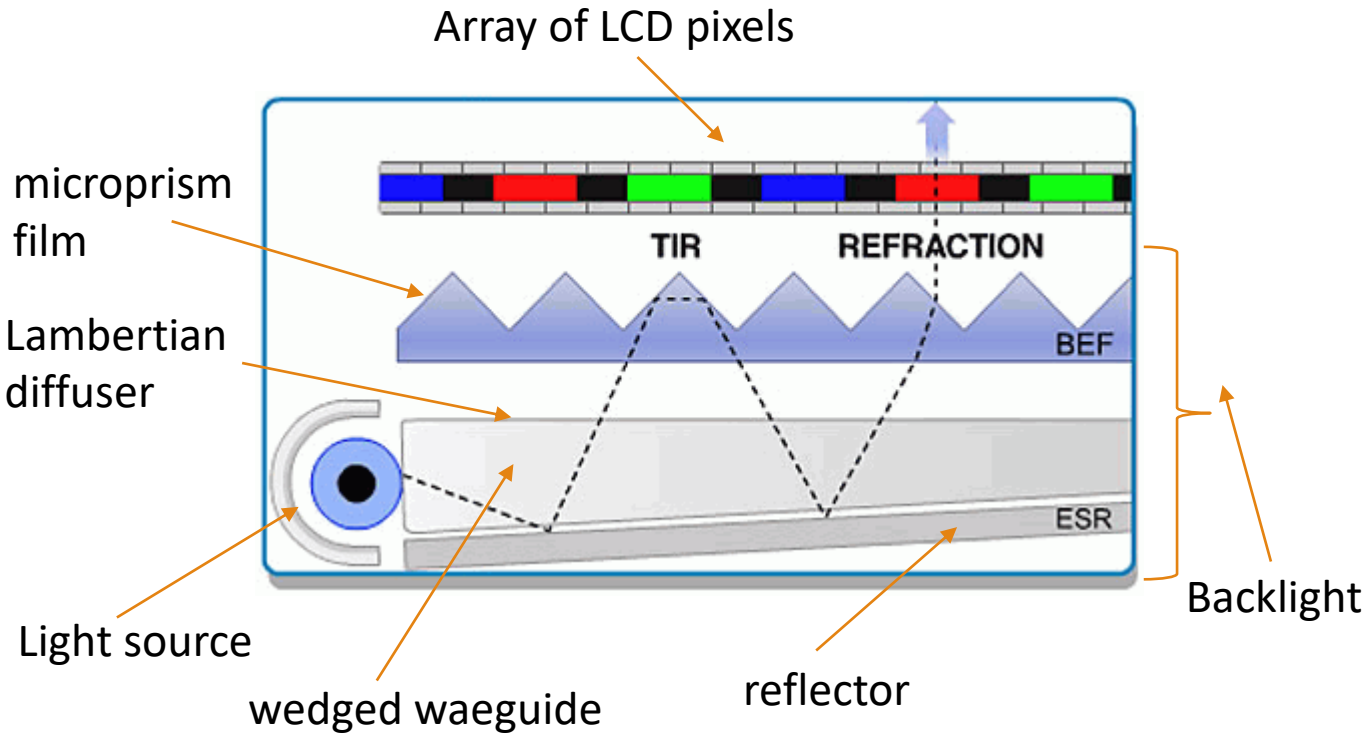


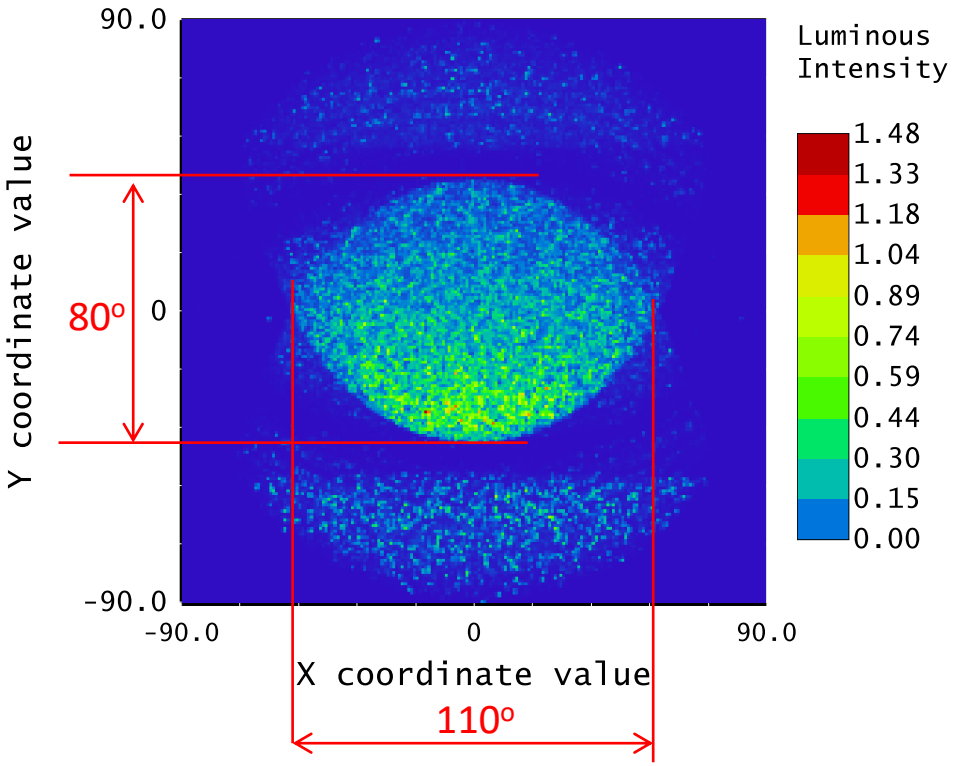
Micro Display
1” – 1.7”

MR (pass-through)
Best Solution

Typical LCD backlight

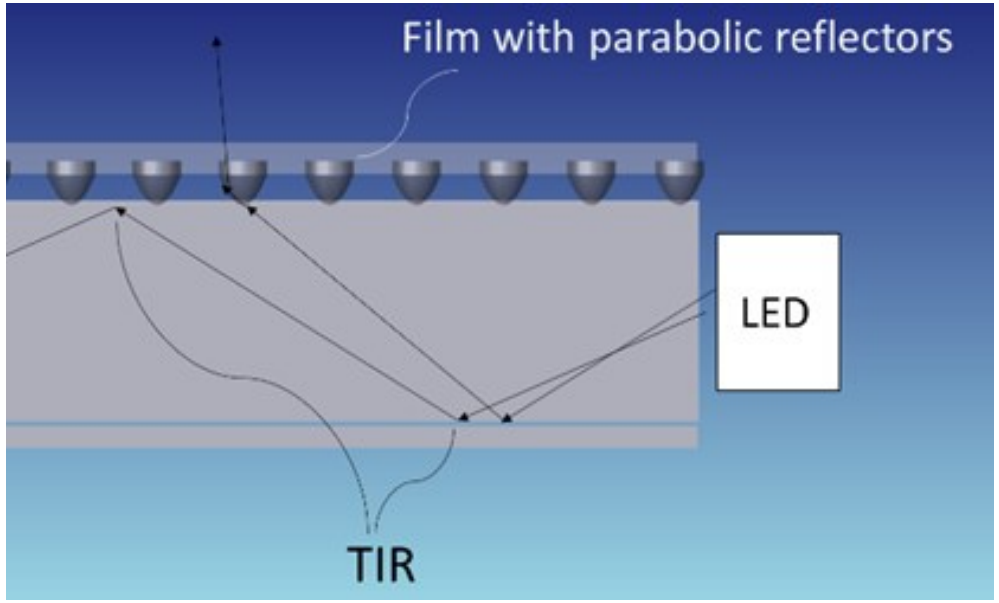
LCD emits most energy into a solid angle ~ 110ºx80º



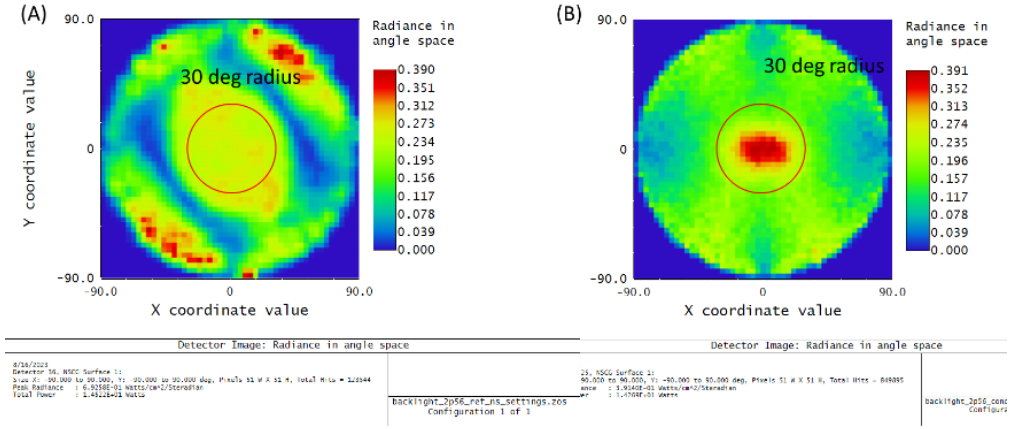


Enhancing the Brightness of VR-LCD

Directional LCD backlight that increases efficiency of the pancake lens module by directing all the light energy towards the area where the user eye pupil is located (EyeBox), reducing light losses.



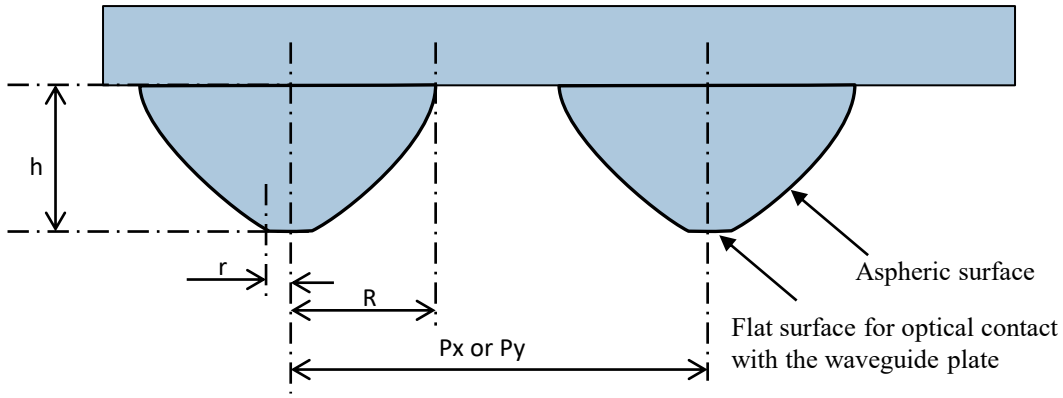
After having the Optimal structures ready, fast LCDs backlight will modified with Optimal Structures and difference in brightness (between x2 to x10 times) will be demonstrated.

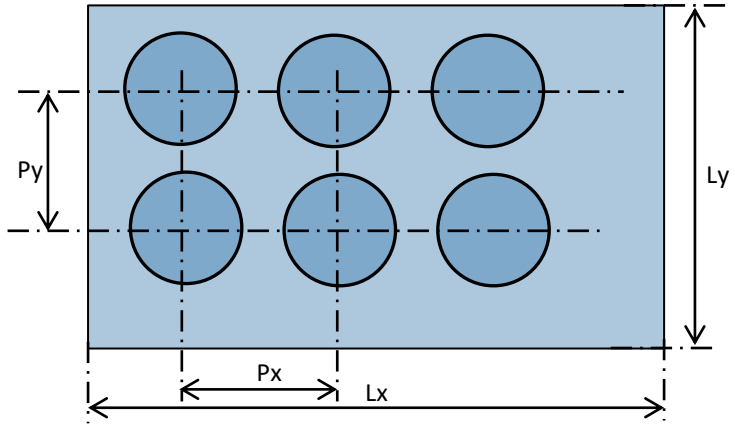


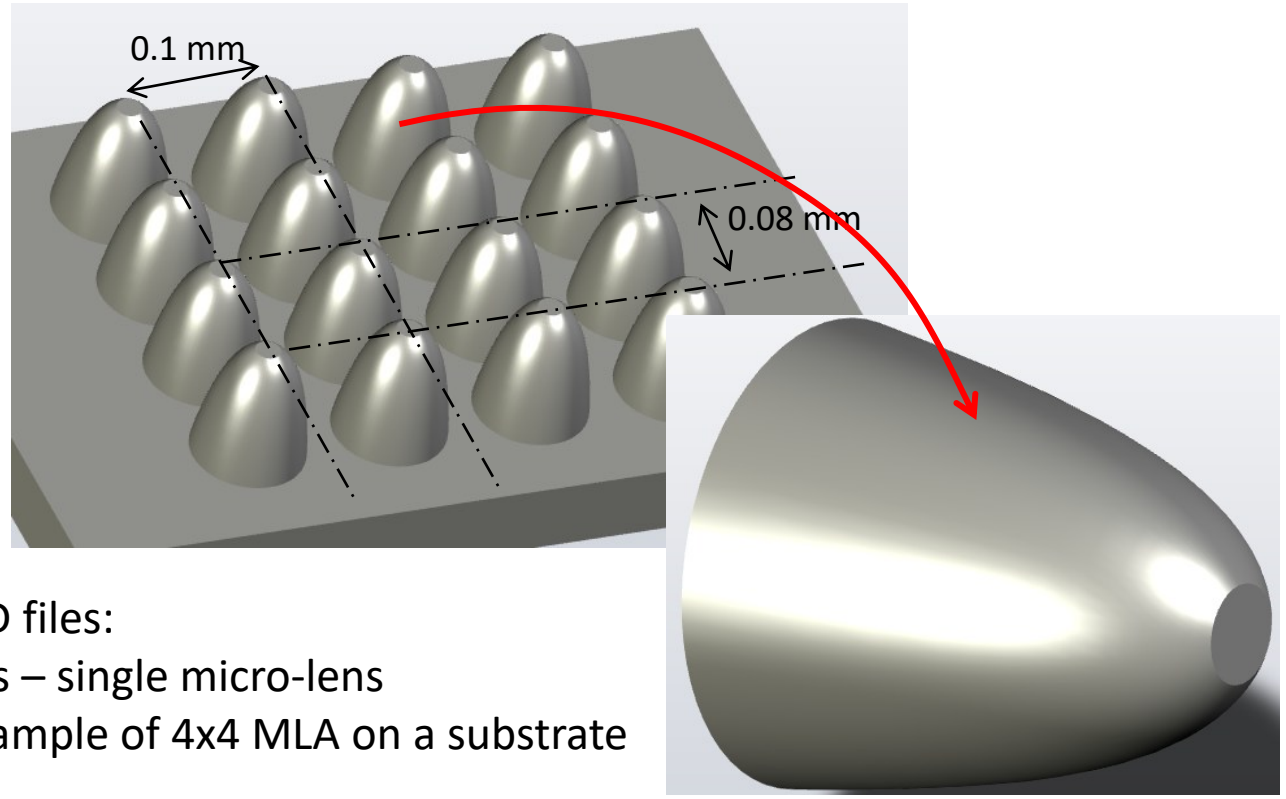
Simulation of light energy distribution wo Optimal structures (left) and with (right)

Micro-Lens Array on Film

Microlenses shall be manufactured on a thin film substrate (about 0.1 mm thick)
The complete structure area is 48 mm x 48 mm
Refractive index of the micro-lenses RI=1.5







Provided CAD files:
MLA_Lens.igs – single micro-lens
MLA.igs – example of 4x4 MLA on a substrate

R, mm	r, mm	h, mm	Px, mm	Py, mm	Lx, mm	Ly, mm
0.039	0.008	0.088	0.08	0.1	48	48

Thank you for your attention!

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