

MICROOPTICS, METAOPTICS, WHAT'S THE FUTURE?

Reinhard Voelkel

CEO SUSS MicroOptics SA



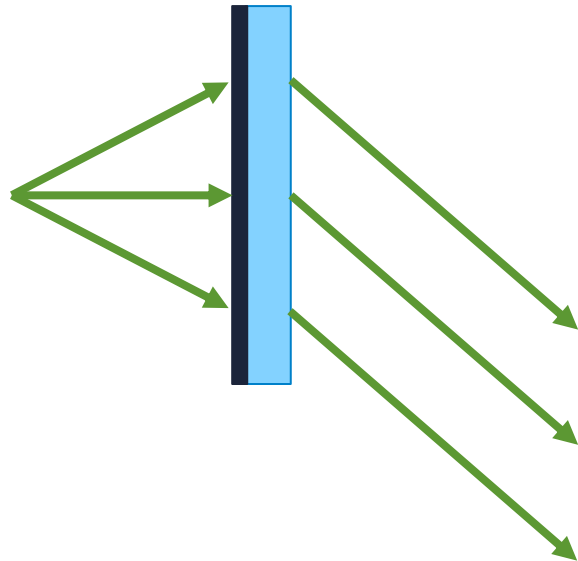
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MICROOPTICS

MY FIRST MICRO-OPTICS ADVENTURE

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- + Holographic lab at University Erlangen-Nürnberg
- + Prof. Adolf W. Lohmann
- + Dichromated Gelatin (DCG)
- + Holographic lenses for laser diode collimation
- + 488nm to 670nm
- + PhD: Holographic coupling elements for optical board-to-board interconnections (1G)



ADOLF W. LOHMANN'S PLANAR OPTICS

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- + Computer Generated Hologram (CGH)
- + Planar Optics will replace bulky camera lenses
- + Optical Computers are needed - now
- + Optical Interconnects will change the world



IBM System 360



A.W. Lohmann (1926-2013)

Source: A. W. Lohmann



Fig. 7.7. Adolf Lohmann (centre) with Byron Brown and Ronald Kay of IBM, c.1966 (Lohmann collection)

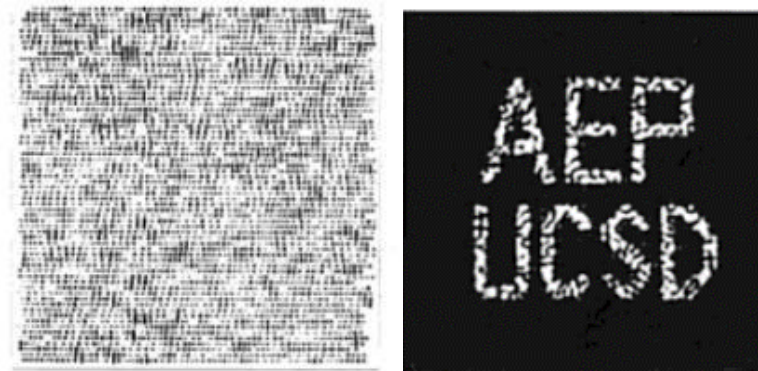


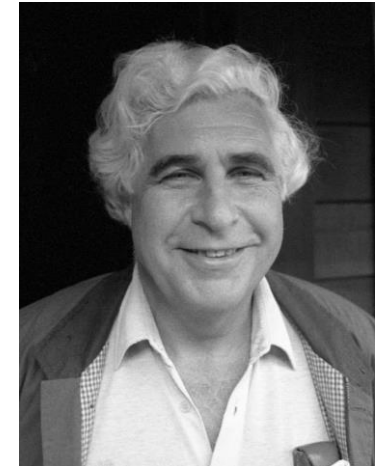
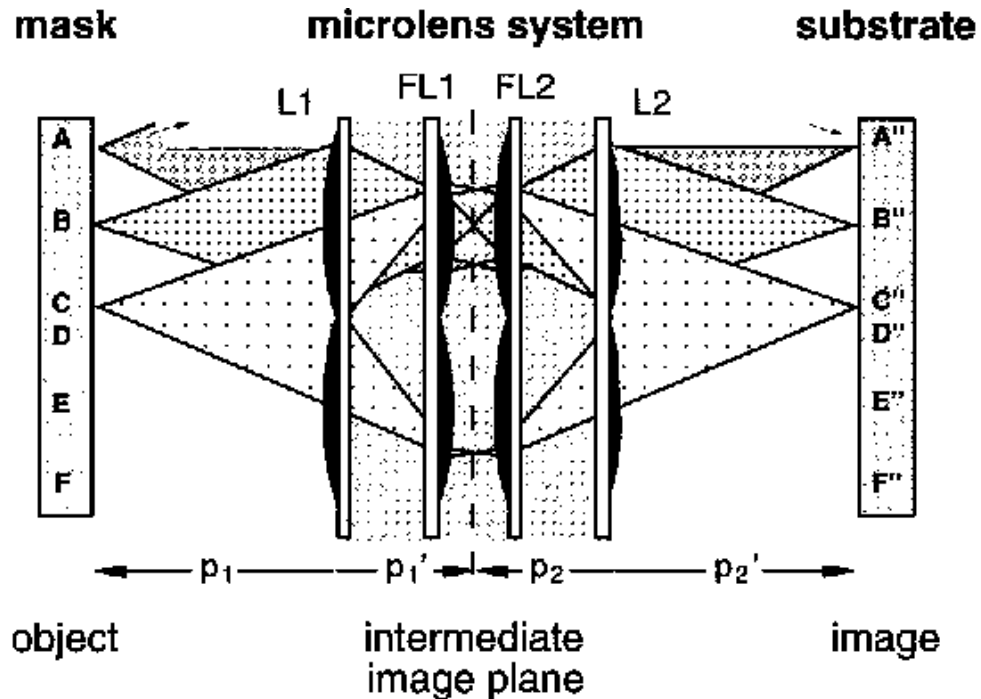
Fig. 7.8. Computer-generated binary hologram and its reconstruction, Lohmann et al., 1967 (Lohmann collection)

Source: A. W. Lohmann

MY SECOND MICRO-OPTICS ADVENTURE

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- + Post-Doc at University of Neuchâtel
- + Prof. Rene Dändliker
- + Microlens Projection Lithography (MPL)
- + 1:1 flat array imaging system for Karl Süss mask aligners
- + Working for Hugle Lithography



Rene Dändliker (1939-2022)

BILL HUGLE, CO-FOUNDER AND FIRST PRESIDENT OF SEMI

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Summary : SEMI's Great Moments in Semiconductor History: The conception of the SEMICON trade show in 1970 is a milestone that marks the emergence of the semiconductor equipment industry.



Fred Kulicke (left) and William Hugle (right) conceived the SEMICON show in 1970 and the first show was held a year later with Philip Gregory (center) as the show manager. In the decade that followed, the SEMICON shows have helped mold the once-fragmented semiconductor materials and equipment business into a cohesive industry. (No. 4 in a series of paintings by Jim deLeon commemorating "Great Moments in Semiconductor History," commissioned by the Semiconductor Equipment and Materials Institute.)
©1980, SEMI

MICROOPTICS CONFERENCE 1995 WITH BILL HUGLE

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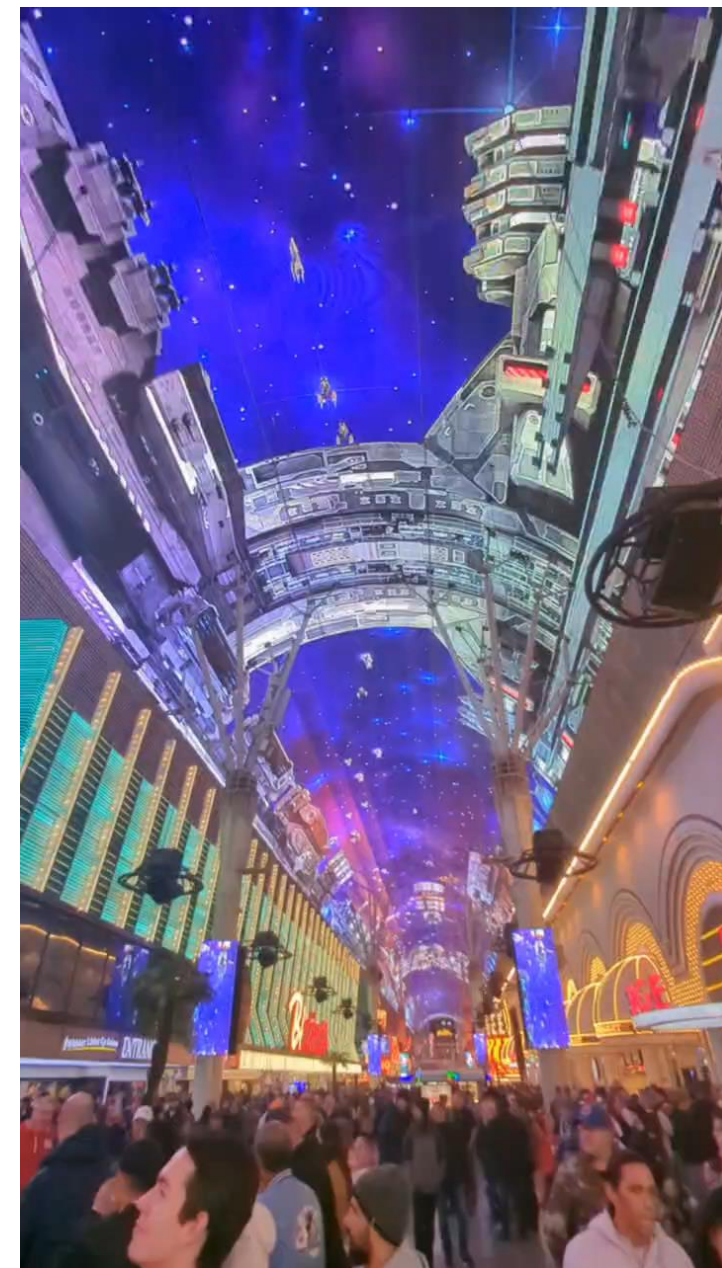
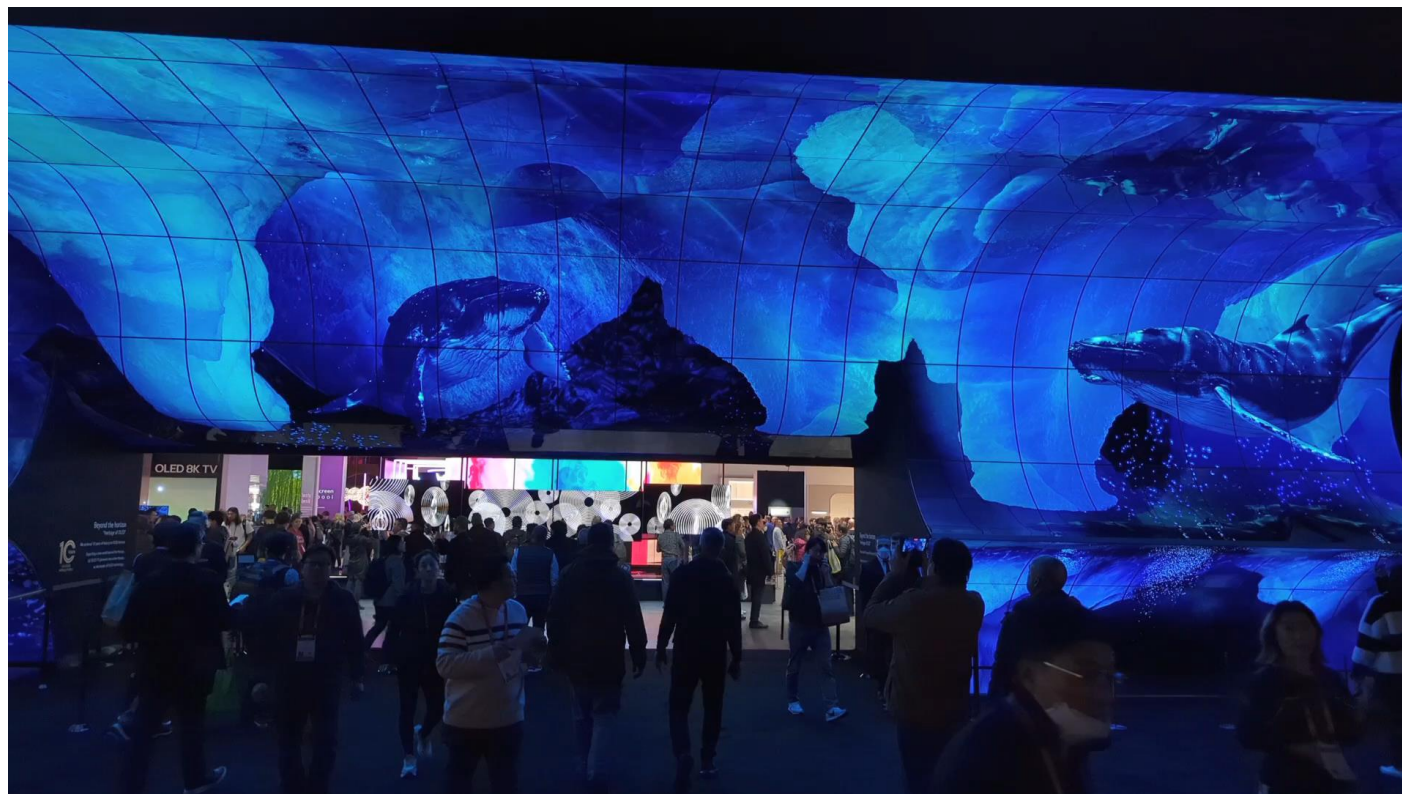
Microoptics Group, JSAP

18–20 October
5th Microoptics Conference
(MOC '95)
Hiroshima, Japan
K. Iga
Optical Society of Japan
Tokyo Institute of Technology
4259 Nagatsuta, Midori-ku
Yokohama, Japan 227

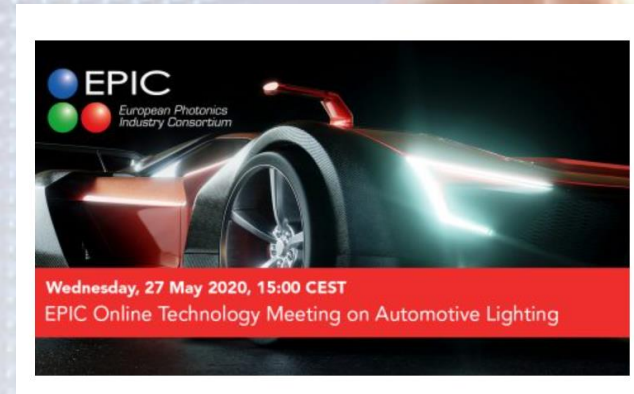


DISPLAYS IN 2023

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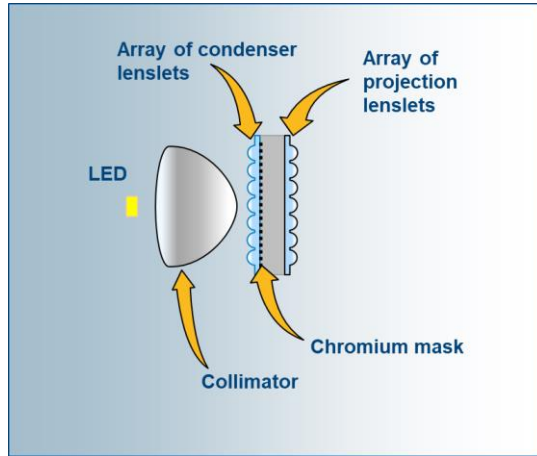


THE MICRO-OPTICS REVOLUTION IN AUTOMOTIVE LIGHTING



MICROLENS ARRAYS CHANGE AUTOMOTIVE LIGHTING

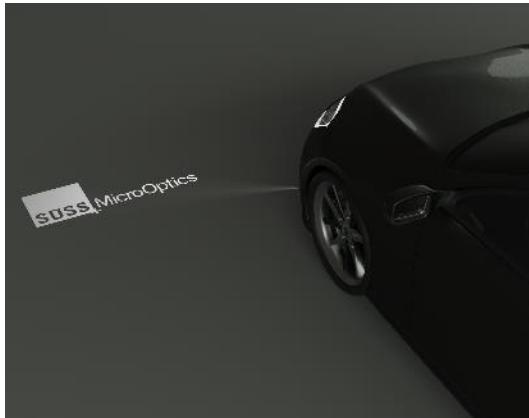
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Source: Lucid.com



Source: Genesis.com



- + Welcome light
- + Signalling functions



- + Slim headlights (day + night signature)
- + Illuminated surfaces



- + Projection on curved surfaces
- + Perfect colour mixing

LIGHT CARPETS: DESIGN AND SAFETY

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BMW, www.glowwing.com



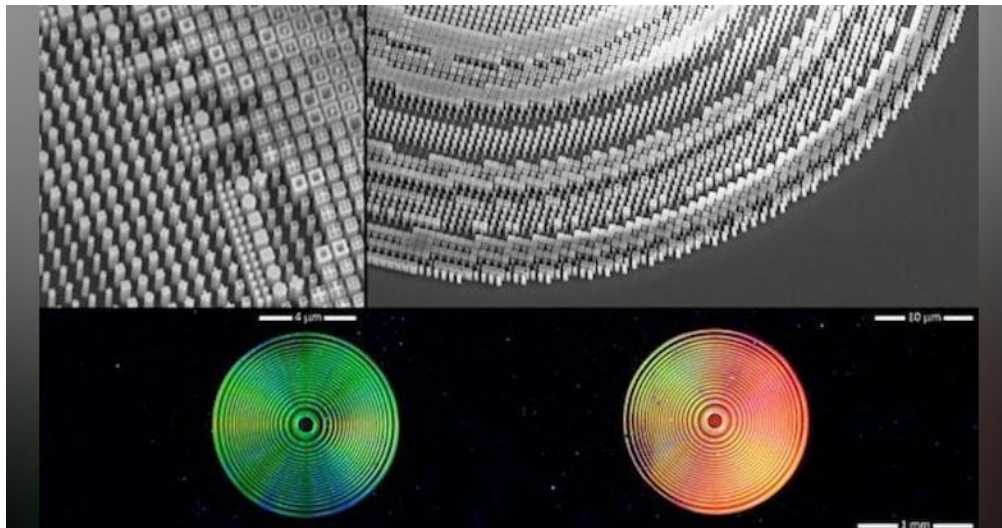
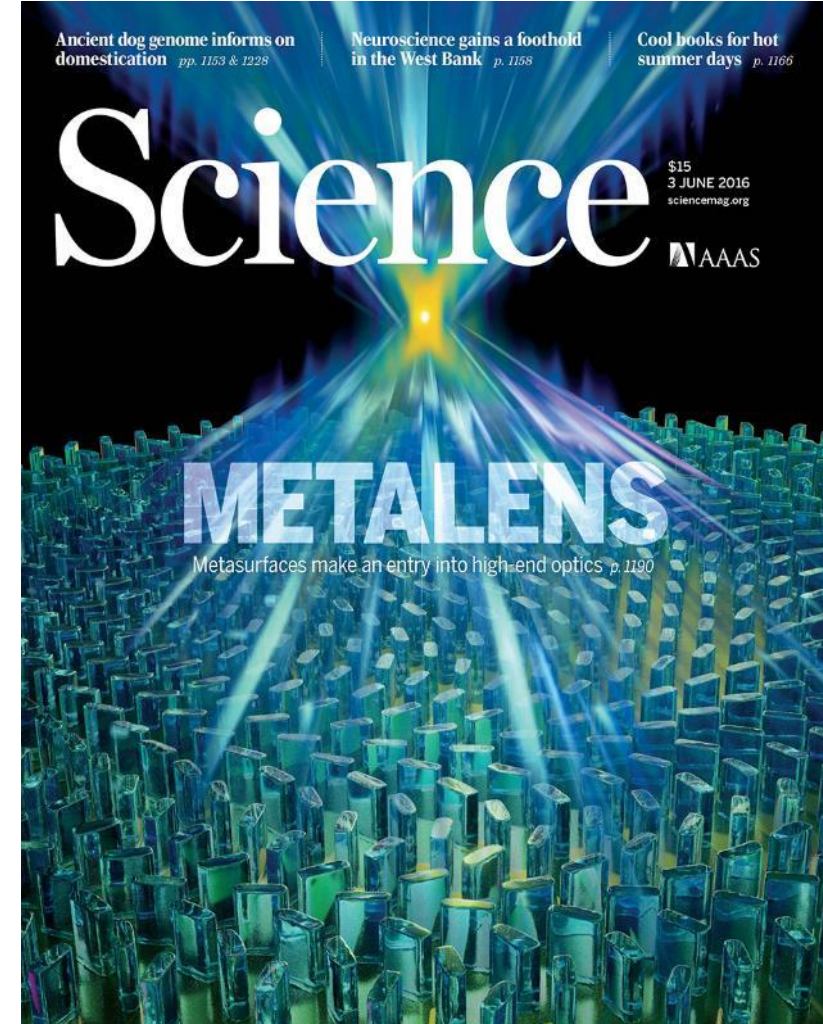
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METALENSES ARE CHANGING THE WORLD!

FEDERICO CAPASSO

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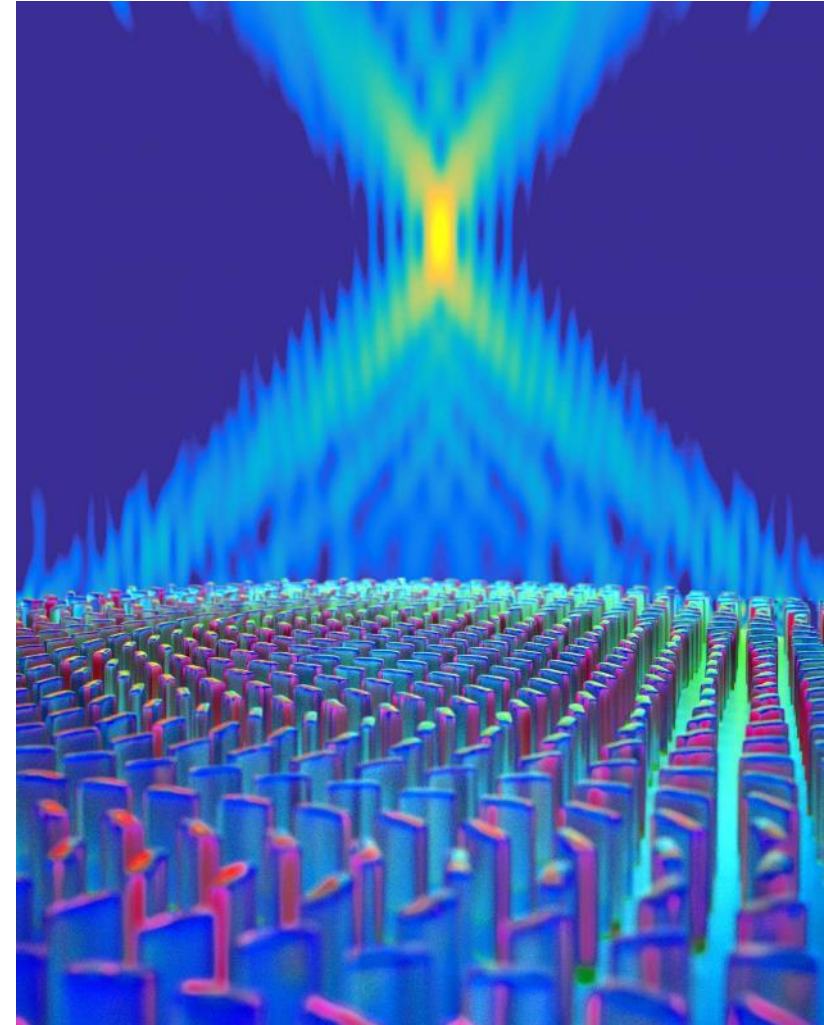
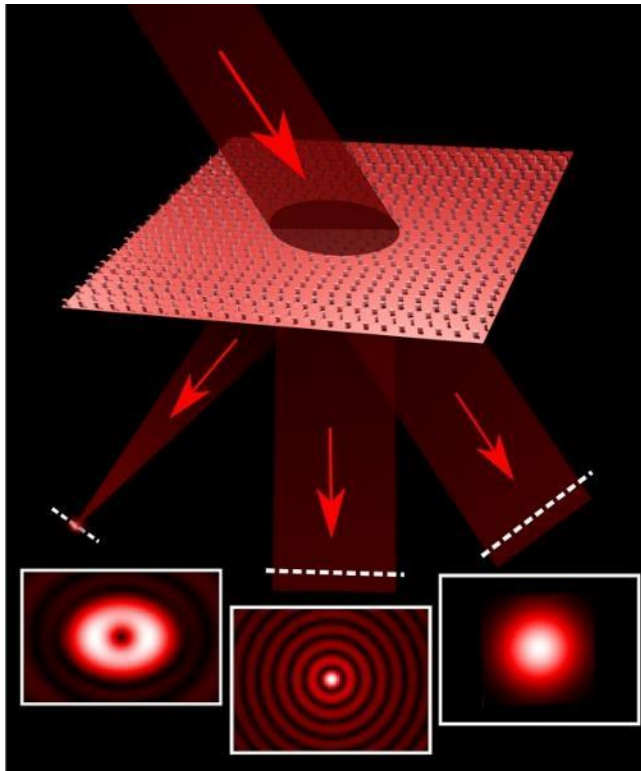
+ The METALENS is now!



METALENSES

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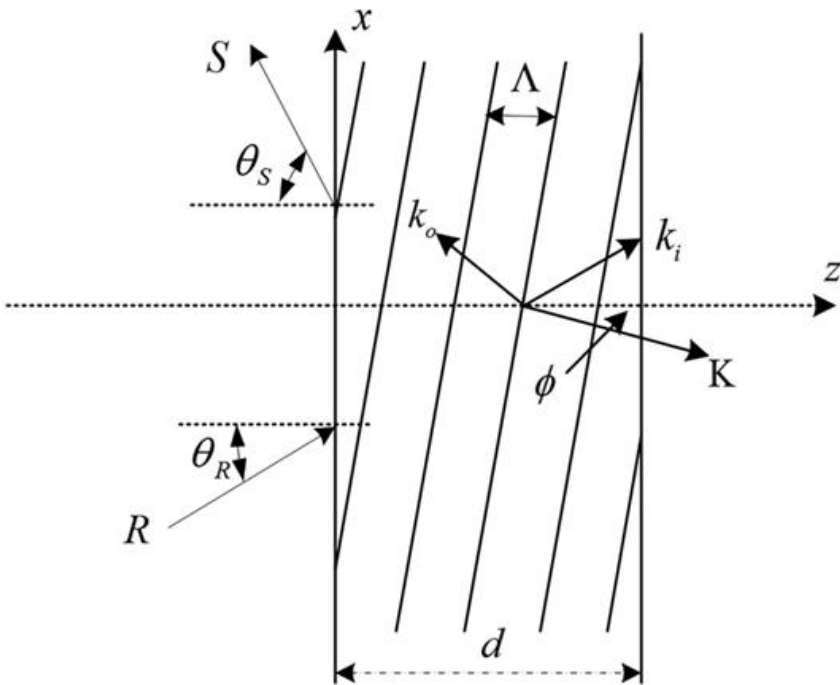
- + Flat lens! Planar Optics!
- + 3D media with a complex-valued index variation?



IS A METALENS A VOLUME HOLOGRAM?

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- + 3D-media, complex-valued refractive index, periodic modulation
- + Coupled-Wave Theory (Kogelnik)
- + Q-factor, Δn , d , Modal-Theory



John (Seán) Sheridan

Conference 12574

Holography: Advances and Modern Trends VIII

24 - 25 April 2023 | Benada

This year's conference is dedicated to the memory of **John (Seán) Sheridan**, University College Dublin (Ireland)
2011-2022 Chair of the Conference on Holography: Advances and Modern Trends




MICROOPTICS, METAOPTICS, WHAT'S THE FUTURE?

The background of the slide is a close-up photograph of a microscope lens. The lens is held by a hand, and the light passing through it creates a diffraction pattern of small, repeating geometric shapes. The text is overlaid on this background.

PLANAR OPTICS HAS CHANGED THE WORLD!

ADOLF W. LOHMANN WAS RIGHT!

A microscopic view of a planar optical device, showing a grid of small, square, white structures on a light blue background. A hand is visible in the bottom right corner, holding the device. The text "PLANAR OPTICS – WHATEVER YOU CALL IT – WILL CONTINUE TO CHANGE THE WORLD!" is overlaid in the center.

PLANAR OPTICS – WHATEVER YOU CALL IT – WILL CONTINUE TO CHANGE THE WORLD!

Thank you!

