

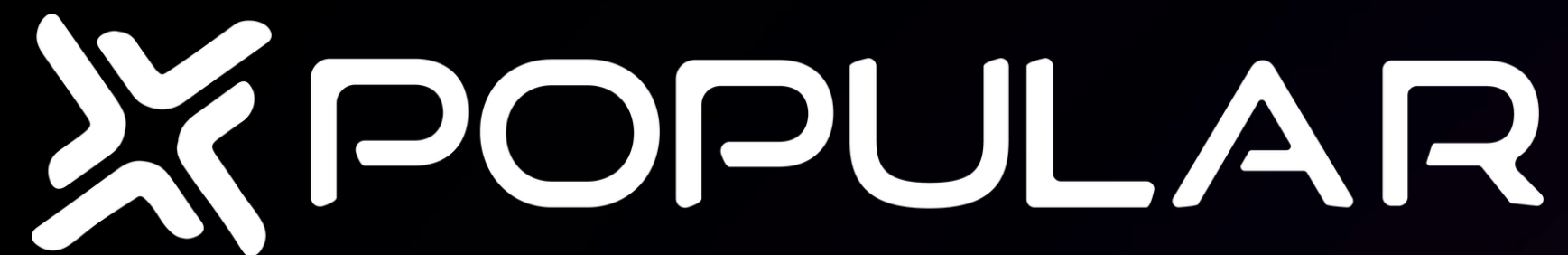
EPIC Technology  
Meeting on  
Photonics for AR



Presented by: Mathieu Feuillade



13th October 2026



## Global objective

Develop a generic **Augmented Reality Eyewear (ARE)** device that suits the widest range of users, either in daily life or professional context, and provides a seamless AR experience with **greater visual, wearable, vestibular and social comfort**, thanks to unobtrusive, lightweight, ordinary-looking and made-to-order **prescription glasses**.

2024  
2027

11  
partners

TRL5  
prototype

6.7 M  
euros

Coordinator **EssilorLuxottica**





# POPULAR

## Context & concept

### Holistic & User Centric

ARE specifications for  
use cases and user tests  
on the field



#### Use cases



Orbelgrupo

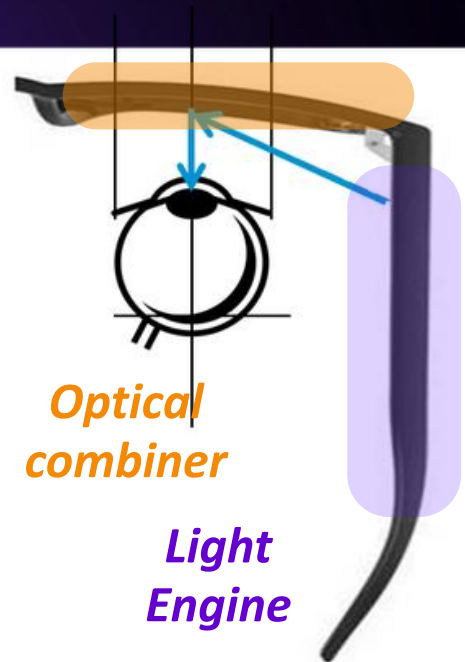


#### Holographic mirror

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Universidad de Alicante



#### OLED $\mu$ display

microOLED



Fraunhofer  
IPMS



#### Integration

engo

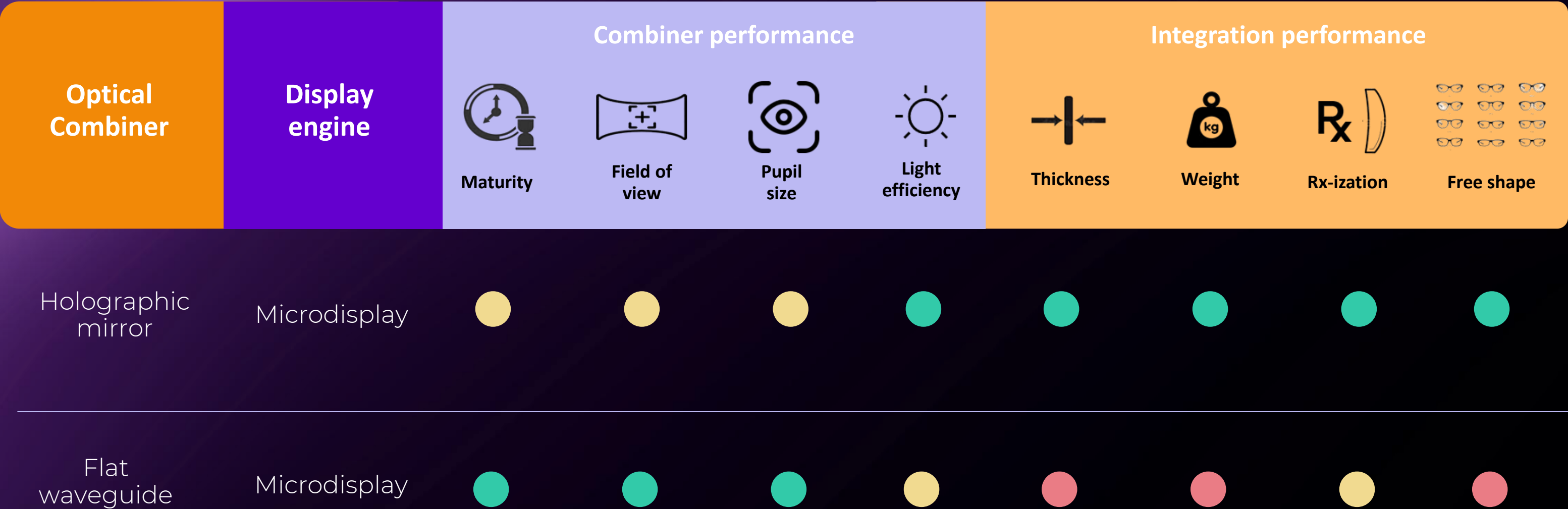
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Tech2heal





# Why Holographic Mirror for Augmented Reality Eyewear?



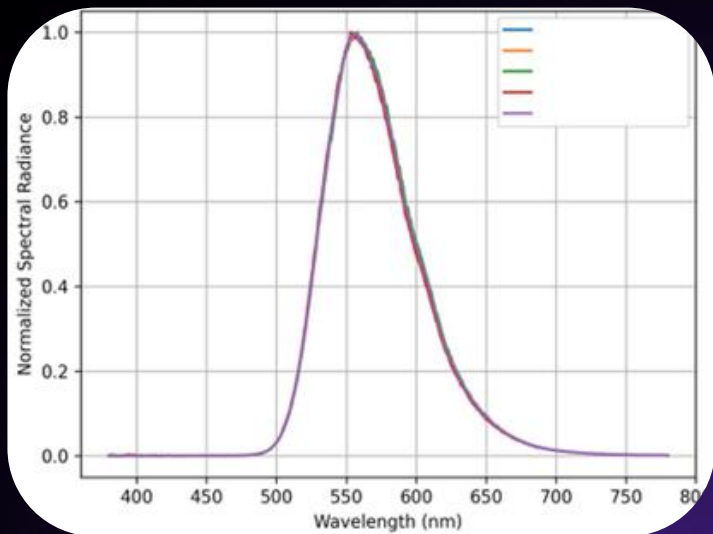


# OLED stack from design to manufacturing & test

microOLED



## DESIGN & SIMULATION



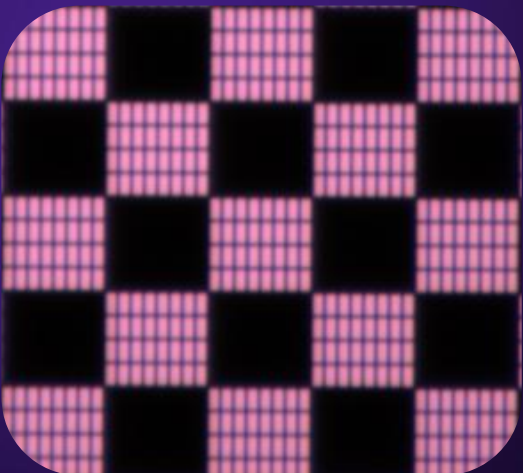
The electroluminescence spectrum of monochrome OLED on **CMOS** recorded at **15 000 cd/m<sup>2</sup>**.

## OLED DEPOSITION & INTEGRATION



**White OLED** deposition by thermal evaporation & CMOS backplane integration

## METROLOGICAL EVALUATION

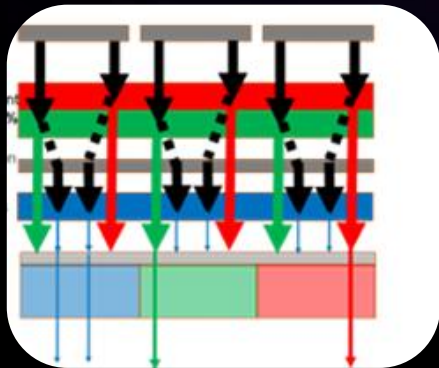


Cross talk characterization on Fraunhofer IPMS backplane **with 6µm pixel pitch**

Monochrome OLED microdisplays

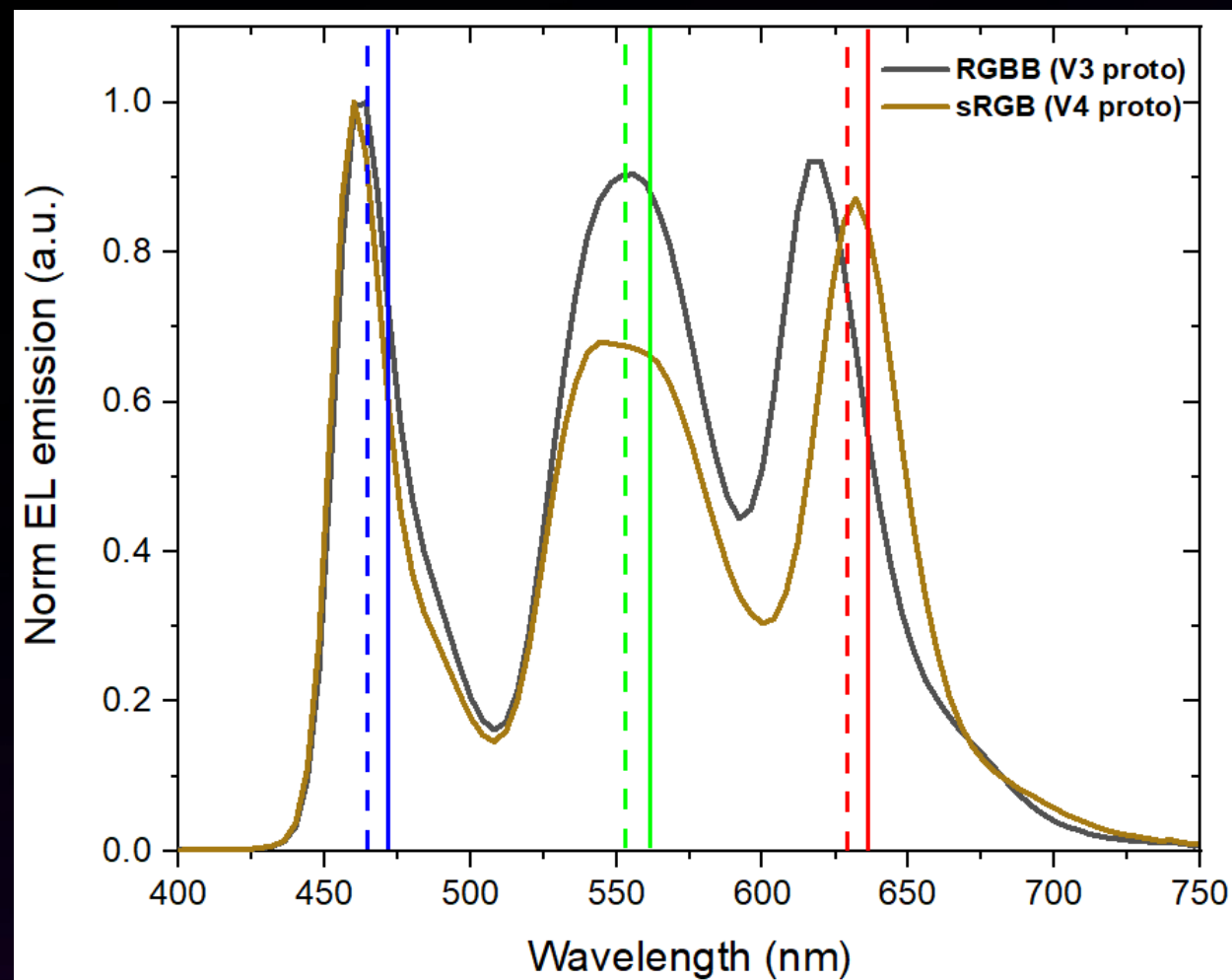


RGB from white OLED stack





# Micro-OLED displays: Alignment of display emission with HLM



Design and fabrication challenges of Tandem White OLED stack:

- Alignment with Holographic Lens Mirror
- Manage impact of encapsulation
- Maximizing efficiency for power consumption reduction;
- OLED lifetime (choice of materials)
- Reducing driving Voltage

**Electroluminescence spectra of micro-OLED displays for V3 and V4 ARE glasses**  
**Solid Blue, Green, and Red lines – laser wavelengths used for HLM recording**  
**Dash Blue, Green, and Red lines - maximum reflectance of HLMs**

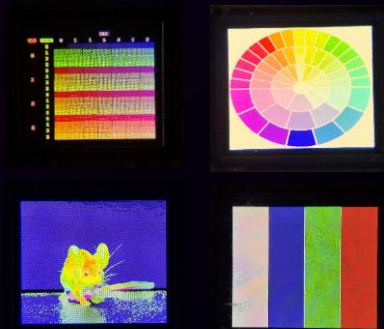


# Micro-OLED displays developed

in the framework of Popular project

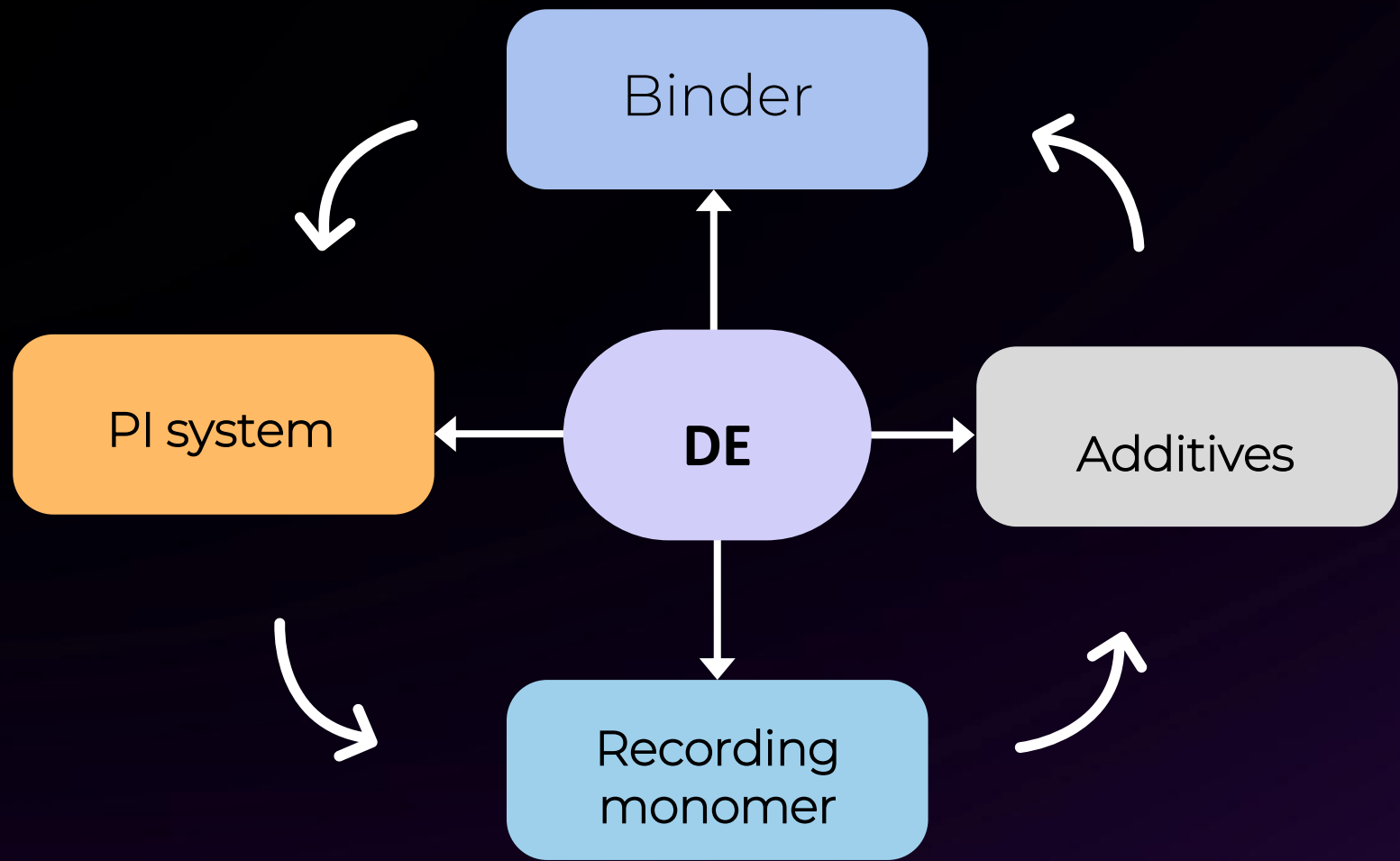


| Product Type         | MPD05 AMOLED microdisplay                                                           | MPD08 AMOLED microdisplay                                                           | MPD08 AMOLED microdisplay                                                           |
|----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Diagonal             | 0.19"                                                                               | 0.19"                                                                               | 0.19"                                                                               |
| Number of pixels     | 304x256                                                                             | 304x256                                                                             | 304x256                                                                             |
| Pixel configuration  |  |  |  |
| Color and brightness | Green                                                                               | RGBB                                                                                | RGB                                                                                 |
| Brightness           | up to 25,000 cd/m2                                                                  | up to 5,500 cd/m2                                                                   | up to 4,500 cd/m2                                                                   |
| Type of OLED         | Single Green (Microoled)                                                            | Tandem White (IPMS)                                                                 | Tandem White (IPMS)                                                                 |
| Pixel pitch          | 12 µm x 12 µm                                                                       | 12 µm x 12 µm                                                                       | 12 µm x 12 µm                                                                       |
| Active area          | 3.64 mm x 3.07 mm                                                                   | 3.64 mm x 3.07 mm                                                                   | 3.64 mm x 3.07 mm                                                                   |
| Power consumption    | Typ 2 mW                                                                            | Typ 6-7 mW                                                                          | Typ 6-7 mW                                                                          |
| Temperature range    | Operation -20 C° to 55 C°                                                           | Operation -20 C° to 55 C°                                                           | Operation -20 C° to 55 C°                                                           |





# Photosensitive resin development for RGB holographic recording



Complex chemical interactions influencing diffraction efficiency and processability.

The Big Read Pollution [Add to myFT](#)

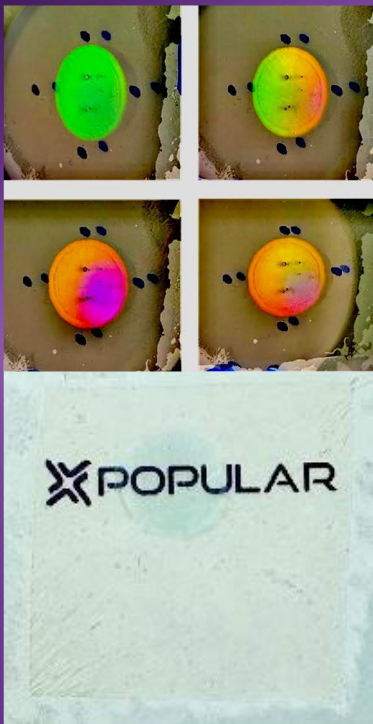
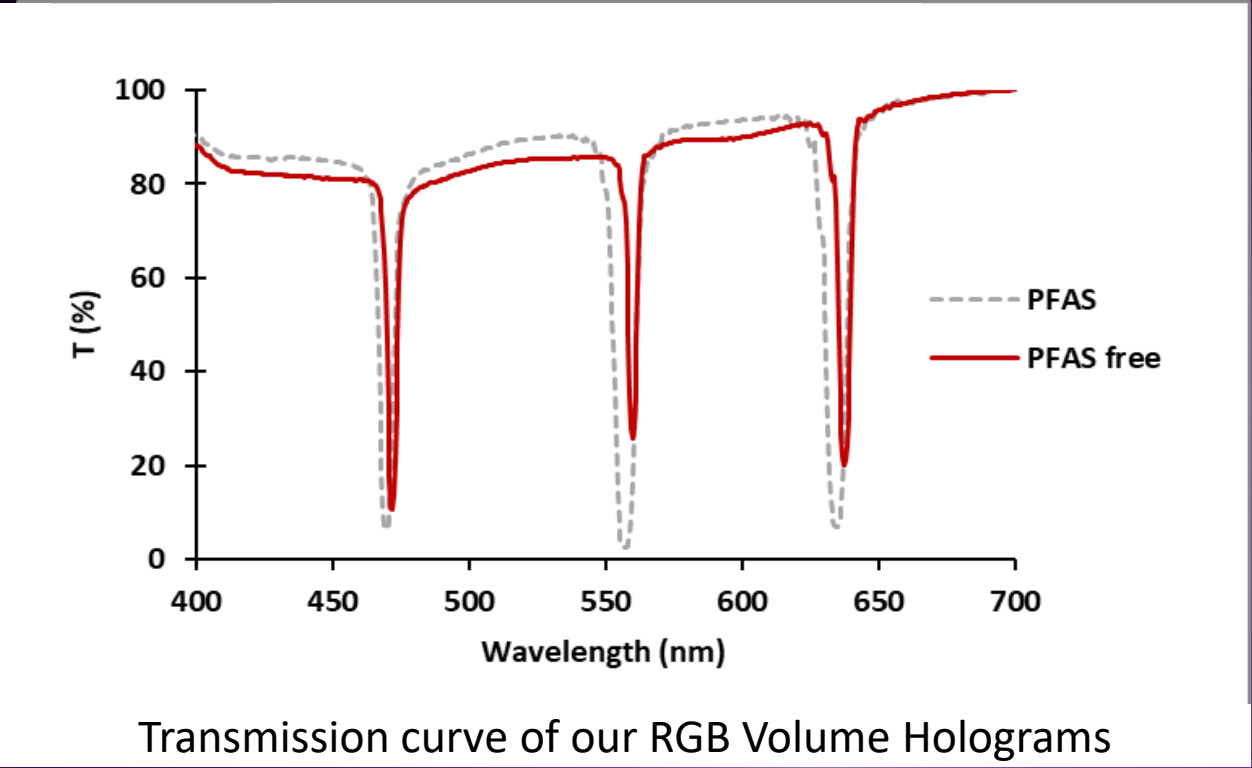
## Europe's fight to get rid of 'forever chemicals'

A man-made molecule called TFA is seeping into waterways across the continent. But industry executives warn about the cost of EU efforts to eradicate pollution

Chemicals [+ Add to myFT](#)

## Manufacturers start to phase out production of 'forever chemicals'

Groups including BASF respond to increased risk of litigation over 'PFAS' substances and regulatory intervention





# Holographic mirror simulation to anticipate compensation strategies

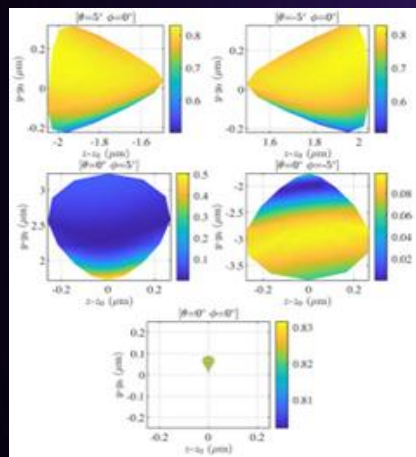
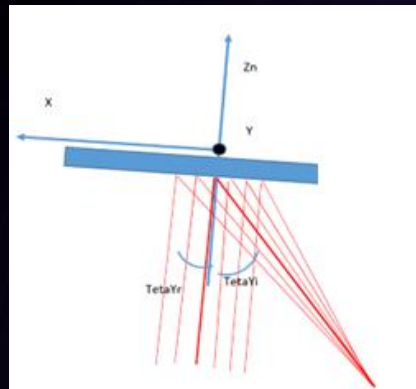
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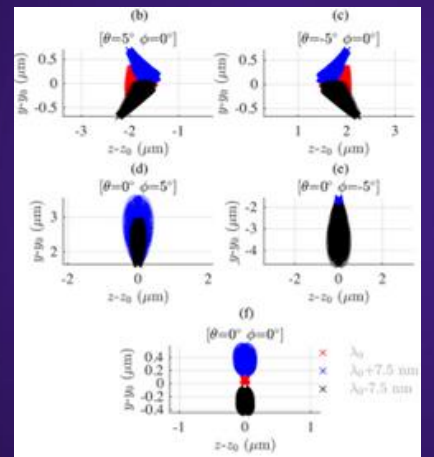
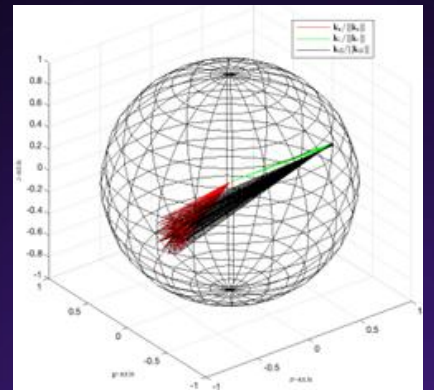
## DESIGN & SIMULATION

Recording geometry



Local diff. efficiency  
& geom. aberrations

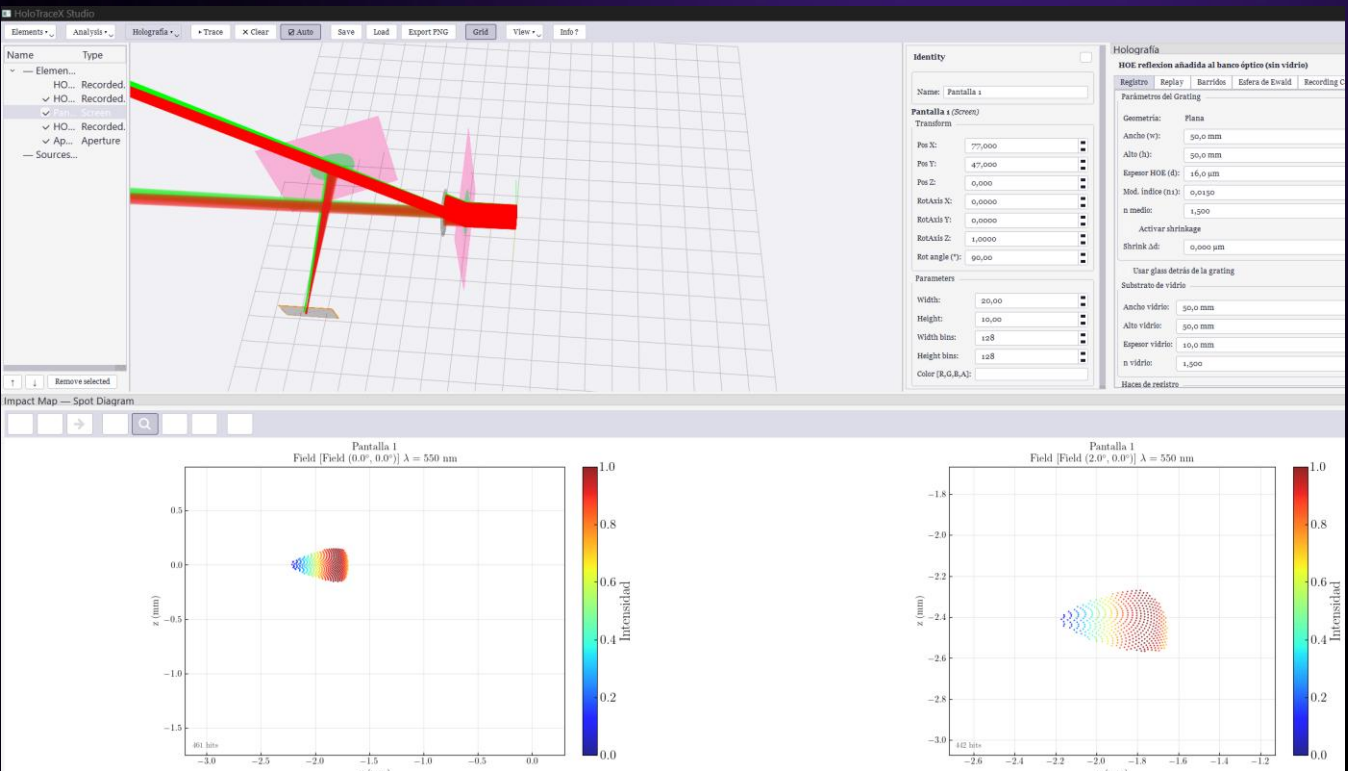
K-sphere visualization:  
Grating vector



Chromatic  
aberrations

**A novel simulation/design tool oriented for Holographic and AR devices**

Registered software HoloTraceX  
Integration and analysis of general optical elements and holograms





# Holographic mirror recording optimization for RGB efficiency

## RECORDING OPTIMIZATION

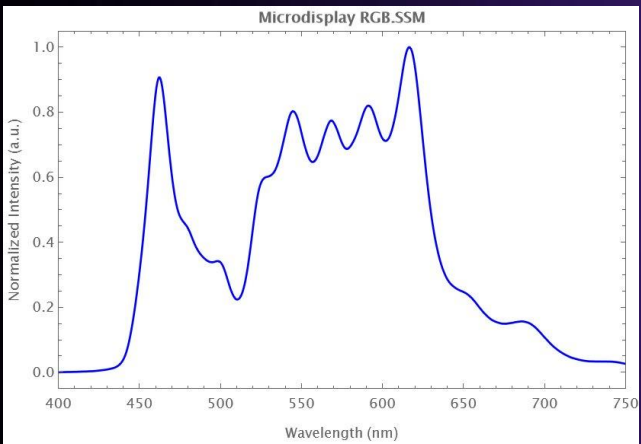


HLM Green POC

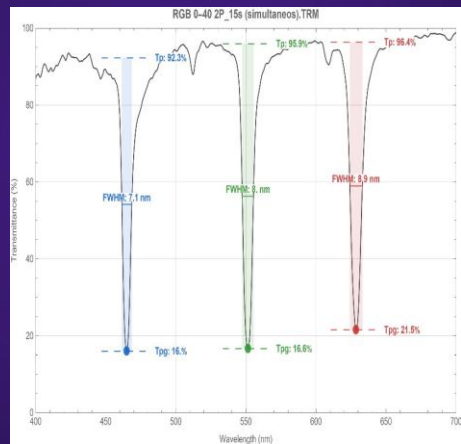


HLM RGB POC

DE  $\approx$  70-80% for Bayfol® HX121



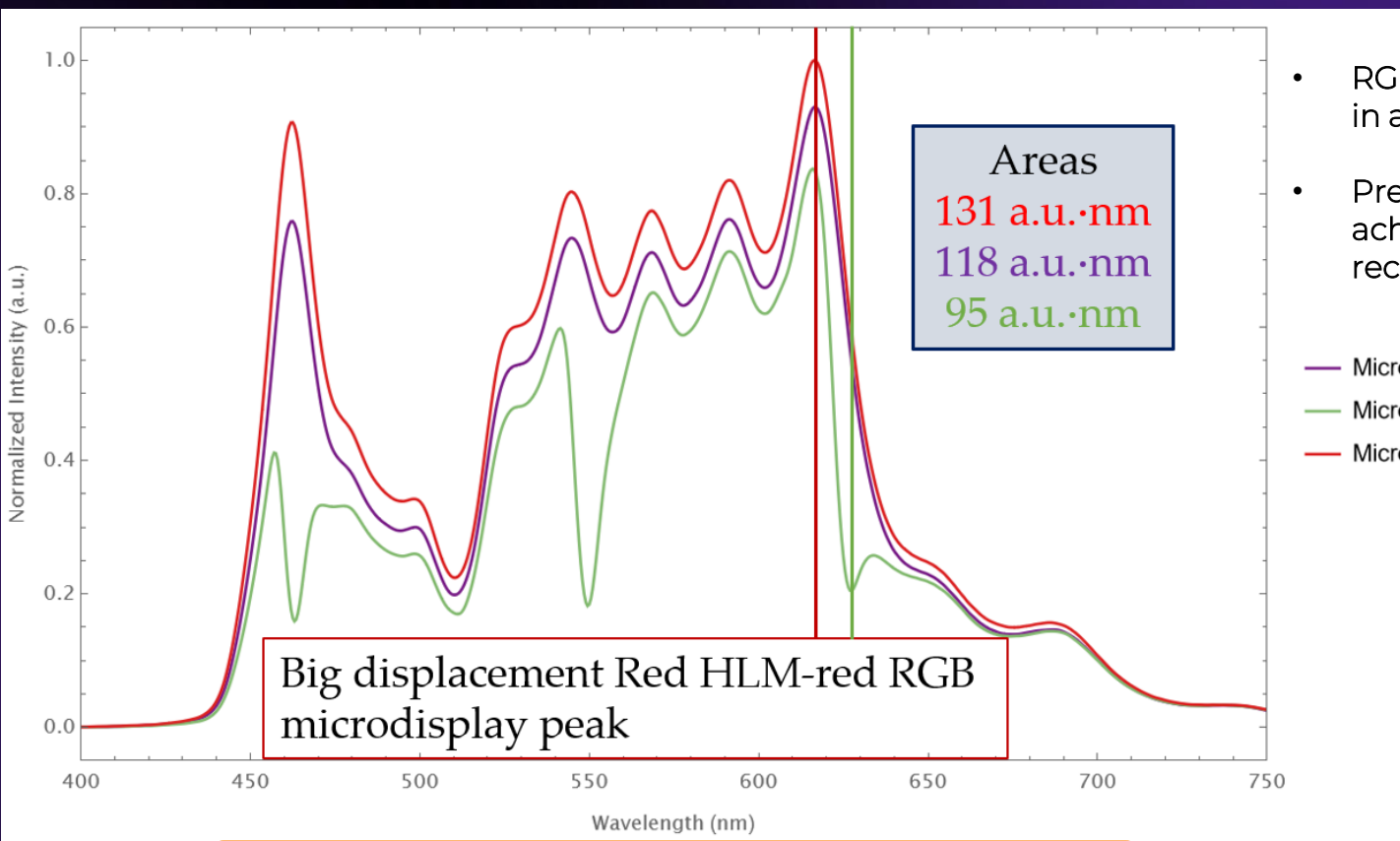
X



=

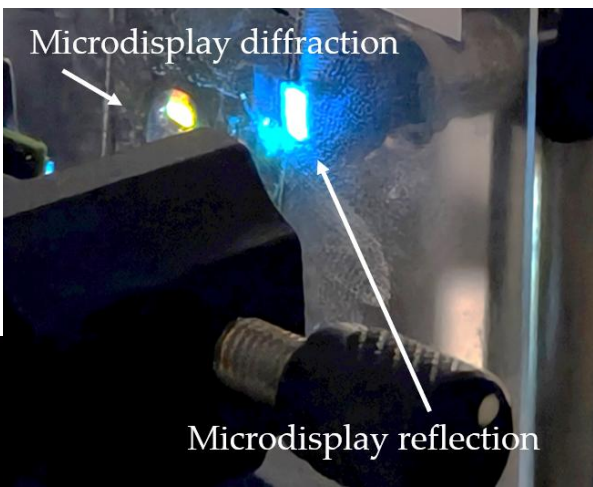
## Effective light usage through the HLM in RGB scenario

Preliminary results RGB microdisplay + RGB hologram onto HX121  
Estimation of overall efficiency



- RGB microdisplay with good and homogenous intensity in almost all visible spectrum
- Precompensation is a key factor for 640 nm HLM to achieve the highest diffraction efficiency when reconstructing with the RGB microdisplay

- Microdisplay RGB+ Bayfol HX121 bleached
- Microdisplay RGB + HLM 2P 15s
- Microdisplay RGB



$$Effective\ area = \frac{118 - 95}{118} \times 100 = 19.5\%$$



# Holographic mirror lens integration

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## LENS INTEGRATION & PROTECTION

*Green hologram integrated on lens*



*RGB hologram integrated on lens*



- Prescription range tested  $[-2..+2]$ , but not limited
- Overall diffraction efficiency significantly higher on mineral than organic substrates for now



# From optical architecture design to technological brick integration

**EssilorLuxottica** **eNGO**

Latest green prototype



Monochromatic  
& Monocular



**Prescription**



**Field of view**  
10° diagonal



**Eye box**  
4 mm x 8 mm



**Power**  
2 mW

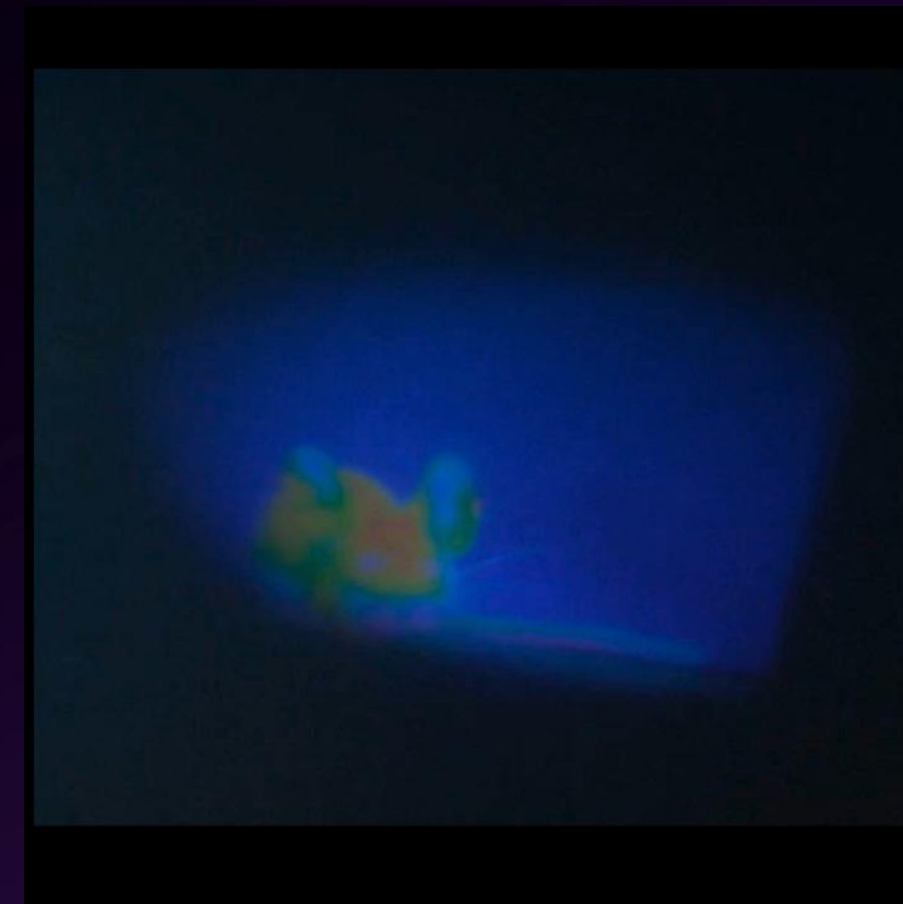


**Weight**  
~40-45 g.



# A first glimpse on RGB

To be delivered soon



**RGB  
& Monocular**

First images

# Partners Contact

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