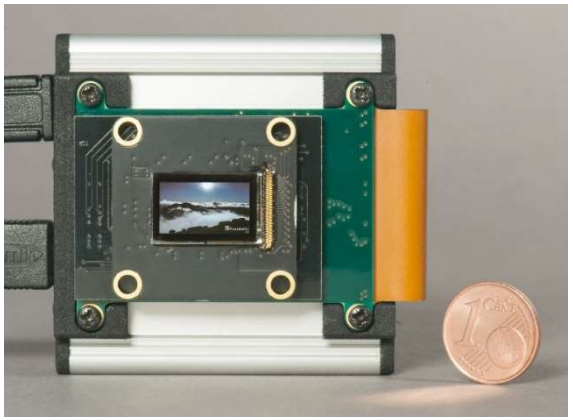
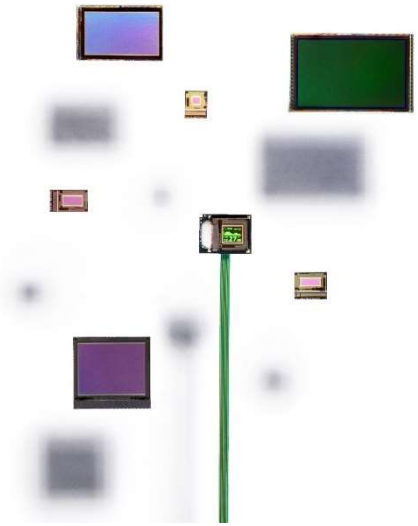
„O/LED-on-silicon for near-to-eye microdisplays and sensing “

Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP
Dresden, D-01109, Germany





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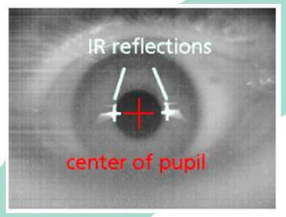
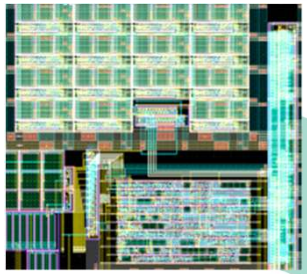
Our Focus: Device Development, Prototyping and Manufacturing

Software development,
e.g. eye-tracking

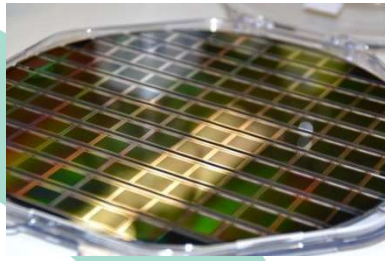


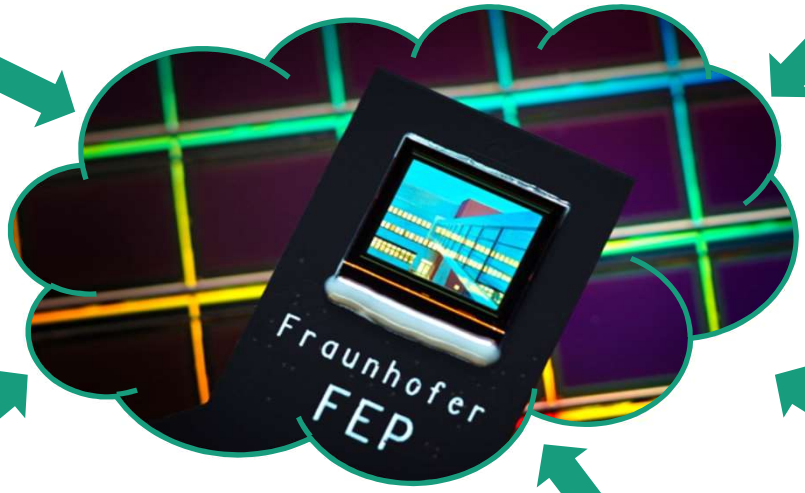
Technical
Consulting



IC Design

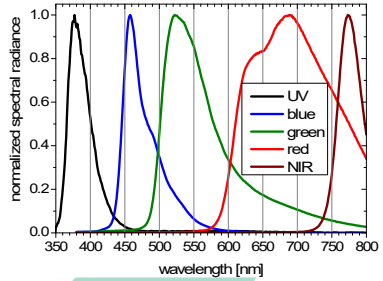
Foundry relation,
CMOS backend

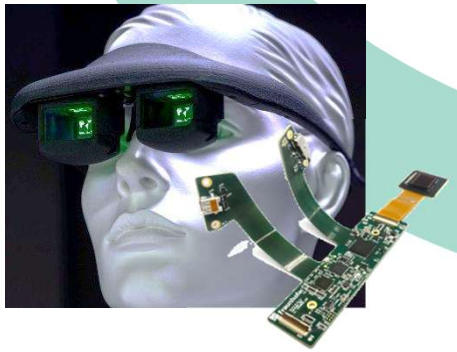


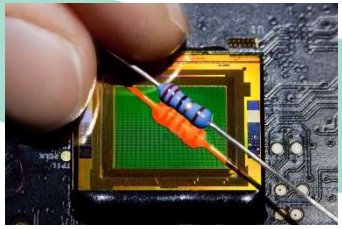


Electronics and
system design

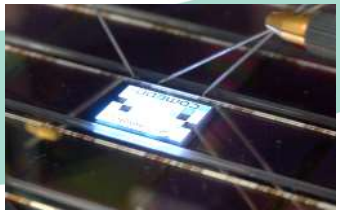
OLED/OPD Design







Electro-optical Test



X-on-Silicon post-
processing (8”)

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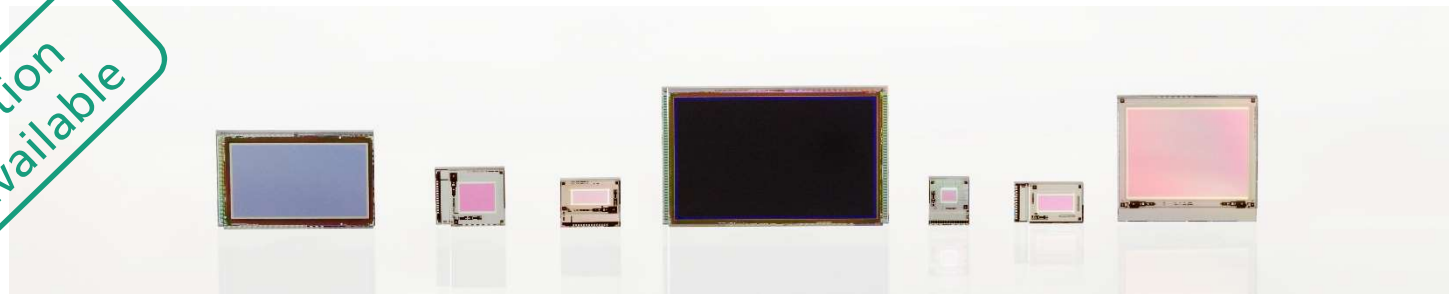
Characteristics of microdisplay designs

Evaluation Kits available



Ultra-low power | Bi-directional | AR | VR

	UUGL1120	UUGL1220	UUGL1320	EBCW1020	HUCW1010	JUCW1010
resolution	304x256	304x128	720x256	800x600	1280x720	1920x1200
color	mono	mono	mono	RGBW	RGBW	RGBW
Max. current per pixel	~2µA/pixel (~1,3A/cm²)	~2µA/pixel (~1,3A/cm²)	~900nA/pixel (~3,6A/cm²)	~1µA/pixel (~1,56A/cm²)	~2.8µA/pixel (~2,3A/cm²)	~2.8µA/pixel (~2,3A/cm²)
Screen diagonal	0.19“	0.16“	0.15“	0.63“	0.64“	1.0“
Data Interface	SPI	SPI	SPI	parallel	parallel	parallel
Configuration interface	SPI	SPI	SPI	I2C	I2C	I2C
Typ. Power consumption	1-3mW	1-3mW	1-3mW	200mW@ 60Hz	100mW@ 60Hz	140mW@ 60Hz

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Outlook: O/LED-on-Silicon features and applications

- high-brightness
  - AR see-through smart glasses
- smart *bi-directional* micro-displays
  - e.g. on-chip embedded eye-tracking
- high-resolution
  - more content (→ HD)
  - 3D, LF, holographic displays
  - smaller chip size, lower cost
- extended spectral emission and detection range
  - <> VIS
  - non-OLED sources → QD, µLED
- New form factors
    - Curved surfaces
    - Non-square shapes
    - Irregular pixel arrays
    - Transparent backplanes
    - Integration into flexible substrates

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Collaboration, contact

- Looking for **partners** in R&D and exploitation
  - Customer-/application-specific devices
    - Application requirements, specifications
      - AR, VR, imagers, sensors, lab-on-chip,…
    - System/application integration
      - optics, electronics, sensing, communication,…
  - Manufacturing technology
    - new materials/processes (e.g., µLED, QD)
    - Pilot-fabrication
  - Privately and publicly funded collaborative projects
  - Technology transfer/licensing

- Dr. *Uwe Vogel*
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