

PRESS RELEASE

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Full-Color RGBW Microdisplays: Next Generation for Brilliant, Energy-Efficient Visualization

Scientists at the Fraunhofer Institute for Photonic Microsystems IPMS have developed a full-color OLED microdisplay based on a 28 nm CMOS process, which is highly efficient and features smallest pixels. The display will be presented at Eurodisplay 2026, taking place from September 22 to 24, 2026 in Dublin, Ireland.

Fraunhofer IPMS is showcasing a new generation of full-color RGBW microdisplays based on a 28 nm CMOS process at Eurodisplay 2026. These advanced displays are specifically designed for near-to-eye visualization and projection, unlocking numerous innovative applications.

The new microdisplays are ideally suited for use in augmented reality (AR), virtual reality (VR), and mixed reality glasses. Thanks to their high resolution and efficiency, they are also perfect for portable devices and applications that require superior image quality with a small form factor microdisplay.

The displays are manufactured using a state-of-the-art 28 nm CMOS process. The flexible backplane architecture combines two driving concepts: frame-based (for continuous updates) and memory-based (for static content). Full-color RGBW pixels are created by an integrated White Calculation Block in the backplane, which calculates the white subpixel from standard RGB image data. The extremely small subpixel size of $2.52 \times 2.52 \mu\text{m}^2$ enables exceptionally high pixel densities of up to 5040 PPI.

“Compared to conventional microdisplays, the new solution offers significantly lower power consumption, and ultra-high resolution. The flexible driving modes allow both rapid video playback and extremely energy-efficient display of static images, making the displays ideal for battery-powered, lightweight devices with extended runtime,” explains Philipp Wartenberg, Head of Department IC & System Design at Fraunhofer IPMS.

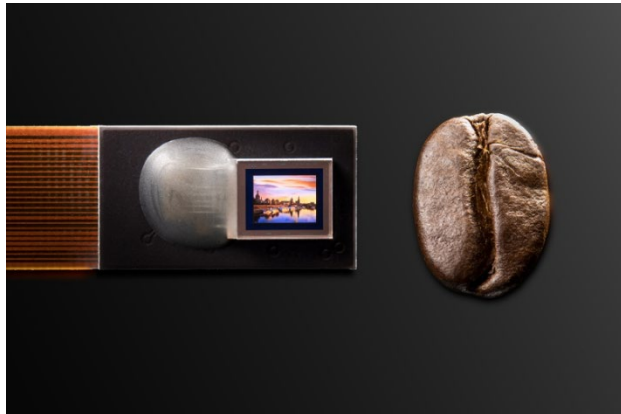
The scientists at Fraunhofer IPMS are developing unique innovative driving concepts for microdisplays - such as those with extremely high pixel density - and can flexibly and customer-specifically adapt display parameters and interfaces. The institute also offers support, from technology consulting and the offer of evaluation kits to pilot production of microdisplays.

Editor

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Image Material**PRESS RELEASE**

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Super-high-resolution and highly efficient colored OLED microdisplay with 720 x 540 pixelsn© Fraunhofer IPMS

Fraunhofer IPMS would like to thank its sponsors for their support. The results were partially developed within these funding projects:

About EdgeVision Microdisplay:

The „RUBIN EdgeVision“ project is funded by the "RUBIN" ("Regional Entrepreneurial Alliances for Innovation") program of the Federal Ministry of Research, Technology, and Space. (FKZ: 03RU2U061C)

About the Backplane project

Backplane – Deep-submicron CMOS process technology for driving integrated microdisplays and evaluation circuits for optical sensors

Funding: Sächsisches Staatsministerium für Wirtschaft, Arbeit, Energie und Klimaschutz

Funding reference: 100392259



FRAUNHOFER INSTITUTE FOR PHOTONIC MICROSYSTEMS IPMS**Fraunhofer IPMS at Eurodisplay 2026**

Table-top booth:

Microdisplays and microscanners

Presentation:

Philipp Wartenberg

“High-brightness low-power Microdisplays for near-to-eye visualization and projection”

Thursday, September 24, 2027, 10 a.m.

About Fraunhofer IPMS

The Fraunhofer IPMS is a leading international research and development service provider for electronic and photonic microsystems in the application fields of Intelligent Industrial Solutions, Medical Technology and Health, Mobility, Green and Sustainable Microelectronics, Aerospace, and Security. The institute works on electronic, mechanical, and optical components and their integration into miniaturized devices and systems. The service range includes everything from concept development to product development and pilot manufacturing in its own laboratories and clean rooms.

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