

PRESS RELEASE

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Fraunhofer IPMS presents innovative SLM Evaluation Kits at Photonix Japan

From Semiconductor Technology to Quantum Computing: Light Modulation Solutions for Japan's Key Industries

The Fraunhofer Institute for Photonic Microsystems IPMS in Germany is a leading research institute in the area of spatial light modulators (SLMs), a technology that is of great relevance to Japan's high-tech industries. At Photonix Japan in Tokyo, the institute will be showcasing its advanced evaluation kits. Thanks to its innovative actuator architecture, Fraunhofer IPMS's novel platform can be equipped with either tilting or piston mirrors, offering a flexible solution for precise light modulation. This enables significant progress in areas such as microlithography, medical technology, astronomy, quantum computing and displays, to name a few.

Japan is one of the world's leading nations in semiconductor manufacturing, medical technology and precision optics — all areas in which spatial light modulators (SLMs) are crucial components for controlling light. Fraunhofer IPMS's research is contributing significantly to the further development of these key industries. SLMs enable the precise modulation of light intensity, direction and phase on a microscopic level and at extremely high speeds. This creates concrete opportunities for Japanese companies in fields such as lithography, microscopy, adaptive optics, and holographic displays.

In order to enable interested companies to test these spatial light modulators, Fraunhofer IPMS offers evaluation kits. An evaluation kit containing arrays of 64,000 individually controllable micromirrors (256 x 256 pixels) will be presented at the Photonix trade fair in Tokyo. Depending on the actuator used, these micromirrors can be tilted or deflected vertically. This feature makes the kits highly versatile, enabling developers to test multiple mirror architectures on a single platform.

"Typically, different mirror technologies necessitate distinct control systems," explains Dr Michael Wagner from Fraunhofer IPMS. "Our kits allow different types of micromirrors to be evaluated on a single system, which is a unique feature that we are also offering to the Japanese market."

The kits can be used for applications in the ultraviolet, visible and near-infrared spectral ranges, which is advantageous for processes in prominent Japanese industries such as semiconductor and medical technology. Fraunhofer IPMS components can also be used in the deep UV wavelength range.

Editor

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The mirrors are controlled by sophisticated electronics that enable modulation frequencies in the kilohertz range. This makes them particularly suitable for applications that require rapid pattern changes. The mirrors' nanometer-precise calibration allows for accurate, almost continuous tilting or piston movements. The complete kit includes control electronics, a micromirror chip and suitable software solutions. Operation support is supplied as well.

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High-precision light modulation for Japanese industry and research

Developments in this field open up a wide range of promising applications in Japan with great potential for future innovation. In microscopy, for example, precise control of 1-axis tilting mirrors could enable selective, high-resolution illumination of samples, setting new standards in imaging. In the semiconductor industry, high-precision modulation methods in the ultraviolet (UV) and deep UV spectrum can further perfect lithography processes. In material processing, low-loss light redistribution using 2-axis tilting mirrors can significantly improve efficiency.

Precise phase modulation using piston mirrors can take 3D projection to a new level. Innovative solutions in the field of holographic 3D displays (e.g. head-up displays) are enabled. So far stereo projection is only able to create 3D visualization effects with perception drawbacks. Piston mirror-based adaptive optics with rapid phase modulation or the creation of optical traps offer exciting perspectives for scientific breakthroughs in astronomy and quantum computing.

Fraunhofer IPMS will be presenting its new Spatial Light Modulator Evaluation Kit and its comprehensive portfolio of high-end spatial light modulators at this year's Photonix Japan, Chiba, Makuhari, from November 12 to 14. Interested parties are cordially invited to visit Fraunhofer IPMS in Hall 8, Booth #4612. Appointments can be booked in advance on the Fraunhofer IPMS website:

<https://www.ipms.fraunhofer.de/en/events/2025/Photonix.html>.

A Japanese-English translator will be present.

About Fraunhofer IPMS

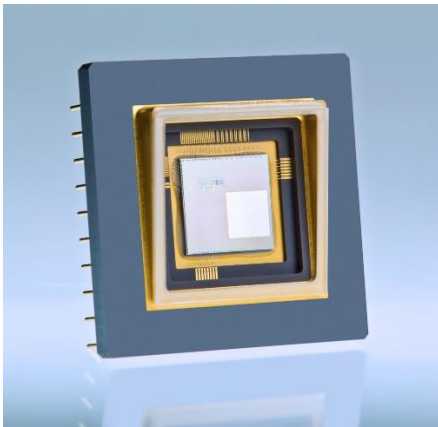
Fraunhofer IPMS is a leading international research and development service provider for electronic and photonic microsystems in the application fields of Smart Industrial Solutions, Bio and Health, Mobility as well as Green and Sustainable Microelectronics. Research focuses on customer-specific miniaturized sensors and actuators, MEMS

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systems, microdisplays and integrated circuits as well as wireless and wired data communication. The institute develops systems and components on 200 and 300 mm wafers in their state-of-the-art clean rooms. Services range from consulting and design to process development and pilot production.

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Images

SLM chip with 256 x 256 micromirrors
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Customer Evaluation Kit with control electronics,
connection cable, and 256 x 256 mirror device
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