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PRESS RELEASE

Fraunhofer IPMS showcases Li-Fi solutions at SPS 2026

Optical wireless communication for flexible and reliable industrial automation

An unstable data connection slows a machine. Cables restrict a robot's movement. These challenges call for new communication approaches. At SPS – Smart Production Solutions 2026, Fraunhofer IPMS is presenting Li-Fi technologies as an optical alternative for reliable data transmission and time-critical applications in industrial automation.

Robots, sensors, controllers, and machines continuously exchange data. As they become increasingly interconnected, demands on speed, availability, and response times grow.

In many industrial applications, this creates trade-offs: cables offer high reliability but reduce the flexibility of moving systems. Radio communication enables mobility but can be affected by electromagnetic interference, metal-rich environments, or high device densities.
"In industrial applications, it is not just wireless data transmission that matters, but above all its availability, speed, and predictability. These requirements determine whether flexible production concepts work reliably," explains Dr. René Kirrbach, Li-Fi group manager at Fraunhofer IPMS.

Fraunhofer IPMS addresses the growing demand for wireless real-time communication driven by increasing automation with Li-Fi solutions for time-critical industrial applications.

Li-Fi: light-based data transmission for industrial applications

Li-Fi (Light Fidelity) uses light as the transmission medium, enabling wireless data communication without conventional radio transmission. A suitable optical connection between transmitter and receiver is required. Fraunhofer IPMS has been developing optical wireless communication solutions for more than 15 years.
Depending on their design, the Li-Fi solutions offer different data rates, interfaces, and features for industrial applications:

- **High speed:** Gbit/s data rates, for example with Li-Fi Grathus®, for data-intensive applications
- **Energy efficiency:** compact, energy-efficient data links with Li-Fi TinySpot for applications with limited space and power budgets

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- **Real-time capability:** Li-Fi Grathus® supports time-critical applications and industrial protocols such as EtherCAT and PROFINET
- **Compatibility:** integration via suitable interfaces, such as Ethernet or UART/SPI, depending on the solution
- **Spatial confinement:** optical transmission along a defined line-of-sight connection
- **Interference resistance:** unaffected by radio interference and electromagnetic influences

Li-Fi solutions for the industrial communication of tomorrow

At SPS 2026 in Nuremberg, Fraunhofer IPMS is presenting selected solutions from its Li-Fi portfolio:
Li-Fi Grathus®: Gbit/s optical data transmission over distances of up to 10 m for demanding industrial applications.
Li-Fi TinySpot: An energy- and space-saving solution for short-range optical data transmission at data rates of up to 20 Mbit/sps.
Li-Fi Power over Light (PoL): Simultaneous data and power transmission for autonomous sensor nodes.
Li-Fi GigaCoupler: A light-based optocoupler for Gbit/s data transmission with galvanic isolation, for example on printed circuit boards.

The demonstrators illustrate Fraunhofer IPMS's development expertise, from optical components and integrated circuits to communication design and custom system development.

From research to industrial application

With different transmission distances, form factors, and data rates, the Li-Fi solutions cover a range of industrial communication scenarios, including machinery and plant engineering, robotics, and sensor applications.
Fraunhofer IPMS will present its solutions at SPS from November 24 to 26, 2026, at the joint booth *Automation meets IT* in Hall 6, Booth 350D, at the exhibition center in Nuremberg. Appointments with the experts can be arranged in advance via the Fraunhofer IPMS website.

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About Fraunhofer IPMS

Fraunhofer IPMS is a world-renowned research and development service provider specializing in electronic and photonic microsystems. Our technologies are used in industries such as mobility, biotechnology, and medical technology. We are also addressing key future fields, such as quantum technologies and neuromorphic

computing. Through our research in green microelectronics, we contribute to a sustainable and resource-efficient world.
The Data Communication and Computing (DCC) business unit develops innovative technologies for secure data communication in the forward-looking fields of IP cores, Li-Fi (light-based data transmission), and quantum technologies. These developments open up new communication opportunities in key industries such as mobility, telecommunications, industrial automation, and energy supply.

Images



Light-based data transmission (Li-Fi) in industrial automation
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Li-Fi Grathus® – Ethernet via optical wireless communication (OWC)
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Two Li-Fi TinySpot modules.
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LiFi Power over Light (PoL) handheld demonstrator
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GigaCoupler Transceiver
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