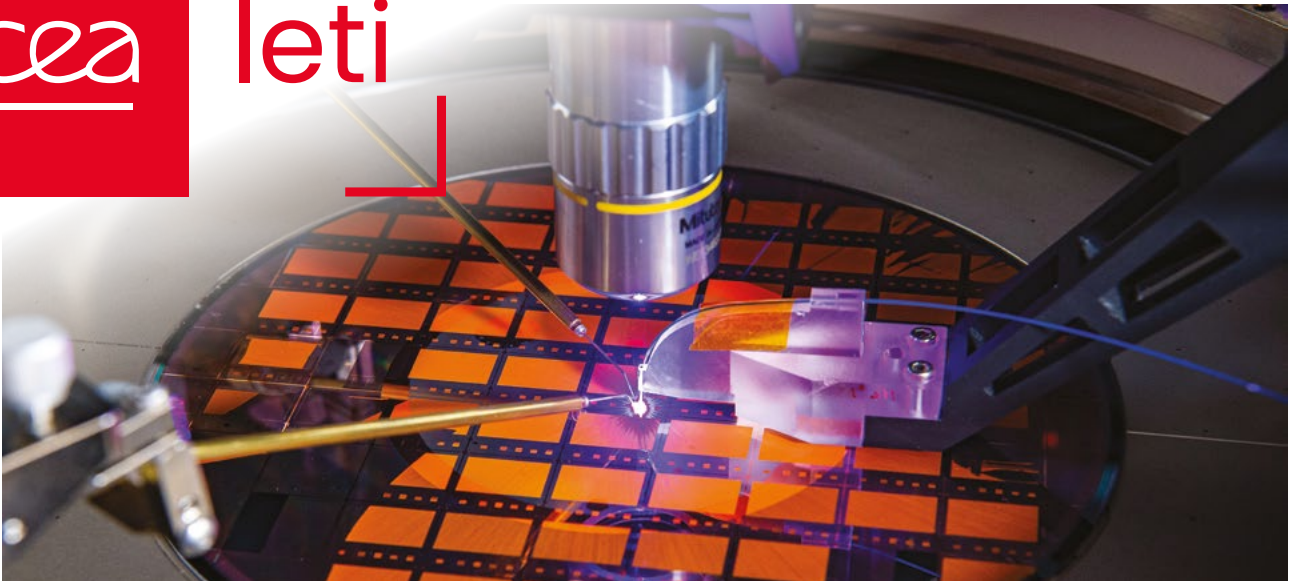




cea

leti



# Advanced microLED technologies

PATENTS  
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PATENTS

High-performance solutions for next-generation displays and data communications for AI, HPC, and data centers

## What it is

CEA-Leti's advanced GaN microLED technologies address tomorrow's display and data communication challenges, achieving new levels of performance.

GaN microLEDs are crossing new frontiers in pixel sizes and performance. Thanks to a wide range of technologies, CEA-Leti can support every stage of the new product development process for industry.

CEA-Leti's GaN microLED technology portfolio is backed by advanced design, simulation, fabrication, and characterization equipment, right up to pilot lines. Capabilities include epitaxial deposition, LED device fabrication on 200 mm and 300 mm wafers and on ASICs, plus LED die packaging.

## What it can do

CEA-Leti's microLEDs can help enable "more display," "more than display," and "beyond display" innovations:

- **Microdisplays** for integration into smart glasses, virtual and augmented reality headsets, and head-up displays.
- **Device integration** (VIS/NIR/SWIR sensors, RF antennas, etc.) into microLED pixels and displays to address near-field gesture recognition, fingerprint readers, and wellness devices like wearables.
- **Optical interconnects** for chip-to-chip and chip-to-memory data communications for artificial intelligence, high-performance computing, and data centers.

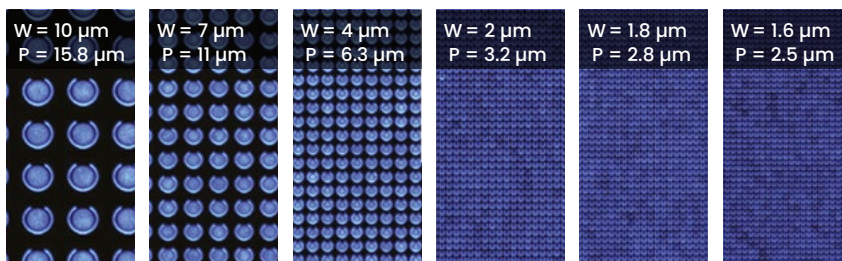
## What makes it unique

CEA-Leti's GaN microLED technologies span the entire value chain:

- **Design & simulation:** Optimize configuration and reduce experiment costs.
- **Materials & substrates:** Integrate innovations at the material and epitaxy levels.
- **Processes & dies:** Leverage proven silicon technologies for efficient process flows and scaleup.
- **Devices:** Boost performance of contacts, mirrors, passivation, and directivity.
- **Integrated circuit design:** Design ASICs for OLEDs, microLEDs, and Rx/Tx transceivers.
- **Systems:** Address system-level specifications and HPC architectures.

MicroLED technologies tackle one of the bottlenecks to tomorrow's virtual and augmented reality systems: high-resolution and high-brightness displays. For data communications, CEA-Leti's microLED technology, combined with 3D integration, enables a compact, mono-chip solution scalable to 300 mm and compatible with advanced data communication interface roadmaps.

Fabrication of pixels down to 1 micron ▼



## Working with CEA-Leti

Companies of all types and sizes can work with CEA-Leti to develop **differentiating products that integrate the latest GaN microLED technologies.**

Proven R&D partnership management processes and robust intellectual property policies are specifically designed to bring new idea from the lab to the market, securely and efficiently.

From design and prototyping through to recurrent batches on its own pilot lines, CEA-Leti possesses the capabilities needed to rapidly prepare new technologies for volume manufacturing, helping industrial players maintain a competitive advantage.

## CEA-Leti microLED technologies

- MicroLED arrays
- Native-red microLEDs
- Color conversion solutions
- Resonant cavity microLEDs
- Light extraction
- Device and system simulation
- MicroLED epitaxy
- Die-to-wafer & wafer-to-wafer 3D integration
- Integrated circuit design
- Smart pixels and multifunctional displays
- Free space communication & modulation

## Publications

- Le Maitre, P. et al. (2024). "Short-range optical communication with GaN-on-Si microLED and microPD matrices." Journal of the Society for Information Display.
- Templier, F., & Dubarry, C. (2022). "Challenges and Solutions for the Fabrication of CMOS-driven MicroLED Displays." Proceedings of the International Display Workshops, 29, 871.
- Templier, F. (2023). "MicroLED Technology: A Unique Opportunity Toward 'More Than Displays.'" Information Display, 39, 13-17.

## Interested in this technology?

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