



MicroLED for communications

A visible light communication system to improve speed, density and power consumption for high-performance computing

MicroLED communication system

CEA-Leti has been working on microLED and related display technology for many years. Thanks to this expertise, CEA-Leti develops light communication system using microLED arrays to emit a modulated light signal that carries information. This light is coupled with an optical fiber bundle and sent through multiple parallel fibers. Once it is detected by a micro-photodiode array, it is converted to electrical signals.

Applications

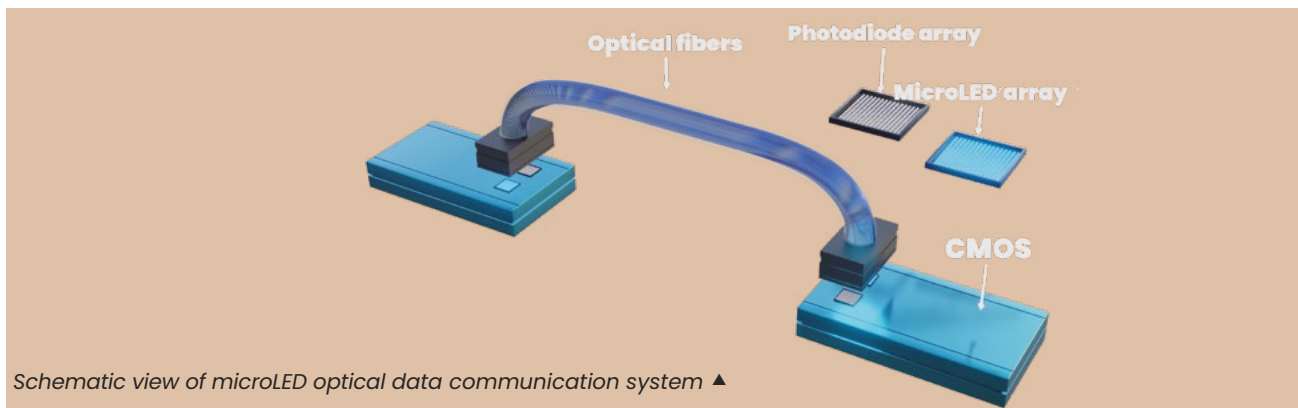
This technology can be used for any application that requires high data throughput and high density data transfer, such as high performance computing and data centers, to address the needs of many applications sectors like:

- Transportation
- Future medical applications
- Smart grids
- Smart cities
- Industry 4.0

What's new?

Advances in high performance computing are currently hampered by limitations in interconnect power and density. By using optical communications system based on microLED arrays, CEA-Leti's solution for distances up to 10 meters comes with numerous benefits:

- Direct integration with CMOS technology
- Very high energy efficiency: <1 pJ/bit energy efficiency
- >125 °C working temperature
- 1 Gb/s per microLED combined with parallel transport via a multichannel fiber bundle leads to very high data throughput
- Very high data density: up to 20 Tb/s/mm²
- Competitive pricing thanks to existing GaN lighting and microLED display industries



What's next?

Our collaborative offer covers the following technological bricks:

- MicroLED components and matrices
- Micro-photodiode components and matrices
- Optical fiber packaging with components
- MicroLED & micro-photodiode matrix integration onto ASICs
- ASICs, digital part design, modulation protocols

CEA-Leti is working on a variety of challenges such as: increasing the bandwidth of microLED and micro-photodiodes, improving energy efficiency, and coupling microLED array light into optical fiber bundles, among others.

Interested in this technology?

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