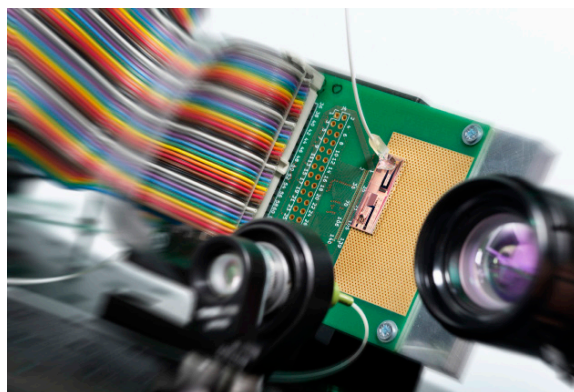


Imec's compact solid-state LiDAR technology

Imec is developing an affordable LiDAR system-in-a-package solution which will open the technology to a new range of applications. Thanks to imec's innovations on system architecture and building blocks, this small, highly accurate Silicon Photonics chip will serve as a sensor that measures distance-to-target by illuminating the target with a reconfigurable discrete pattern of light using a coherent optical engine for detection.

Photonic integrated circuits for next generation LiDAR chips

A LiDAR (Light Detection and Ranging) system computes distances by illuminating a scene with a laser, capturing the reflected light, and then forming a 3D image of the environment, containing range data. Though LiDAR has been in use for high-end applications for decades, new developments now make it available for several new applications, such as autonomous driving, intelligent machine vision, consumer electronics and robotics. To this end, imec develops a miniaturized, affordable, solid-state solution operating in the short-wavelength infrared (SWIR) region.



Optical Phased Array test assembly for LiDAR

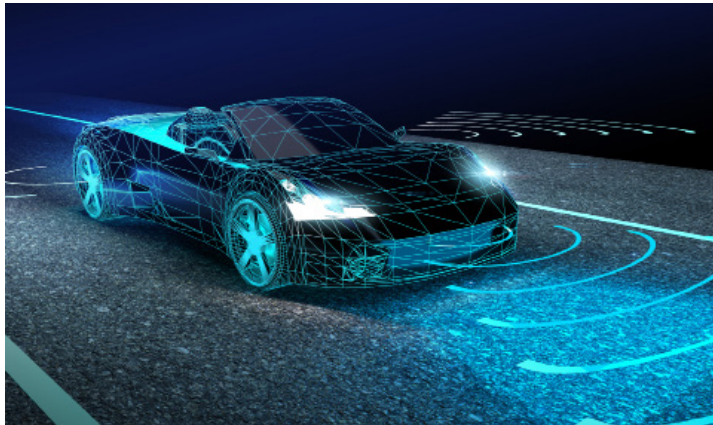
Key benefits

- **Small size and light weight.** Imec's chip-based solution will significantly reduce the form factor of LiDAR modules. This enables integration in numerous applications, even drones (due to the module's light weight).
- **Low power consumption.**
- **Cost-effective.** By using semiconductor technology, the cost can be drastically reduced.
- **Ranging up to 300 meters.** While many applications can benefit from this feature, this will be crucial for long-range automotive applications in autonomous driving and advanced driver-assistance systems (ADAS).

Specifications of LiDAR demos

Several compact LiDAR chips are being developed, at wavelengths around 1550nm, to demonstrate the unique capabilities of semiconductor technology.

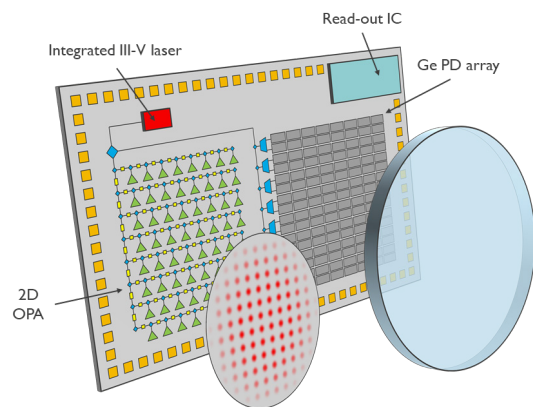
- High angular resolution ($< 0,1^\circ$) in both horizontal and vertical directions.
- Eye-safe
- Maximum range of 300 meters
- Range resolution of a few centimeters
- Capable of performing imaging at several frames per second (target 10-30Hz)



LiDAR for ADAS and autonomous vehicles

Applications

- Autonomous vehicles
- Aerial drones
- Automation of factory robots
- Service robots in hospitals and other customer-oriented environments
- Assisted surgery
- Intelligent machine vision and robotics
- Agriculture
- Consumer electronics (e.g. in smartphones)



Photonic integrated circuit-based LiDAR concept with laser source, beamsteering array, photodetector array, and dedicated read-out IC

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