applied optics

Applied Optics Research at imec: introduction to the feature issue

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This feature issue provides an overview of the current applied optics research activities taking place at imec, Interuniversity Microelectronics Center, at its campuses in Leuven, Brussels and Ghent, Belgium. The issue contains articles covering wide range of topics on imaging systems, image processing, new materials, optical devices, sensors and detectors.

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Imec is a world-leading research and innovation center in nanoelectronics and digital technologies. Imec leverages its state-of-the-art research and development infrastructure and its team of more than 5,500 employees and top researchers, for research in advanced semiconductor and system scaling, silicon photonics, artificial intelligence, beyond 5G communications and sensing technologies, and in application domains such as health and life sciences, mobility, industry 4.0, agrofood, smart cities, sustainable energy and education.

Imec unites world-industry leaders across the semiconductor value chain, Flanders-based and international tech, pharma, medical and ICT companies, start-ups, and academia and knowledge centers. Headquartered in Leuven (Belgium), it has research sites across Belgium, in the Netherlands and the USA, and representation on three continents.

In this issue sourced by various departments active in the fields of image processing, optical devices, sensors and detectors, imec presents a few of the most recent contributions in the are of applied optics.

The IMEC-ARF department is active in research and development of the millimeter wave and sub-10GHz technologies, for communications and radar applications.

IMEC-SAT is active in development of disruptive technologies for both light emission and detection. One of the aspects is combining novel materials with properties beyond incumbent semiconductors to enable new types of displays and image sensors. The scope is proof-of-concept realization with an outlook towards a producible solution that can enable new use cases.

The IMEC-IPI department is involved in research on sensor-fusion for automotive applications, medical imaging, image, video and 3D quality enhancement. Our sensor fusion research focuses on computer vision based object detection based on joint information from RGB, thermal camera, radar and lidar.

Imec's involvements in the domain of digital holography for 3D imaging extend over the entire signal processing chain: from efficient generation, over compression and various targeted manipulations, to visual quality assessment and standardization efforts within JPEG Pleno (ISO/IEC 21794).

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