



SOI & ADVANCED SUBSTRATES NEWS
ACCELERATING INDUSTRY GROWTH | Bi-Weekly Newsletter

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SILICON-ON-INSULATOR COUPLED
WAVEGUIDE-RESONATOR SENSOR:
TRADE-OFF BETWEEN SENSITIVITY
AND OTHER PERFORMANCE
PARAMETERS

This work presents a novel SOI sensor integrating a hybrid plasmonic waveguide for high refractive index sensitivity (210 nm/RIU), optimizing the inherent trade-offs with other performance parameters for photonic biosensing.

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WAVEGUIDE-MULTIPLEXED
PHOTONIC MATRIX-VECTOR
MULTIPLICATION PROCESSOR
USING MULTIPORT
PHOTODETECTORS

This work presents a scalable intensity-based photonic MVM processor on a SOI platform, utilizing waveguide multiplexing and multiport photodetectors for deep learning acceleration. This approach offers a simplified and efficient foundation for large-scale optical neural networks.

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VOLTAGE CONTROLLED MAGNETIC
TUNNEL JUNCTION BASED ADC
LESS PROCESSING-IN-PIXEL FOR
EXTREME EDGE INTELLIGENCE

This work presents an ADC-less processing-in-pixel architecture on GlobalFoundries' 22nm FD-SOI technology, leveraging VC-MTJs for energy-efficient edge AI. It enables binary activation neural networks with a global shutter, delivering significant energy and bandwidth improvements for computer vision tasks.

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EXPERIMENTAL DEMONSTRATION
OF DUAL-POLARIZATION
MULTIPLEXED OPTICAL PHASED
ARRAY EMPOWERED BY INVERSE
DESIGN

This work demonstrates a dual-polarization optical phased array (OPA) on a 220nm SOI platform, utilizing inverse design to overcome mode disparity. It achieves a 34.9° longitudinal and full 2-D beam steering across TE/TM modes, promising advancements for LiDAR and optical wireless communication.

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SOI ECOSYSTEM NEWS

AMD UNVEILS VISION FOR AN OPEN
AI ECOSYSTEM, DETAILING NEW
SILICON, SOFTWARE AND SYSTEMS
AT ADVANCING AI 2025

AMD unveiled its vision for an open AI ecosystem at Advancing AI 2025, launching new Instinct MI350 Series accelerators and detailing next-gen "Helios" rack-scale solutions.

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CEA-LETI AND SOITEC ANNOUNCE
STRATEGIC PARTNERSHIP TO
LEVERAGE FD-SOI FOR ENHANCED
SECURITY OF INTEGRATED
CIRCUITS

CEA-Leti and Soitec have formed a strategic partnership to leverage FD-SOI technology for enhanced cybersecurity of integrated circuits, specifically targeting critical markets like automotive and industrial IoT.

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FABRICATION OF HIGH-GE-CONTENT
SILICON GERMANIUM FILM ON
SIO2/SILICON (111) PATTERNED
SUBSTRATE BY EPITAXIAL LATERAL
OVERGROWTH

This research details an effective method for fabricating high-quality, high-Ge-content SiGe films on patterned silicon, significantly improving material quality for advanced semiconductors by suppressing defects and benefiting the wider ecosystem.

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CMOS-COMPATIBLE SHORT-WAVE
INFRARED LINEAR ARRAYS OF GE-
ON-SI AVALANCHE PHOTODIODES

This work demonstrates mass-manufacturable, CMOS-compatible Ge-on-Si Avalanche Photodiode arrays for SWIR detection, enabling widespread integration of high-performance optical detectors on silicon to expand the semiconductor ecosystem's capabilities.

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COMPOUND SEMICONDUCTOR

MITSUBISHI ELECTRIC
CORPORATION CLAIMS TO HAVE
DEVELOPED THE FIRST COMPACT 7
GHZ BAND GALLIUM NITRIDE (GAN)
POWER AMPLIFIER MODULE (PAM)
WITH THE HIGHEST POWER
EFFICIENCY.

Mitsubishi Electric has developed the first compact 7 GHz band gallium nitride (GaN) power amplifier module (PAM) with record power efficiency. This breakthrough is set to enhance the installation ease and power efficiency of 5G-Advanced and future 6G base stations.

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THEORY OF THE DIVACANCY IN 4H-
SIC: IMPACT OF JAHN-TELLER
EFFECT ON OPTICAL PROPERTIES

This work uses first-principles calculations to study divacancy configurations in 4H-SiC, focusing on how the Jahn-Teller effect impacts their optical properties. The findings provide insights into electron-phonon interactions within this compound semiconductor, guiding the design of quantum emitters for quantum technologies.

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RESEARCHERS DISCOVER LED
'EFFICIENCY CLIFF'

Researchers uncovered an "efficiency cliff" in submicron InGaN LEDs, showing significant performance drop due to sidewall issues. This highlights a critical challenge for compound semiconductor devices, requiring new passivation methods for future miniature light emitters.

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RESEARCH ON IMPROVING THE
AVALANCHE CURRENT LIMIT OF
PARALLEL SIC MOSFETS

This research presents an innovative parameter-matching method to significantly improve the avalanche current limit of parallel SiC MOSFETs. This enhances the safety and reliability of these critical power devices for high-performance systems..

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SEMI BLOG

THE CRITICAL ROLE OF PENDULUM
VALVES AND THEIR SEALS IN
SEMICONDUCTOR WAFER
PROCESSING

The rapid expansion of the semiconductor industry, with 97 new fabs launching by 2025, highlights the critical role of pendulum valves in wafer manufacturing. These essential components regulate gas flow and vacuum conditions in etch and deposition chambers, with their longevity and reliability heavily dependent on the performance and maintenance of specialized seals to prevent costly failures and ensure high chip yield.

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SEMI NEWS HIGHLIGHT

58 PARTNERS CHARGED WITH
IMPLEMENTING CUTTING-EDGE
SOLUTIONS FOR EMISSION
CONTROL, MATERIALS INNOVATION,
WASTE REDUCTION, AND RAW
MATERIAL REUSE

A pan-European consortium has launched the GENESIS project, a €55 million initiative led by CEA-Leti with 58 partners, aimed at achieving sustainable semiconductor manufacturing across Europe. This integrated effort will drive 45 innovations in emission control, eco-friendly materials, waste minimization, and raw material reuse to green the chip industry.

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EVENTS



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