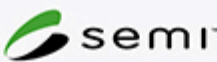




SOI & ADVANCED SUBSTRATES NEWS
ACCELERATING INDUSTRY GROWTH | Bi-Weekly Newsletter

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SOI: Powering AI Efficiency

Our civilization is currently driven by the powerful wave of AI, through the development of advanced large language models and data centers. Energy consumption is a crucial issue among these key enabling technologies. At CEA-Leti, we are convinced that the most powerful lever of improvement lies in energy efficiency: to do more with less energy and resources, SOI once again represents a major solution.

Michaël Tchagaspian
EVP, Technology Strategic Partnerships



FEATURED IN THIS EDITION

RESONANT INTEGRATED OPTICAL GYROSCOPE WITH AN ULTRA-HIGH Q VALUE SOI RESONANT RING

This paper presents in-depth research on resonant optical gyroscopes, successfully demonstrating a high-Q silicon on insulator (SOI) resonator that enabled a compact, single-chip integrated resonant optical gyroscope (RIOG), significantly reducing its size for broader applications.

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ALL-ON-CHIP RECONFIGURABLE GENERATION OF SCALAR AND VECTORIAL ORBITAL ANGULAR MOMENTUM BEAMS

This work reports the first all-on-chip structured light generator capable of creating both scalar and vectorial angular momentum beams. Facilitated by a silicon-on-insulator (SOI) chip with a silica mode multiplexer, this compact generator precisely controls multiple linearly-polarized modes to synthesize various angular momentum states.

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UNCOOLED, BROADBAND TERAHERTZ BOLOMETERS USING SOI MEMS BEAM RESONATORS WITH PIEZORESISTIVE READOUT

This work presents an uncooled, broadband terahertz (THz) bolometer using SOI MEMS beam resonators with piezoresistive readout. It demonstrates high sensitivity and fast response, proving its strong potential for advanced THz spectroscopy and imaging applications.

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ULTRA-LOW-LOSS SILICON PHOTONIC WAVEGUIDES OPERATING WITH THE WAVELENGTH-BANDS OF 1.31/1.55/2 MM

Ultra-low-loss silicon photonic waveguides have been demonstrated on a 220 nm SOI platform. These waveguides achieve record-low propagation losses (down to 0.07 dB/cm) across 1.31, 1.55, and 2 μm wavelength-bands, critically advancing photonic integrated circuits.

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SOI ECOSYSTEM NEWS

INFINEON ADVANCES ON 300-MILLIMETER GAN MANUFACTURING ROADMAP AS LEADING INTEGRATED DEVICE MANUFACTURER (IDM)

Infineon announced it is on track with scalable gallium nitride (GaN) manufacturing on 300-millimeter wafers, with first customer samples in Q4 2025. This leverages their IDM strategy to meet growing demand for GaN semiconductors in applications like EV charging and AI systems, aiming for cost parity with silicon.

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PHOTONDELTA AND LUMINATE NY ANNOUNCE COLLABORATION TO CREATE TRANSATLANTIC GROWTH NETWORK FOR PHOTONICS STARTUPS

PhotonDelta and Luminate NY announced a strategic collaboration to accelerate global photonics innovation. This transatlantic partnership creates a growth network, offering early-stage photonics companies access to technology development, funding, and market strategies in both the U.S. and Europe.

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SPIN-QUBIT CONTROL WITH A MILLI-KELVIN CMOS CHIP

Researchers successfully benchmarked silicon MOS-style electron spin qubits controlled by low-power-density cryo-CMOS circuits at milli-kelvin temperatures. This demonstrates efficient universal logic operations with minimal impact on qubit performance, paving the way for scalable quantum control.

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DIRECT OBSERVATION OF 3D NITROGEN DISTRIBUTION IN SILICON-BASED DIELECTRICS USING ATOM PROBE TOMOGRAPHY

A novel atom probe tomography approach directly observed 3D nitrogen distribution in silicon-based dielectrics. This provides crucial atomic-scale insights into nitrogen's effect on electrical properties and reliability, advancing next-generation semiconductor devices.

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COMPOUND SEMICONDUCTOR

EU PROJECT TO PROVIDE 4 INCH ALN CRYSTALS

In a pioneering project, IKZ, PVA TePla AG, and Siltronic have partnered to scale up aluminum nitride (AlN) crystal growth to 4-inch substrates. This collaboration is a crucial milestone for industrializing AlN, enabling its mass production for high-power electronics and UV photonics.

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UK TEAM COLLABORATE TO PIONEER CDTE PVS FOR SPACE

Swansea and Loughborough Universities are collaborating to develop game-changing CdTe solar cells on ultra-thin glass for space applications. This project aims to transform space solar power by providing a lighter, cheaper, and radiation-resistant alternative to current technologies.

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1-NM-THICK EPITAXIAL ALN PASSIVATION FOR HIGHLY EFFICIENT FLEXIBLE INGAN RED MICRO-LEDs

This research reports a 1-nm-thick epitaxial AlN passivation for 1.5-μm-diameter InGaN red micro-LEDs. It achieves high external quantum efficiency and flexible form factors through device transfer. This breakthrough overcomes key bottlenecks for inorganic micro-LEDs, enabling advancements in AR and metaverse industries.

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THE CHARACTERISTICS AND POLARIZATION EFFECTS IN ALINGAN BARRIER GAN MISHEMT WITH VARIOUS COMPOSITIONS OF GROUP III ELEMENTS

This study uses Sentaurus TCAD simulation to explore how varying compositions of AlxInyGaN barrier layers impact AlInGaN/GaN MISHEMT performance. Findings highlight the importance of precise material composition control and an AlN spacer layer in optimizing these devices.

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SEMI BLOG

SEMI SCC RELEASES GUIDANCE ON CALCULATING SCOPE 3 CATEGORY 11 EMISSIONS FOR THE SEMICONDUCTOR SECTOR

The Semiconductor Climate Consortium (SCC)'s Scope 3 Working Group has released a new guidance document for calculating Scope 3, Category 11 emissions within the semiconductor sector. This initiative aims to standardize emissions reporting and calculation methods, specifically addressing the unique complexities of the semiconductor supply chain to facilitate industry-wide sustainability efforts.

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SEMI NEWS HIGHLIGHT

SEMI AND LINX CONSULTING UNVEIL WAFER FAB MATERIALS QUARTERLY REPORT

SEMI, in collaboration with Linx Consulting, launched the new Wafer Fab Materials Quarterly report, providing timely, actionable insights and forecasts for global wafer fab materials markets. Published quarterly, this comprehensive report covers various materials, tracks supplier performance, and offers capacity forecasts, aiding strategic decision-making in the dynamic semiconductor industry.

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