Photonics

Weekly Intelligence Report

2026-06-27 | 46 articles | 11 countries

troy-technical.jp

This Week's Keyword

AI Optical Interconnects

$15B+ investments, 1.6T/3.2T modules

46 articles	11 countries	$15B+ USD	68% power reduction
Total Articles Analyzed	Source Countries/Regions	SiPh M&A/Investments	CPO Efficiency Gain

All 46 Articles This Week — 5-Axis Evaluation Matrix

How to read columns — Tech Novelty: degree of breakthrough Market Proximity: closeness to commercialization Market Impact: industry-wide effect Data Reliability: quantitative data & peer review US/EU Relevance: direct impact on US/European companies & supply chains

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#01	$15B+ SiPh M&A;/Invest	Market Overview	●●●○○	●●●●●	●●●●●	●●●●○	●●●●●	Silicon photonics sees over $15B in M&A;/investments (NVIDIA, Marvell, Ayar Labs) for AI, overcoming copper limits.
#02	On-Chip Photonics Mfg	Analysis	●●●○○	●●●○○	●●●●○	●●○○○	●●●●●	On-chip photonics is crucial for AI scaling, but manufacturing infrastructure and standardization are urgent challenges.
#03	Credo NPO for AI DC	Corporate Strategy	●●●○○	●●●●○	●●●○○	●●○○○	●●●●●	Credo advocates Near-Package Optics (NPO) for AI data centers, balancing power efficiency and serviceability as CPO bridge.
#04	Credo SiPh Future	Corporate Strategy	●●○○○	●●●●○	●●●○○	●●○○○	●●●●●	Credo sees silicon photonics as key for high-bandwidth, low-power AI/cloud, akin to semiconductors for electronics.
#05	STM PIC100 to China	New Product	●●○○○	●●●●●	●●●●○	●●●○○	●●●●●	STMicroelectronics expands silicon photonics market with PIC100 chip order from a Chinese optical transceiver manufacturer.
#06	CPO Mass Production	Analysis	●●●○○	●●●○○	●●●●●	●●○○○	●●●●●	CPO mass production is the urgent priority for AI data centers, as connectivity becomes the next bottleneck.
#07	CPO 1.6T 68% Power	Analysis	●●●○○	●●●○○	●●●●●	●●●○○	●●●●○	CPO enables 1.6T optical modules, slashing 800G port power consumption by 60-68%, crucial for AI infrastructure.
#08	Xscape FalconX Laser	New Product	●●●●○	●●●●○	●●●●○	●●●○○	●●●●●	Xscape Photonics launches 8-wavelength "FalconX" laser for AI data centers, raising $37M to address power, distance, bandwidth.
#09	NPO/CPO Roadmap	Market Forecast	●●○○○	●●●○○	●●●●○	●○○○○	●●●●●	AI hardware to transition to NPO by 2027/28, then CPO by 2029, shaping future AI infrastructure.
#10	China DT-OCS for AI	Research	●●●●●	●○○○○	●●○○○	●●○○○	●●○○○	Chinese scientists propose 'Digital Twin Optical Computing System' (DT-OCS) for AI, a virtual light-based computer system.
#11	Marvell+Celestial AI	Corporate Strategy	●●●○○	●●●●○	●●●●○	●●○○○	●●●●●	Marvell leverages Celestial AI's Photonic Fabric for AI networking, boosting stock 14% by enhancing speed/memory loads.
#12	GitHub SiPh Projects	Market Overview	●●○○○	●●○○○	●●○○○	●○○○○	●●●●●	GitHub hosts diverse open-source silicon photonics projects for optical computing and analog links, promoting R&D.;

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#13	Nokia US 400Tbps Net	New Product	●●●○○	●●●●●	●●●●○	●●●●○	●●●●●	Nokia, t3 Broadband, Aureon deploy 100Tb/s (scalable to 400Tb/s) AI-optimized optical network in US Midwest.
#14	Tower+Marvell 5M PICs	New Product	●●●○○	●●●●●	●●●●○	●●●●○	●●●●●	Tower Semiconductor & Marvell ship over 5M coherent PICs for AI data centers, enabling high bandwidth/energy efficiency.
#15	Training-Free Opt Proc	Research	●●●●●	●○○○○	●●●○○	●●●●●	●●●●●	arXiv paper demonstrates broadband, compact, training-free optical processors for parallel image classification.
#16	Optalysys PQC	Research	●●●●○	●●○○○	●●●○○	●●○○○	●●●●●	Optalysys uses photonics to accelerate lattice-based cryptography, enhancing security for the quantum computing era.
#17	TSMC CoWoS Capacity	Corporate Strategy	●●○○○	●●●●●	●●●●●	●●●○○	●●●●○	TSMC accelerates advanced packaging strategy to address CoWoS capacity shortfall, driven by AI accelerator demand.
#18	NVIDIA $4B Optics, US	Market Overview	●●●○○	●●●●●	●●●●●	●●●●○	●●●●●	NVIDIA invests $4B in optical interconnects; US quantum foundry leverages $4.6B to become next TSMC.
#19	Optical I/O & CPO Fund	Market Overview	●●●○○	●●●●○	●●●●●	●●●○○	●●●●●	Semiconductor industry prioritizes optical I/O and CPO with significant investments to fortify AI infrastructure.
#20	Broadcom AI ASIC+Opt	Corporate Strategy	●●●○○	●●●●●	●●●●○	●●●○○	●●●●●	Broadcom fortifies cash flow with $3B buyback to accelerate AI ASIC and optical interconnect strategy.
#21	SuperX 1.6T Modules	New Product	●●●○○	●●●●○	●●●○○	●●○○○	●●●○○	SuperX to unveil 1.6T optical modules for AI data centers at Interop Tokyo 2026, leveraging DSP and silicon photonics.
#22	NTT IOWN AI Energy	Research	●●●●○	●●●○○	●●●●○	●●●●○	●●●○○	NTT demonstrates 30% energy reduction in AI training via remote distributed deployment using IOWN photonic network.
#23	Optical Chip Capacity	Market Overview	●●○○○	●●●●●	●●●●●	●●●○○	●●●●●	Global optical chip capacity expands dramatically due to AI data center demand; STMicro & Source Photonics invest.
#24	QIA HyperLight TFLN	New Product	●●●●○	●●●○○	●●●●○	●●●○○	●●●●○	Qatar Investment Authority backs HyperLight's $80M round to accelerate thin-film lithium niobate PIC deployment for AI.
#25	Coherent InP Fab Exp	Corporate Strategy	●●●○○	●●●●●	●●●●●	●●●●○	●●●●●	Coherent expands Texas InP fab, quadrupling wafer production with $2B NVIDIA investment for AI optical interconnects.
#26	Quandela+NVIDIA QPU	Research	●●●●○	●●○○○	●●●○○	●●●○○	●●●●●	Quandela validates ultra-low latency photonic QPU integration with NVIDIA GPU via NVQLink for real-time hybrid computing.
#27	Ayar Labs+NVIDIA CPO	Corporate Strategy	●●●○○	●●●●○	●●●●○	●●○○○	●●●●●	Ayar Labs joins NVIDIA NVLink Fusion to deploy Co-Packaged Optics in rack-scale AI infrastructure.
#28	Ciena 3.2Tbps Optics	New Product	●●●●○	●●●○○	●●●●○	●●●○○	●●●●●	Ciena develops 3.2 Tbps optical networking for NVIDIA's AI platform, accelerating commercialization within 1-2 years.
#29	Nokia US ATP Expans	Corporate Strategy	●●○○○	●●●●●	●●●●○	●●●○○	●●●●●	Nokia expands US semiconductor advanced test and packaging capacity 10x in Pennsylvania to bolster AI growth.
#30	Nokia Agentic AI Net	New Product	●●●●○	●●●●○	●●●○○	●●●○○	●●●●●	Nokia enhances autonomous networks with agentic AI, automating optical network operations for proactive detection.
#31	Nokia MCT Subsea 30T	New Product	●●●○○	●●●●●	●●●○○	●●●○○	●●●○○	Nokia partners with Symphony Communication to upgrade MCT subsea cable to 30Tbps, enhancing SE Asia AI infrastructure.

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#32	Lumentum Stock/Short	Market Forecast	●○○○○	●●●●●	●●●●●	●●●○○	●●●●●	Lumentum stock surges on optical demand; McKinsey forecasts 800G/1.6T transceiver shortages, boosting margins.
#33	HyperLight $80M TFLN	New Product	●●●●○	●●●○○	●●●●○	●●●●○	●●●●●	HyperLight secures $80M Series C led by MediaTek to accelerate TFLN PIC manufacturing for AI infrastructure.
#34	1.6T: SiPh, InP, TFLN	Comparison	●●●○○	●●●○○	●●●●○	●●○○○	●●●●●	SiPh, InP, and TFLN fiercely compete as core materials for 1.6T optical modulators, driven by AI data center demands.
#35	Coherent LiDAR 3D	Research	●●●●●	●○○○○	●●●○○	●●○○○	●●●●●	New coherent LiDAR system measures depth, velocity, and polarization simultaneously, expanding 3D sensing capabilities.
#36	Lumentum 5-yr Backlog	Market Overview	●○○○○	●●●●●	●●●●●	●●●○○	●●●●●	Lumentum secures five-year order backlog amid surging AI optical demand; NVIDIA investment strengthens supply.
#37	Qualcomm 1.6T/3.2T	Corporate Strategy	●●●○○	●●●○○	●●●●○	●●●○○	●●●●●	Qualcomm extends Dragonfly ecosystem with 1.6T/3.2T optical modules to power next-gen AI factories by 2028.
#38	Si3N4 PICs for AI/QC	Research	●●●●○	●●○○○	●●●○○	●●●●●	●●●●●	Silicon nitride PICs emerge as an integrated platform for IoT, AI, LiDAR, and quantum computing due to low loss/high integration.
#39	Optical Comm for AI	Market Overview	●○○○○	●●●●●	●●●●●	●●○○○	●●●●●	Optical communication is critical for resolving bottlenecks in AI infrastructure, 5G, and data centers with extreme bandwidth.
#40	PhotonPath+XIVER Mfg	Corporate Strategy	●●○○○	●●●●○	●●●○○	●●●○○	●●●○○	PhotonPath and XIVER partner to scale Oxyn platform manufacturing on 200mm wafer infrastructure for telecom/datacom.
#41	Optical Stocks Drop	Market Analysis	●○○○○	●●●●●	●●●●●	●●●○○	●●●●●	Optical component stocks (AOI, Coherent, Lumentum) plunge due to AI infrastructure spending uncertainty and CPO delays.
#42	TFLN Topo Optics	Research	●●●●●	●○○○○	●●○○○	●●●●●	●●●●●	Research on material-anisotropy-driven topological optical lattices on TFLN opens doors to next-gen photonic devices.
#43	QCi Acquires NHanced	Corporate Strategy	●●●●○	●●●○○	●●●●○	●●●●○	●●●●●	QCi acquires NHanced Semiconductors to expand TFLN photonic PIC manufacturing for quantum computing, AI, and secure comms.
#44	QCi NeuraWave Edge AI	New Product	●●●●○	●●●○○	●●●○○	●●●○○	●●●●●	QCi partners with Planck Dynamics to deploy NeuraWave photonic reservoir computer for next-gen edge AI applications.
#45	Fujitsu AI Award	Corporate Strategy	●○○○○	●●●●●	●●○○○	●●○○○	●●○○○	Fujitsu awarded Frost & Sullivan's 2026 Asia-Pacific Enabling Technology Leadership for advancing AI integration/hybrid computing.
#46	UMich ScAlN Quantum	Research	●●●●○	●○○○○	●●●○○	●●●○○	●●●●●	UMich team secures $4M NSF funding to accelerate Scandium Aluminum Nitride quantum photonic chip design.

●●●●○ High ●●●○○ Med-High ●●○○○ Med ●○○○○ Low | Yellow highlight = featured article

Three Questions That Demand Your Decision This Week

❶ Is your AI interconnect strategy future-proof?

With $15B+ in investments and a shift to 1.6T/3.2T optical modules, traditional copper and even current optical solutions are becoming bottlenecks. Are your AI platforms and data centers ready for CPO/NPO?

❷ Are you securing critical optical component supply?

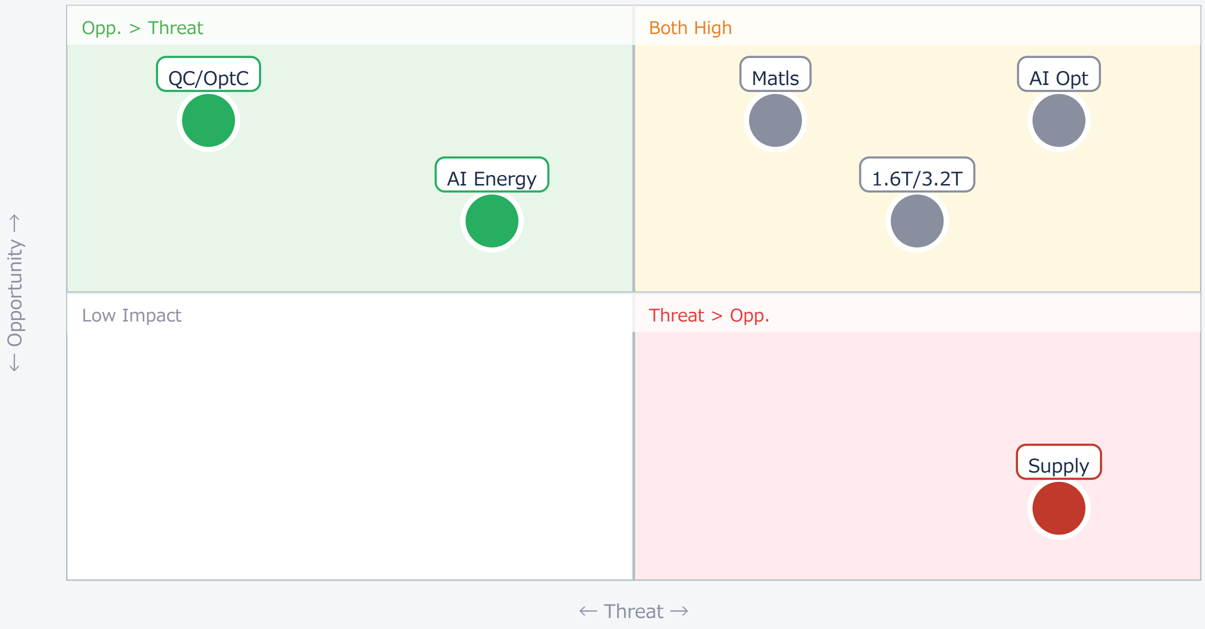
TSMC's CoWoS capacity shortfall and McKinsey's forecast of 800G/1.6T transceiver shortages highlight supply chain risks. Have you diversified suppliers and invested in domestic manufacturing like NVIDIA and Coherent?

❸ How are you leveraging advanced photonic materials?

SiPh, InP, and TFLN are fiercely competing for next-gen optical modules. Are your R&D; and procurement teams evaluating these materials for optimal performance, cost, and scalability in your future products?

Opportunities vs. Threats for US/European Companies

Opportunity vs. Threat Matrix for US/European Companies



Item	Quadrant	↑ Opportunity	↓ Threat
● AI Opt	Critical	Market growth	Supply chain strain
● Matls	Critical	Performance edge	Material lock-in
● Supply	Threat	Domestic mfg	Shortages, volatility
● QC/OptC	Opp.	Future tech lead	Long R&D; cycle
● AI Energy	Opp.	Cost savings, green AI	Adoption barriers
● 1.6T/3.2T	Critical	New product rev	Rapid obsolescence

Deep Dive ① — AI Drives $15B+ Silicon Photonics Boom

#01 | 2026/06/23 | The OPTIM Update | Tech Novelty●●●○○ Proximity●●●●● Market Impact●●●●● Data Reliability●●●●○ US/EU Relevance●●●●●

The silicon photonics sector has seen over $15 billion in M&A; and investments between late 2025 and mid-2026, fueled by the exponential growth of AI clusters. Major players like NVIDIA ($4B in Coherent/Lumentum) and Marvell ($3.25B in Celestial AI) are aggressively funding mass production of silicon photonics and co-packaged optics (CPO) solutions.

This capital influx targets overcoming copper interconnect limitations (bandwidth, power, reach) in AI supercomputing. Foundries like Tower Semiconductor and GlobalFoundries are expanding capacity, while TSMC collaborates on 100 Tb/s CPO prototypes with advanced CoWoS packaging, signaling a rapid industrial-scale application phase.

> ▶ Strategic Analyst's Perspective
>
> Strategic Analyst's Perspective: The published investment figures are realistic, reflecting the urgent need for optical interconnects in AI. The primary technical barrier is scaling CPO manufacturing and integration. [Opportunity] for US/EU materials & component suppliers to capture significant market share by accelerating CPO/SiPh production. [Threat] for OEMs relying solely on traditional electrical interconnects, risking obsolescence and higher power costs. Next actions: [Procurement] Assess current and future optical interconnect supplier capacity by Q3 2026. [R&D;] Prioritize CPO integration roadmaps, focusing on heterogeneous integration challenges by Q4 2026. [Strategy] Evaluate potential M&A; targets in silicon photonics or advanced packaging to secure IP and capacity by year-end.

Deep Dive ② — NVIDIA Fuels US InP Fab Expansion

#25 | 2026/06/23 | [News/Blog] | Tech Novelty●●●○○ Proximity●●●●● Market Impact●●●●● Data Reliability●●●●○ US/EU Relevance●●●●●

Coherent is quadrupling its indium phosphide (InP) wafer production capacity at its Texas fab, backed by a $2 billion strategic investment from NVIDIA. This expansion is critical for securing the supply of optical interconnects and compound semiconductors vital for NVIDIA's next-gen AI platforms, such as the Vera Rubin Ultra NVL576.

InP is essential for high-efficiency laser diodes and modulators in 800G, 1.6T, and 3.2T optical modules. NVIDIA's direct investment underscores the strategic importance of optical components in AI growth and the need to overcome bandwidth and power limitations of copper interconnects, accelerating CPO/NPO adoption.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: NVIDIA's direct investment in Coherent's InP fab is a strong signal of commitment to securing critical supply, indicating the numbers are realistic. Technical barriers include yield management at increased scale and integration complexity for advanced InP components. [Opportunity] for US/EU compound semiconductor manufacturers to attract strategic investments and expand domestic production, enhancing supply chain resilience. [Threat] for OEMs and device manufacturers if they lack direct supply agreements or diversified InP sources, risking component shortages and increased costs. Next actions: [Procurement] Review critical optical component supply contracts and explore direct investment/partnership opportunities with key suppliers by Q3 2026. [Business Dev] Engage with AI accelerator developers to understand future InP demand and specifications by Q4 2026.

Deep Dive ③ — Si3N4 PICs for Next-Gen Tech

#38 | 2026/06/21 | [Scientific Paper/Academic] | Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●○○ Data Reliability●●●●● US/EU Relevance●●●●●

Silicon nitride (Si3N4) photonic integrated circuits (PICs) are emerging as a promising platform for IoT, AI, LiDAR, and quantum computing due to their exceptionally low propagation loss and high integration capabilities. The research highlights SiN's CMOS compatibility and advancements in heterogeneous integration with SOI and InP.

SiN PICs enable ultra-low-loss waveguides and high-Q resonators, crucial for high-performance optical sensors, frequency combs, and microwave photonics. Heterogeneous integration allows combining SiN's low loss with SOI's electronic integration or InP's light emission, leading to complex, high-functionality photonic devices for quantum light sources, AI interconnects, and LiDAR.

> ▶ Strategic Analyst's Perspective
>
> Strategic Analyst's Perspective: The technical claims for SiN PICs are well-supported by academic research, though commercialization is still in the applied research stage (2-5 years). Key technical barriers include advanced heterogeneous integration techniques and robust packaging for diverse applications. [Opportunity] for US/EU materials & component suppliers to invest in SiN foundry capabilities and develop specialized PICs for emerging markets like quantum and advanced sensing. [Threat] for companies locked into single-material platforms, as SiN's versatility and integration potential could offer superior performance. Next actions: [R&D;] Establish internal research programs or academic partnerships focused on SiN PIC development and heterogeneous integration by Q3 2026. [Strategy] Conduct a technology scouting exercise to identify startups and research groups specializing in SiN applications for AI, LiDAR, and quantum by year-end.

Other Notable Articles

STMicroelectronics Expands AI Data Center Silicon Photonics Market with PIC100 Chip Order from Chinese Customer (Business Korea)
Tech Novelty●●○○○ Proximity●●●●● Market Impact●●●●○ Data Reliability●●●○○ US/EU Relevance●●●●●

European supplier STMicro secures key Chinese order, highlighting global competition in AI optical components.

AI Computing Drives 1.6T Optical Modules, CPO Slashes Power Consumption by Up to 68% (EqualOcean)
Tech Novelty●●●○○ Proximity●●●○○ Market Impact●●●●● Data Reliability●●●○○ US/EU Relevance●●●●○

CPO's 60-68% power savings for 800G ports are critical for sustainable AI data center scaling.

Xscape Photonics Launches 8-Wavelength "FalconX" Laser, Raising $37M to Address AI Data Center Power, Distance, and Bandwidth (New Market Pitch)
Tech Novelty●●●●○ Proximity●●●●○ Market Impact●●●●○ Data Reliability●●●○○ US/EU Relevance●●●●●

US startup Xscape's 8-wavelength laser offers high-density, low-power solution for AI data center interconnects.

Nokia, t3 Broadband, Aureon Deploy Ultra-High-Capacity AI-Optimized Optical Network in US Midwest, Scalable to 400Tbps (Nokia)
Tech Novelty●●●○○ Proximity●●●●● Market Impact●●●●○ Data Reliability●●●●○ US/EU Relevance●●●●●

Nokia's 400Tbps-scalable optical network deployment in the US Midwest addresses growing AI/cloud demands.

Applied Optoelectronics Plunges 13%, Coherent Drops 9%, Lumentum Falls 8%: AI Infrastructure Spending Uncertainty Shakes Optical Market (24/7 Wall St.)
Tech Novelty●○○○○ Proximity●●●●● Market Impact●●●●● Data Reliability●●●○○ US/EU Relevance●●●●●

Market volatility due to hyperscaler capex uncertainty and CPO deployment delays signals caution for optical suppliers.

Recommended Actions This Week

Action recommendations based on article evaluation matrix and opportunity/threat analysis.

Immediate (this week)

- [Procurement] Conduct an urgent risk assessment of current optical component supply chains, focusing on 800G/1.6T transceivers and CoWoS packaging capacity, identifying potential single points of failure.
- [Executive] Schedule a cross-functional meeting (R&D;, Procurement, Strategy) to review the impact of AI optical interconnect investments and market volatility on existing product roadmaps and financial forecasts.

Short-term (1 month)

- [R&D;] Evaluate the technical feasibility and integration challenges of CPO/NPO solutions for next-generation AI platforms, specifically assessing thermal management and heterogeneous integration requirements.
- [Strategy] Initiate competitive intelligence on key players (e.g., Broadcom, Marvell, HyperLight, Xscape) and their advanced optical material strategies (SiPh, InP, TFLN) to identify emerging threats and opportunities.
- [Business Dev] Engage with hyperscale data center operators and AI accelerator developers to understand their evolving demands for 1.6T/3.2T optical modules and CPO deployment timelines.

Medium-long term (quarter+)

- [R&D;] Invest in R&D; for advanced photonic materials like SiN and TFLN, exploring their potential for quantum computing, LiDAR, and high-performance AI applications, potentially through academic partnerships.
- [Procurement] Develop a long-term supply chain resilience strategy, including exploring domestic manufacturing expansion (e.g., Nokia's US ATP fab) or strategic partnerships/investments to secure critical optical component capacity.
- [Strategy] Formulate an IP strategy for next-generation optical computing and quantum photonics, identifying key patent landscapes and potential licensing opportunities or acquisition targets.
- [Executive] Set aggressive internal targets for AI data center energy efficiency, leveraging photonic network solutions (e.g., NTT's IOWN) to reduce operational costs and environmental impact.

Photonics — Selected Articles

Date: 2026-06-27

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#19 Semiconductor Industry Prioritizes Optical I/O and Co-Packaged Optics with Significant Investments to Fortify AI Infrastructure

#20 Broadcom Fortifies Cash Flow with $3B Share Buyback to Accelerate AI ASIC and Optical Interconnect Strategy

#21 SuperX to Unveil 1.6T Optical Modules for AI Data Centers at Interop Tokyo 2026

#22 NTT Demonstrates 30% Energy Reduction in AI Training via Remote Distributed Deployment Leveraging IOWN Photonic Network

#23 Global Optical Chip Capacity Expands Dramatically Driven by Surging AI Data Center Demand; STMicroelectronics and Source Photonics Announce Major Investments

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#30 Nokia Enhances Autonomous Networks Portfolio with Upgraded Agentic AI Capabilities, Automating Optical Network Operations

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#37 Qualcomm Extends Dragonfly Ecosystem with 1.6T/3.2T Optical Modules to Power Next-Gen AI Factories

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#43 Quantum Computing Inc. Acquires NHanced Semiconductors to Expand TFLN Photonic PIC Manufacturing Capacity for Quantum Computing, AI, and Secure Communications

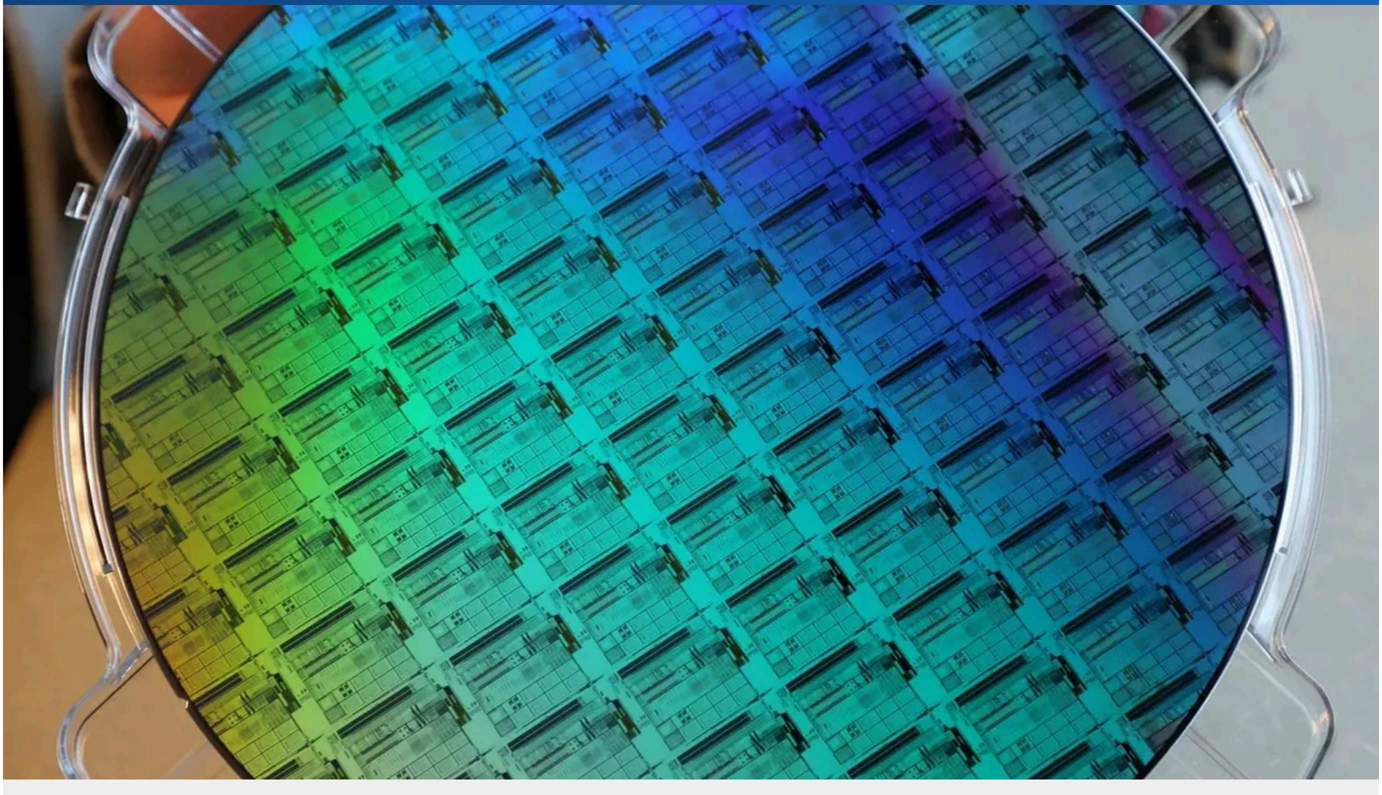
#44 Quantum Computing Inc. Partners with Planck Dynamics to Deploy NeuraWave Photonic Reservoir Computer as Foundational Platform for Next-Gen Edge AI Applications

#45 Fujitsu Awarded Frost & Sullivan's 2026 Asia-Pacific Enabling Technology Leadership Recognition for Advancing AI Integration and Hybrid Computing

#46 University of Michigan Team Secures $4M NSF Funding to Accelerate Scandium Aluminum Nitride Quantum Photonic Chip Design

#01 Silicon Photonics Sector Sees Over $15B in M&A and Investments, Driven by AI Demand Boom

Published June 23, 2026 The OPTIM Update Unknown



OVERVIEW

Silicon photonics has become strategically vital for overcoming copper interconnect limitations as AI clusters expand. Between late 2025 and mid-2026, over $15 billion in M&A and major investments occurred, including NVIDIA's $4 billion in Coherent and Lumentum, Marvell's reported $3.25 billion investment in Celestial AI, and Ayar Labs' $500 million Series E. This rapid capital influx signals a transformative period for the industry. Key foundries like Tower Semiconductor and GlobalFoundries are expanding capacity, while TSMC collaborated with Ayar Labs to demonstrate over 100 Tb/s co-packaged optics prototypes with advanced CoWoS packaging.

IN DEPTH

Key Findings

Silicon photonics technology has firmly established itself as a strategically indispensable foundational technology for overcoming the bandwidth, power consumption, and reach limitations faced by traditional copper interconnects amidst the exponential expansion of AI clusters. In a brief period from late 2025 to mid-2026, M&A activities and major investments in silicon photonics-related companies surged to over $15 billion. This included NVIDIA's cumulative $4 billion investment in Coherent and Lumentum, Marvell's strategic $3.25 billion investment in Celestial AI (reported by some as an acquisition, but more accurately a collaboration and investment), and Ayar Labs' successful $500 million Series E funding round. This aggressive influx of capital unequivocally signals that the industry is undergoing a rapid and profound transformation.

Technical / Clinical Details

Investments during this period are primarily focused on the mass production of silicon photonics technology, advanced packaging solutions, and the development of co-packaged optics (CPO). Tower Semiconductor invested $300 million to triple its silicon photonics manufacturing capacity by mid-2026. GlobalFoundries is also actively supporting fabless photonics companies through its 'GF Fotonix' platform. Notably, TSMC's role is critical; the company is heavily invested in advanced 3D packaging technologies like CoWoS and has collaborated with Ayar Labs to demonstrate co-packaged optics prototypes achieving over 100 Tb/s bandwidth. These technical advancements are enabling ultra-high-speed, energy-efficient data transmission between AI processors, supporting the construction of next-generation AI supercomputing infrastructure.

Background & Context

The computational demands of AI workloads have already begun to surpass the capabilities of electrical signal-based data transmission. Specifically, the training of large language models (LLMs) and generative AI requires connecting tens of thousands of GPUs with low latency and high bandwidth, which constitutes a major challenge for data center power consumption and cooling. Silicon photonics is positioned as the next phase of 'Moore's Law' in the AI era, combining the advantages of optical signals—faster and lower-loss transmission than electrical signals—with the scalability offered by existing CMOS manufacturing infrastructure. The massive investments by semiconductor industry giants underscore that this technology is no longer merely in the research phase but has entered a phase of industrial-scale practical application.

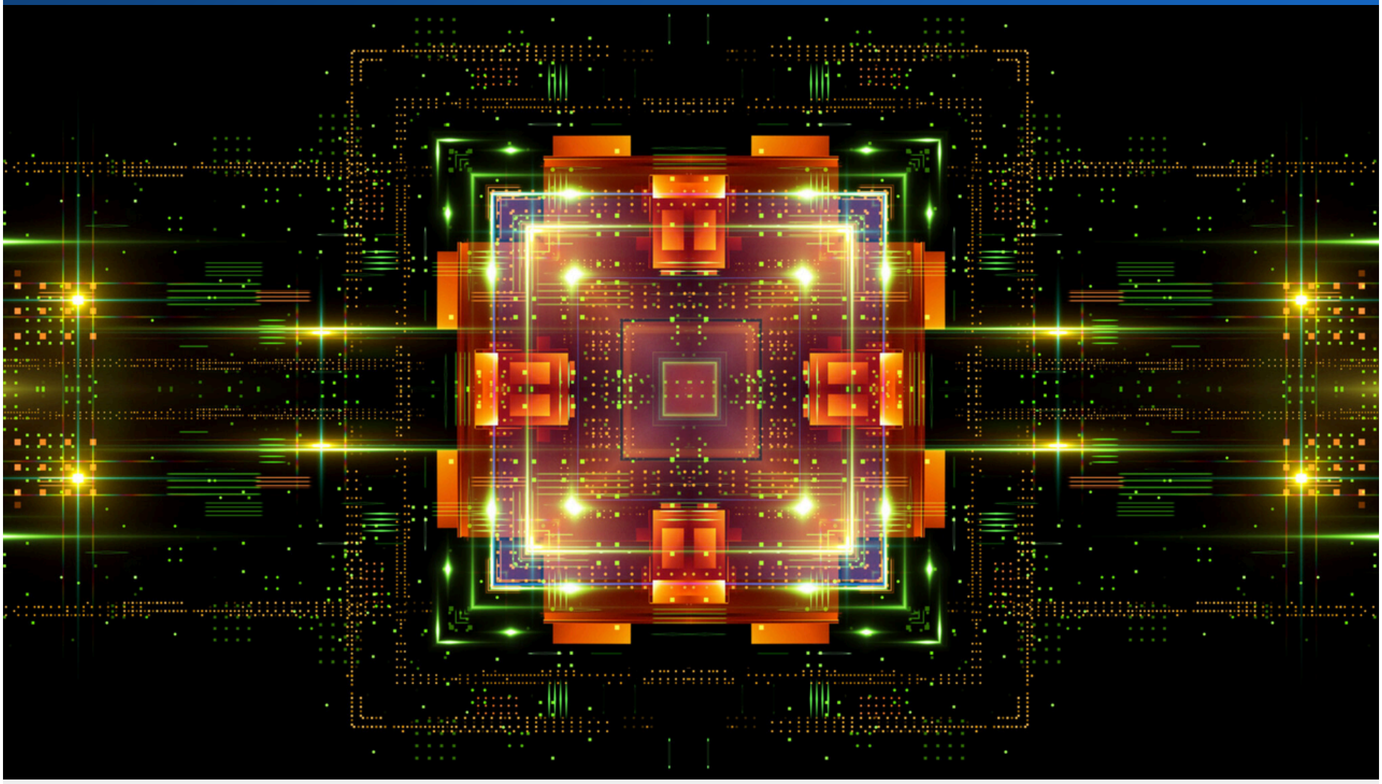
Strategic Significance & Outlook

The over $15 billion investment in the silicon photonics sector is set to accelerate the pace of technological innovation and market introduction. AI data centers are expected to accelerate their transition to CPO and near-package optics (NPO) to further improve power efficiency and performance. The strategic moves by players like NVIDIA, Marvell, and Ayar Labs indicate that optical interconnects are positioned as a core element of the AI ecosystem. Continuous investment and strengthening of manufacturing capabilities in this sector will not only expand AI capabilities and enable the creation of new applications but will also be essential for significantly improving the sustainability and economic efficiency of data centers.

Source: https://www.optim.vc/the-state-of-silicon-photonics-whos-building-whos-buying-and-where-the-industry-is-heading/

#02 On-Chip Photonics Manufacturability Emerges as Urgent Challenge for Scaling AI Infrastructure

Published June 18, 2026 Semiconductor Engineering USA



OVERVIEW

The rapid evolution of AI infrastructure necessitates urgent integration of photonics directly onto chips. As computational units expand across racks and data centers, increasing data movement speed with less heat requires deeper integration of photonics, both in-package and on-chip. However, the manufacturing infrastructure needed to enable widespread adoption of this technology is struggling to keep pace with demand, highlighting the need for standardization and yield improvements.

IN DEPTH

Key Findings

The explosive evolution of AI infrastructure is generating intense pressure for the integration of photonics directly onto chips. As the most useful unit of computation expands from individual chips to entire racks, clusters, and even entire data centers, there is a growing imperative to move vast amounts of data faster and with less heat. To meet this demand, photonics technology is being driven toward deeper integration, from in-package optics to on-chip optics. However, a critical and immediate challenge is that the manufacturing infrastructure required to widely implement this innovative technology is not keeping pace with current demand.

Technical / Clinical Details

On-chip photonics is essential for overcoming the physical limitations (bandwidth, power consumption, latency) faced by electrical interconnects. By building optical waveguides, modulators, and detectors directly onto semiconductor chips, based on silicon photonics, it becomes possible to achieve optical-speed communication between chips. This enables ultra-high data rates of several terabits per second while significantly reducing power consumption. However, manufacturing this technology presents new challenges not encountered in traditional CMOS processes, as it requires the high-precision integration of optical and electrical components on the same chip. Specifically, advanced technical development and process refinement are needed in areas such as optical fiber coupling, laser source integration, thermal management, and yield optimization.

Background & Context

AI, particularly the training and inference of large language models (LLMs) and generative AI, involves moving immense amounts of data between thousands of GPUs and AI accelerators. This data movement currently represents the primary bottleneck for the overall performance and power efficiency of AI systems. Since existing electrical interconnects are unable to adequately address this challenge, the industry is rapidly transitioning towards co-packaged optics (CPO) and on-chip photonics. Semiconductor manufacturers and data center operators recognize this technology as the next frontier that will enable AI scaling, and they are accelerating investments in R&D and standardization efforts.

Strategic Significance & Outlook

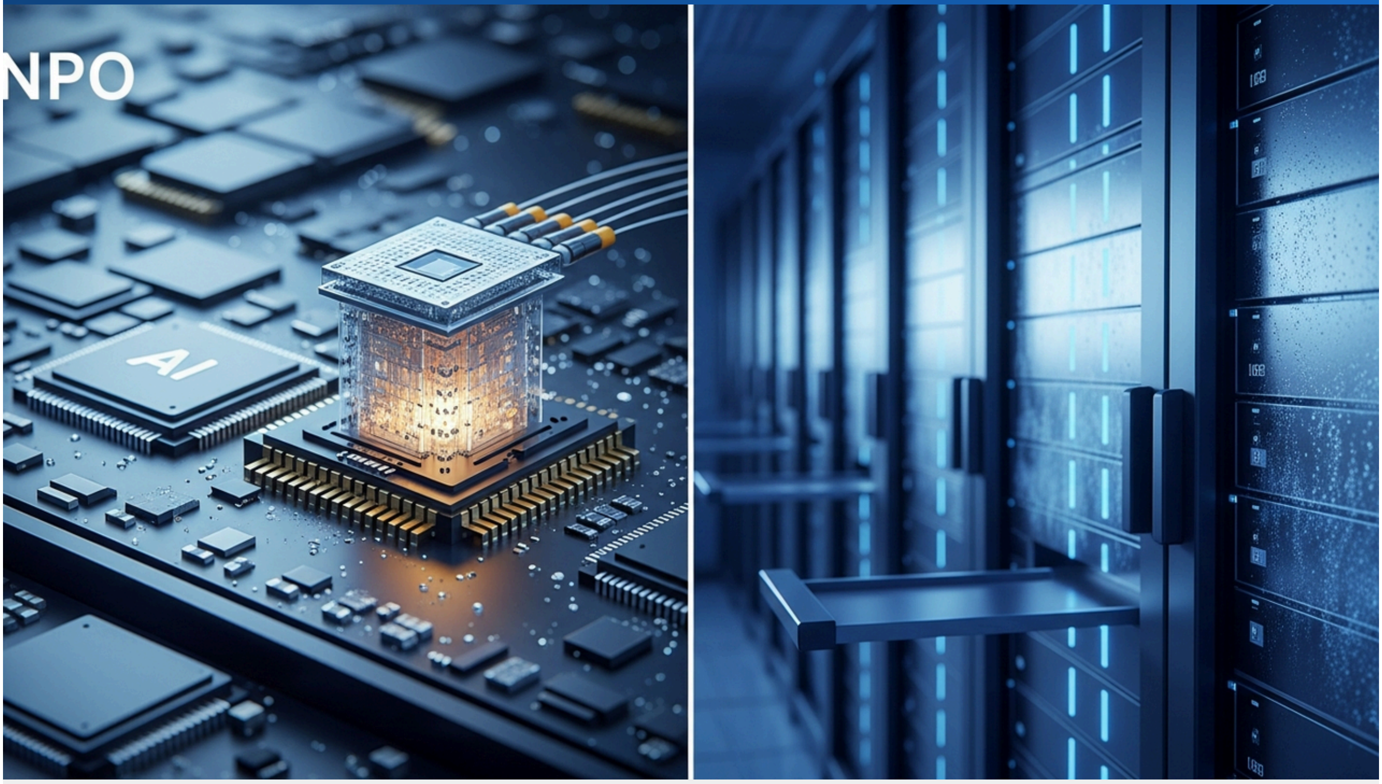
The development of manufacturing infrastructure for the mass production of on-chip photonics is profoundly critical for the future of AI infrastructure. Achieving standardization, automation, and high yields in manufacturing processes will be indispensable for transitioning this technology from laboratories to data centers. Close collaboration among semiconductor equipment manufacturers, foundries, and design tool vendors will be key to overcoming these challenges. As manufacturing technology matures, on-chip photonics is expected to dramatically boost AI chip performance, drastically improve data center power efficiency, and lay the foundation for widespread AI adoption and new breakthroughs. This will resolve the most challenging connectivity issues facing AI, leading to a more powerful and sustainable AI ecosystem.

Source: https://semiengineering.com/making-on-chip-photonics-manufacturable/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#03 Credo Champions Near-Package Optics (NPO) Evolution, Balancing Power Efficiency and Serviceability for AI Data Centers

Published June 25, 2026 Credo USA



OVERVIEW

Optical connectivity architecture in AI and data center infrastructure is evolving from pluggable to integrated, low-power models. Credo advocates Near-Package Optics (NPO) as a solution that integrates laser sources directly with photonic integrated circuits, reducing optical coupling loss and simplifying system-level implementation. NPO, an evolutionary step toward Co-Packaged Optics (CPO), offers improved power efficiency, compatibility with existing manufacturing processes, and balanced system serviceability, meeting the demands of AI workloads.

IN DEPTH

Key Findings

The optical connectivity architecture within AI and data center infrastructures is currently undergoing a significant evolution, shifting from traditional pluggable optical transceivers towards more integrated, low-power consumption models. Credo champions Near-Package Optics (NPO) as a crucial step in this evolution. NPO enables the direct integration of laser sources with photonic integrated circuits, which effectively reduces optical coupling losses and substantially simplifies system-level implementation. This approach provides a practical solution that balances enhanced bandwidth and power efficiency, essential for demanding AI workloads, with compatibility with existing manufacturing processes and improved system serviceability.

Technical / Clinical Details

NPO is a technology that positions optical interconnects in close proximity to main chips like switch ASICs. This design allows for optical-to-electrical conversion to occur physically closer to the chip, thereby shortening electrical signal pathways and reducing signal degradation and associated power consumption. While Co-Packaged Optics (CPO) aims for ultimate integration by embedding optical components within the same package as the ASIC, NPO maintains external laser sources while placing them in very close proximity to the chip. This design mitigates thermal management challenges compared to CPO and improves serviceability, as lasers can be replaced as individual components. NPO can meet the demands of next-generation high-speed interconnects, such as 1.6T and 3.2T, while minimizing disruption to existing infrastructure and supply chains.

Background & Context

The explosive growth of AI involves immense data movement within data centers, which has exposed the physical limitations of traditional electrical interconnects. Power consumption and latency have become major bottlenecks in scaling AI clusters, driving the industry to rapidly transition to optical connectivity solutions. While CPO is considered the long-term goal, its complex manufacturing processes and thermal management challenges suggest that widespread adoption will take time. NPO emerges as a pragmatic option for the interim period, offering many of CPO's power efficiency benefits while enabling faster market introduction and operational flexibility. Credo, leveraging its expertise in optoelectronic integration, is leading the charge in developing the NPO market.

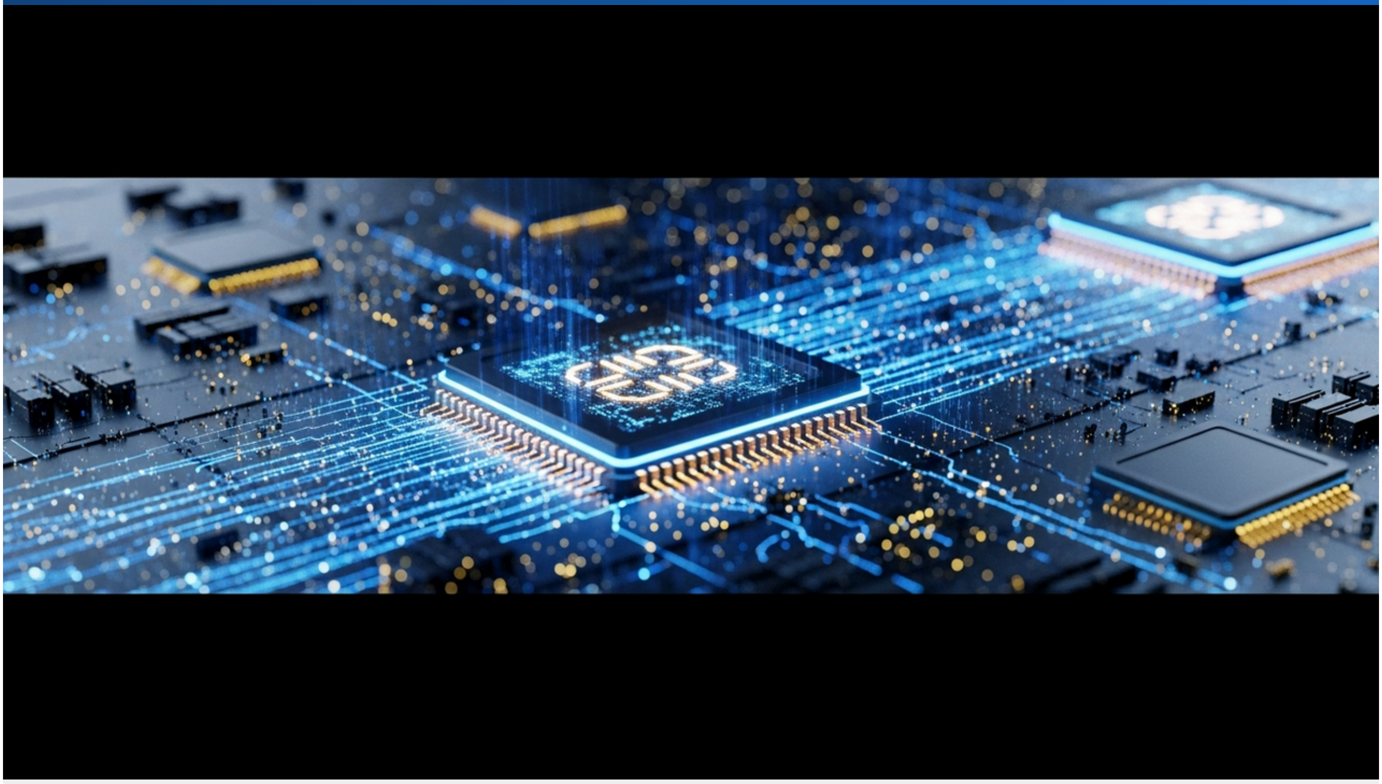
Strategic Significance & Outlook

NPO is poised to play a vital role in significantly improving the power efficiency of AI data centers and reducing operational costs. Due to its compatibility with existing manufacturing ecosystems, NPO is likely to penetrate the market more quickly than CPO. This will lead to enhanced performance for AI workloads and facilitate the construction of denser data centers. Credo's focus on NPO strategically positions the company to strengthen its leadership in the optical connectivity market. In the future, the technologies and experiences gained from NPO are expected to serve as a bridge, paving the way for the further evolution and widespread adoption of CPO. Data center interconnect technology is steadily transitioning towards a more sustainable and high-performance future through the introduction of NPO.

Source: https://credosemi.com/blogs/near-package-optics/

#04 Credo Foresees Silicon Photonics Future: Enabling High-Bandwidth, Low-Power for AI and Cloud Era

Published June 19, 2026 Credo USA



OVERVIEW

Silicon photonics is delivering transformative benefits to optics—miniaturization, cost reduction, and low power—akin to semiconductors in electronics. Its ecosystem is rapidly maturing, optimized for high-demand applications like AI and cloud services. Essential for high-bandwidth and co-packaging with electrical chips, silicon photonics' scalability and performance are predicted to be central to next-generation data center design, realizing energy-efficient infrastructure crucial for AI evolution.

IN DEPTH

Key Findings

Silicon photonics holds the potential to deliver transformative benefits to the field of optics that are comparable to, or even greater than, what semiconductor technology has brought to electronics. These advantages include miniaturization, significant manufacturing cost reductions, and dramatic decreases in power consumption. The ecosystem surrounding this technology is rapidly maturing, driven by the demands of high-growth applications such as artificial intelligence (AI) and cloud services, making it one of the most desirable solutions for these sectors. Silicon photonics is indispensable for achieving high-bandwidth communication and efficient co-packaging with electrical chips, and its inherent scalability and exceptional performance are positioned as core elements in the design of next-generation data centers.

Technical / Clinical Details

Silicon photonics utilizes standard CMOS manufacturing processes to integrate optical components such as waveguides, modulators, and detectors directly onto silicon wafers. This allows for optical and electrical components to be placed on the same chip or in very close proximity, minimizing electrical signal path lengths and dramatically reducing signal loss and power consumption. For AI workloads, in particular, terabits-per-second data transfer is required between CPUs, GPUs, and memory, which is physically impossible with traditional copper interconnects. Silicon photonics serves as the foundational technology for co-packaged optics (CPO) and near-package optics (NPO), enabling these ultra-high-speed interconnects with low latency and high efficiency. This maximizes the performance of AI chips and improves the overall computational power and energy efficiency of data centers.

Background & Context

The explosive growth of AI and cloud computing has led to a dramatic increase in data traffic within data centers. By the late 2020s, intra-data center traffic is projected to surpass total internet traffic, making the efficient movement of this enormous data volume the biggest bottleneck for further AI scaling. Electrical interconnects are facing thermal, power, and bandwidth limitations, making the transition to silicon photonics an inevitable trend. Many leading semiconductor companies and data center providers are accelerating their investment and development in this technology, recognizing its pivotal role in the future of AI.

Strategic Significance & Outlook

The widespread adoption of silicon photonics technology will revolutionize next-generation data center architectures, enabling the construction of denser and more energy-efficient AI clusters. As CPO and NPO solutions mature, silicon photonics will significantly enhance the performance of AI accelerators and switch ASICs, drastically reducing the time required for AI model training and inference. Furthermore, it will substantially contribute to lowering data center operational costs and reducing environmental impact. Companies like Credo, by leading innovation in this field and providing foundational technology to unlock AI's full potential, are expected to strengthen their presence as key players accelerating digital transformation. The future of silicon photonics is a world of high bandwidth and low power, driven by AI and cloud services.

Source: https://credosemi.com/blogs/future-of-silicon-photonics/

#05 STMicroelectronics Expands AI Data Center Silicon Photonics Market with PIC100 Chip Order from Chinese Customer

Published June 24, 2026 Business Korea South Korea

OVERVIEW

STMicroelectronics is actively expanding its silicon photonics market presence to meet growing AI data center demand. The company secured an order for its PIC100 chips from a major Chinese optical transceiver manufacturer, enhancing collaborations with key U.S. and Chinese clients. The PIC100 is a high-efficiency photonic integrated circuit, built on a 300mm wafer platform, integrating optical modulators, photodetectors, and silicon/silicon nitride waveguides on a single chip. This move solidifies STMicroelectronics' position as a key supplier of optoelectronic integration technology in the AI era.

IN DEPTH

Key Findings

STMicroelectronics is proactively expanding its presence in the silicon photonics market amidst the global surge in demand from artificial intelligence (AI) data centers. The company has strengthened its collaborations with key customers in both the United States and China. As part of this strategy, STMicroelectronics has secured a significant order for its latest generation photonic integrated circuit (PIC), the PIC100 chip, from a leading Chinese optical transceiver manufacturer. This strategic success clearly indicates STMicroelectronics' growing establishment as a primary supplier of high-speed, high-efficiency optical connectivity solutions for AI infrastructure.

Technical / Clinical Details

The PIC100 chip, offered by STMicroelectronics, is a highly efficient silicon photonics device manufactured on the company's advanced 300mm wafer platform. This chip integrates multiple critical optical components onto a single integrated circuit. Specifically, it includes optical modulators responsible for generating and modulating high-speed optical signals, photodetectors that convert optical signals into electrical signals, and passive components such as silicon and silicon nitride (SiN) waveguides for efficient optical signal transmission. The integration of these functionalities enables the PIC100 to achieve miniaturization, low power consumption, and high reliability, providing the essential foundation for terabit-scale high-speed interconnects required in AI data centers. The adoption of silicon nitride waveguides, in particular, facilitates low-loss and broadband optical transmission, improving the performance of long-distance and multi-AI accelerator connections.

Background & Context

The rapid growth of AI workloads is dramatically increasing data movement within data centers, leading to bandwidth, power, and latency bottlenecks for traditional electrical interconnects. Silicon photonics has emerged as one of the most promising technologies to address these challenges, delivering high-density optical connectivity at the chip level, which significantly boosts AI system performance and energy efficiency. STMicroelectronics, leveraging its long-standing expertise in semiconductor manufacturing and strategic investments in advanced photonics technology, is positioned as a central player in this transformative period. The order from a major customer in the Chinese market particularly symbolizes the accelerating growth and adoption of this technology.

Strategic Significance & Outlook

The adoption of STMicroelectronics' PIC100 chip by a leading Chinese optical transceiver manufacturer will further accelerate the proliferation of silicon photonics in the global AI data center market. This move strengthens the company's competitive advantage as a key technology supplier in the increasingly contested optoelectronic integration market. Moving forward, STMicroelectronics is expected to contribute to the realization of next-generation co-packaged optics (CPO) and near-package optics (NPO) solutions through its PIC100 chip supply, thereby supporting enhancements in AI infrastructure performance and power efficiency. This technology will be an indispensable component in maximizing AI capabilities and building a more sustainable and high-performance data center ecosystem.

Source: https://www.thelec.net/news/articleView.html?idxno=11631

Collected: June 26, 2026 | Automated Research System (Gemini API)

#06 AI Data Centers' Next Bottleneck: Connectivity — Co-Packaged Optics Mass Production Becomes Urgent Priority

Published June 18, 2026   The Futurum Group   USA

OVERVIEW

As AI clusters scale to tens of thousands of GPUs, the next major bottleneck is identified as the interconnectivity infrastructure, not compute power itself. Co-Packaged Optics (CPO) has rapidly transitioned from research to a top strategic technology in the semiconductor industry. The primary challenge, however, remains its economic mass production at hyperscale. CPO demands heterogeneous integration of switch ASICs, silicon photonics, lasers, and fiber interfaces, with thermal management being a critical unresolved issue.

IN DEPTH

Key Findings

As artificial intelligence (AI) clusters rapidly scale from thousands to tens of thousands of GPUs, it has become evident that the next major bottleneck limiting AI performance is not the computational power itself, but rather the infrastructure efficiently connecting these vast computing resources. Co-Packaged Optics (CPO) technology, identified as key to resolving this challenge, has swiftly transitioned from a mere research topic to one of the most strategically significant technologies within the semiconductor industry. However, the paramount challenge for this innovative technology lies in its ability to be economically and reliably mass-produced at hyperscale for data centers.

Technical / Clinical Details

Co-Packaged Optics (CPO) is a technology that integrates high-performance electrical chips, such as switch ASICs and GPU chips, with optical transceivers within the same package. This integration dramatically shortens the length of electrical pathways by converting electrical signals into optical signals before they leave the chip. This shortening significantly ameliorates major electrical interconnect issues like signal degradation, power consumption, and latency. Realizing CPO requires the heterogeneous integration of distinct components—switch ASICs, silicon photonics chips (housing optical waveguides, modulators, and detectors), external laser sources, and fiber interfaces—with extremely high precision. Efficiently managing the heat generated by such high-density integration is also a critical technical challenge for maintaining the reliability and performance of CPO systems.

Background & Context

AI workloads, especially the training of large language models (LLMs), involve data movement between GPUs that is several to tens of times greater than traditional levels. Existing pluggable optical modules and copper connections are struggling to meet the required bandwidth, low latency, and, most critically, power efficiency demands. Given that a significant portion of data center power consumption is dedicated to cooling and data movement, technologies like CPO are essential for the sustainable growth of AI. Hyperscalers such as Google, Meta, Microsoft, and Amazon have expressed strong interest in adopting CPO technology, and major semiconductor vendors are accelerating their development efforts.

Strategic Significance & Outlook

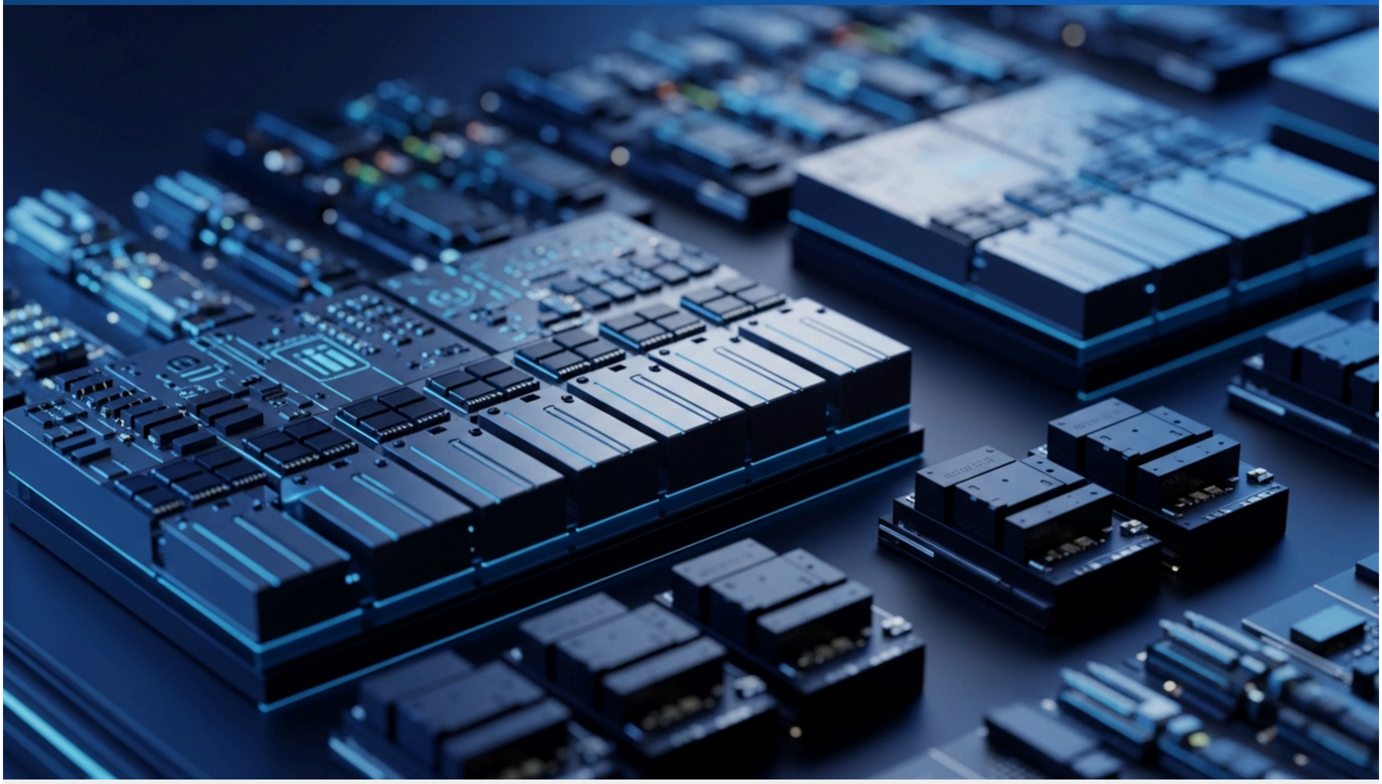
The mass production and widespread adoption of CPO will revolutionize AI data center architectures, enabling the construction of higher-performance and more power-efficient AI clusters. If manufacturing challenges, particularly those related to heterogeneous integration and thermal management, can be overcome, CPO has the potential to become the mainstream data center interconnect technology by the late 2020s. The success of this technology will not only support further advancements in AI capabilities and enable the creation of new applications but will also significantly contribute to reducing data center operational costs and environmental impact. CPO is poised to become an indispensable element in shaping the future of AI and laying the foundation for next-generation digital infrastructure.

Source: https://www.powerup-electronics.com/co-packaged-optics-the-next-ai-bottleneck-isnt-compute-its-connectivity/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#07 AI Computing Drives 1.6T Optical Modules, CPO Slashes Power Consumption by Up to 68%

Published June 20, 2026 EqualOcean China



OVERVIEW

With Moore's Law slowing, horizontal scaling of AI clusters is unavoidable, pushing electrical interconnects to bandwidth, latency, and power limits. By 2026, the shift from copper to optics is a defining data center trend. Co-packaged optics (CPO) dramatically reduces 800G port power consumption from 14-16W in pluggable solutions to 5.2-5.6W, achieving a 60-68% efficiency gain. This significant improvement accelerates 1.6T optical module adoption, enhancing AI infrastructure sustainability.

IN DEPTH

Key Findings

As the slowdown of Moore's Law becomes increasingly apparent, performance enhancements for artificial intelligence (AI) clusters have become heavily reliant on horizontal scaling (scale-out). This trend has led traditional electrical interconnects to confront physical limitations in terms of bandwidth, latency, and power consumption. Consequently, in 2026, the transition from copper to optical interconnects has established itself as one of the definitive trends in data center construction. Co-packaged optics (CPO), in particular, is a key technology accelerating this transition, dramatically reducing the power consumption of 800G ports from 14-16W in conventional pluggable solutions to a mere 5.2-5.6W, achieving a remarkable power efficiency improvement of 60-68%.

Technical / Clinical Details

CPO is a technology that integrates the main components of optical transceivers within the same package as switch ASICs or GPU chips. This design allows the optical-to-electrical conversion to occur in extremely close proximity to the chip, thereby minimizing the electrical signal path length and substantially reducing signal loss, latency, and most importantly, power consumption. Compared to traditional pluggable optical modules, CPO shortens the distance that signals travel electrically from several centimeters to just millimeters, resulting in approximately 10W of power savings per 800G port. For large-scale AI data centers with hundreds or thousands of ports, these power savings translate into annual reductions of several megawatts, dramatically cutting operational costs and environmental impact. The proliferation of 1.6T optical modules is a direct consequence of CPO technology's maturity and its ability to meet the high bandwidth and low power consumption requirements of AI workloads.

Background & Context

The training and inference of AI, especially large language models (LLMs) and generative AI, demand low-latency, high-bandwidth interconnections for thousands to tens of thousands of GPUs. This data movement currently constitutes the primary bottleneck for the overall performance and power efficiency of AI systems. Given that a significant portion of data center power consumption is attributed to cooling and data movement, technologies like CPO are indispensable for the sustainable growth of AI. Major hyperscalers and semiconductor companies are investing heavily in the development and deployment of CPO technology, anticipating it will become the mainstream data center interconnect in the latter half of the 2020s.

Strategic Significance & Outlook

The dramatic improvement in power efficiency offered by CPO will revolutionize the design and operation of AI data centers. The proliferation of 1.6T optical modules will extend the performance and efficiency benefits of CPO across the entire AI infrastructure, enabling the construction of denser, more energy-efficient GPU clusters. The advancement of this technology will not only further enhance AI computational capabilities and enable the creation of new applications but will also significantly contribute to reducing data center operational costs and environmental impact. CPO is poised to become an indispensable element in shaping the future of AI and laying the foundation for next-generation digital infrastructure.

Source: https://www.siplus-semi.com/en/detail/1328.html

#08 Xscape Photonics Launches 8-Wavelength "FalconX" Laser, Raising $37M to Address AI Data Center Power, Distance, and Bandwidth

Published June 18, 2026 New Market Pitch USA

OVERVIEW

Xscape Photonics has secured an additional $37 million in March 2026 and launched its 8-wavelength "FalconX" laser product for AI data center networks, garnering new attention. The product aims to solve critical power, distance, and bandwidth issues arising from massive data movement in AI systems. Ayar Labs, Lightmatter, and Celestial AI also play significant roles in this sector, driving solutions for AI infrastructure.

IN DEPTH

Key Findings

To tackle the severe traffic congestion issues within artificial intelligence (AI) data centers, the prominent startup Xscape Photonics successfully raised an additional $37 million in funding in March 2026. Concurrently, the company introduced its groundbreaking 8-wavelength "FalconX" laser product specifically designed for AI data center networks. This new product aims to resolve critical challenges such as power consumption, transmission distance, and bandwidth limitations that arise from the colossal amounts of data processed and moved by AI systems. This technology holds immense potential to dramatically enhance the efficiency and scalability of AI infrastructure.

Technical / Clinical Details

Xscape Photonics' "FalconX" is a laser product capable of transmitting eight distinct wavelengths of optical signals simultaneously over a single optical fiber. This capability achieves significantly higher bandwidth density compared to existing optical connectivity technologies. This technology is particularly relevant in the context of co-packaged optics (CPO) and near-package optics (NPO), enabling ultra-high-speed communication between AI accelerators and switch ASICs. By utilizing eight wavelengths, it can transfer eight times more data within the same physical space, thereby reducing power consumption and shrinking the data center's footprint. Moreover, optical signals experience less attenuation over long distances compared to electrical signals, supporting more flexible deployment within data centers and the construction of extensive AI clusters.

Background & Context

The rapid advancement of AI places unprecedented demands on intra-data center interconnects. The training and inference of large AI models require petabit-per-second data transfer between thousands to tens of thousands of GPUs. Traditional electrical interconnects cannot meet the combined requirements for bandwidth, low latency, and low power consumption. Consequently, the transition to optical connectivity is considered essential for the future of AI infrastructure. Other innovative optical technology companies, such as Ayar Labs with CPO, Lightmatter with optical computing, and Celestial AI with its Photonic Fabric, also play critical roles in this field. Xscape Photonics' entry is expected to further intensify competition and accelerate technological innovation in the optical connectivity solutions market for AI data centers.

Strategic Significance & Outlook

The emergence of high-density 8-wavelength laser products like Xscape Photonics' "FalconX" will have a profound impact on the design and operation of AI data centers. Enhanced power efficiency and increased bandwidth density will improve the performance of AI workloads and reduce operational costs. This latest funding round is a crucial step for the company to scale FalconX production and accelerate its market introduction. Moving forward, Xscape Photonics is expected to establish standards for optical connectivity in AI infrastructure through collaborations with hyperscalers and AI accelerator vendors, growing into an indispensable technology supplier for driving next-generation AI innovation. Ultimately, it aims to solve the most challenging connectivity issues facing AI and contribute to a more powerful and sustainable AI ecosystem.

Source: https://newmarketpitch.com/blogs/news/semiconductor-top-startups

#09 NPO/CPO to Shape AI Hardware Future: Phased Transition to Near-Package Optics by 2027, Co-Packaged Optics by 2029 Predicted

Published June 24, 2026   Reddit   Unknown

OVERVIEW

Industry discussions forecast a phased transition for AI hardware, moving from current pluggable optical modules to Near-Package Optics (NPO) by 2027/28, and then to Co-Packaged Optics (CPO) by 2029. Major players like Astera Labs, Credo, and Lumentum emphasize this shift, with CPO dubbed the industry's 'holy grail.' NPO places optical interconnects near ASIC chips, while CPO fully integrates them within the same package, promising higher power efficiency and bandwidth density, outlining the future direction of AI infrastructure.

IN DEPTH

Key Findings

In the evolving roadmap for AI hardware, industry stakeholders are actively discussing a phased approach for transitioning from current pluggable optical modules to Near-Package Optics (NPO) by 2027-2028, and subsequently moving towards Co-Packaged Optics (CPO) by 2029. Leading technology companies such as Astera Labs, Credo, and Lumentum are underscoring the significance of this transition, with CPO widely recognized as the 'holy grail' for achieving ultimate performance and power efficiency in AI data centers. This clear roadmap strongly indicates the future direction of AI infrastructure.

Technical / Clinical Details

NPO technology involves placing optical interconnect modules in physically close proximity to Application-Specific Integrated Circuit (ASIC) chips. This shortens the electrical path from the ASIC before conversion to optical signals, thereby reducing signal loss and power consumption. NPO is expected to be introduced ahead of CPO, as it presents fewer manufacturing and thermal management challenges. CPO, on the other hand, is a more advanced integration technology that fully embeds optical interconnect components within the same package as the ASIC. This extremely dense integration further shortens electrical pathways, maximizing power efficiency and dramatically increasing bandwidth density. While CPO introduces new technical challenges such as thermal management, heterogeneous integration, and complexities in testing and repair, its performance advantages are substantial.

Background & Context

The explosive growth of AI workloads places unprecedented demands on data movement between GPUs in data centers. Traditional electrical interconnects and pluggable optical transceivers are struggling to meet the combined requirements of bandwidth, low latency, and low power consumption. Consequently, the industry is accelerating its shift towards more efficient optoelectronic integration solutions. NPO is positioned as a pragmatic step in the transition to CPO, offering many of CPO's benefits while enabling relatively faster market adoption. This technological transition is crucial for sustainable AI growth and for reducing data center operational costs.

Strategic Significance & Outlook

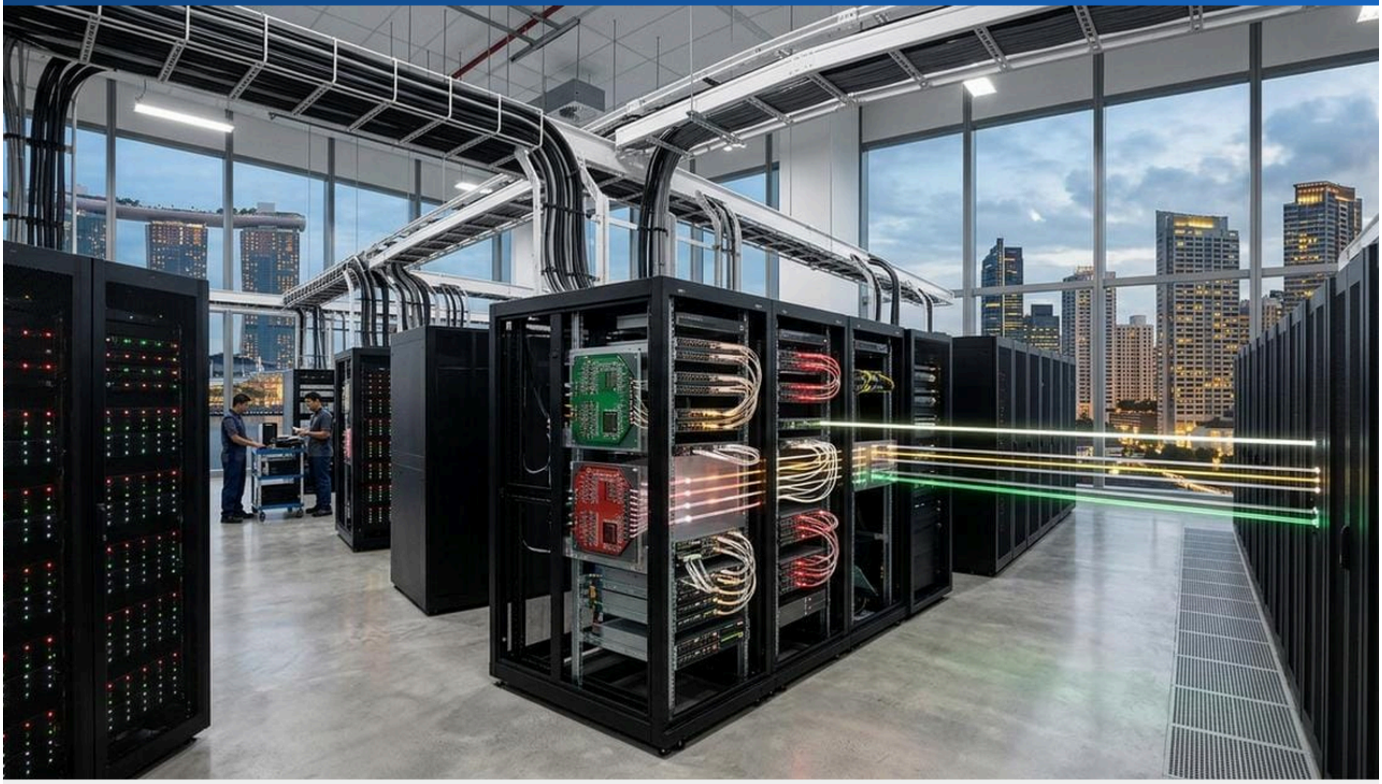
The roadmap for AI hardware's phased transition from NPO to CPO will profoundly impact data center design and operation. In the short term, NPO will be a primary means of improving the power efficiency and performance of AI infrastructure, providing critical experience and a technological foundation for CPO's maturity. Once CPO becomes widespread around 2029, AI clusters will become even denser, with significantly enhanced computational and data transmission capabilities. This technological evolution is indispensable for shaping the future of AI, and close collaboration among hyperscalers, semiconductor manufacturers, and optical component providers will be key to the successful implementation of this roadmap. Ultimately, it will contribute to the realization of a more powerful and sustainable AI ecosystem.

Source:
https://www.reddit.com/r/GrowthStockInvesting/comments/1ueihiw/near_packaged_optics_and_copackaged_o

Collected: June 26, 2026 | Automated Research System (Gemini API)

#10 Optical Computing Poised to Replace Electricity: Chinese Scientists Propose 'Digital Twin Optical Computing System' (DT-OCS) for AI

Published June 20, 2026 TechNode Global China



OVERVIEW

Optical computing is emerging as a promising approach to break through energy and latency bottlenecks of traditional electronics. Chinese scientists have proposed a "Digital Twin Optical Computing System (DT-OCS)" that runs AI programs on a virtual light-based computer system within a real "digital twin" PC. This aims to solve challenges of conventional optical computing systems reliant on direct physical hardware access. DT-OCS transforms optical computing into a shareable research platform through reproducible, accessible, and scalable software resources.

IN DEPTH

Key Findings

Optical computing is emerging as one of the most promising approaches to overcome the energy consumption and data processing latency bottlenecks faced by traditional electronic devices. In this context, Chinese researchers have proposed a groundbreaking "Digital Twin Optical Computing System (DT-OCS)". This system enables AI programs to run on a virtual light-based computer system constructed within a real "digital twin" PC environment. This innovation aims to resolve a major challenge of conventional optical computing systems, which are constrained by their reliance on direct access to physical optical hardware and its limited availability. The DT-OCS is designed as a highly reproducible, accessible, and scalable software resource, transforming optical computing from a specialized, device-dependent resource into a widely shareable and reproducible research platform.

Technical / Clinical Details

The DT-OCS is built upon digital twin technology, which accurately models and simulates the behavior of physical optical computing systems. In this virtual environment, photons, instead of electrons, transmit and process information via waveguides, optical fibers, and photonic circuits. This system addresses problems inherent in traditional optical computing, such as the need for expensive dedicated hardware, the complexity of physical setups, and access restrictions. Researchers can now develop and test optical computing algorithms and architectures through DT-OCS without requiring actual hardware. This accelerates the development cycle and allows more researchers to explore the potential of optical computing. This technology is particularly crucial given that modern data centers, AI accelerators, and high-performance computing (HPC) workloads consume significant power merely by moving data between memory, processors, and network interfaces.

Background & Context

The rapid advancement of AI and machine learning has dramatically increased demands for computational power and data processing speed. However, traditional electronic computing faces physical limitations such as heat generation, power consumption, and interconnect latency. Optical computing, by utilizing photons as information carriers, inherently possesses the potential to overcome these bottlenecks. Until now, its implementation has relied on costly specialized hardware and complex optical system construction. The proposal of DT-OCS by Chinese researchers represents a significant step towards democratizing and popularizing optical computing, with the potential to profoundly impact the entire research and development community.

Strategic Significance & Outlook

The success of DT-OCS will fundamentally alter the landscape of optical computing R&D. It will enable faster and more cost-effective exploration of new optical computing architectures and algorithms without physical constraints. This could shorten the path to commercialization for optical computing and accelerate innovation in fields such as AI, deep learning, and quantum computing. DT-OCS is expected to overcome scalability and accessibility challenges facing optical technology, forming a foundation to foster a collaborative research environment where a broader range of scientists and engineers can contribute to this innovative field. Ultimately, it will contribute to the realization of energy-efficient, more powerful computing systems.

Source: https://www.sotaventomedios.com/how-optical-computing-could-replace-electricity-for-faster-data-processing/

#11 Marvell Leverages Celestial AI's Photonic Fabric Technology in AI Networking Strategy, Drives 14% Stock Jump

Published June 18, 2026 Stocktwits USA

OVERVIEW

Marvell Technology's reported strategy to leverage Celestial AI's Photonic Fabric technology in its AI networking strategy sent its stock soaring by 14%. KeyBanc upgraded Marvell's AI networking outlook and raised its price target. Celestial AI's Photonic Fabric aims to enhance speed and handle higher memory loads for large-scale AI applications by using light for connections between AI processors and memory, differentiating Marvell from competitors and strengthening its leadership in the AI data center market.

IN DEPTH

Key Findings

Marvell Technology's reported strategy to deeply integrate Celestial AI's innovative "Photonic Fabric" technology into its AI networking strategy has been met with significant market approval, causing the company's stock to surge by 14% today. In response to this positive development, KeyBanc has upgraded its outlook for Marvell in the AI networking sector and raised its price target. Celestial AI's Photonic Fabric technology aims to achieve data movement between AI processors and memory using photons instead of traditional electrical copper wiring, thereby dramatically increasing data transfer speeds and addressing the high memory load demands faced by large-scale AI applications. This strategic partnership is considered crucial for Marvell to strengthen its differentiation in the highly competitive semiconductor market and solidify its leadership in the AI data center market.

Technical / Clinical Details

Celestial AI's Photonic Fabric technology is an optical interconnect solution based on silicon photonics, enabling light-speed data transmission between AI chips and memory, or between chips themselves. Traditional electrical wiring faces physical limitations where signal attenuation, latency, and power consumption increase with transmission distance. Photonic Fabric overcomes these challenges by providing ultra-high bandwidth at terabits-per-second, with low power consumption and low latency. By adopting this technology, Marvell's switch ASICs and optical transceiver products will be able to achieve the next-generation performance and efficiency required by AI data centers. This will maximize the parallel processing capabilities of AI accelerators and significantly reduce training times for large language models (LLMs) and generative AI.

Background & Context

The explosive growth in computational demand from AI workloads has exacerbated bottlenecks in intra-data center interconnectivity. Specifically, the massive data movement between GPU clusters has become a major constraint on overall system performance and power efficiency. The semiconductor industry is accelerating its transition to optoelectronic integration technologies like co-packaged optics (CPO) and near-package optics (NPO) to address this challenge. The adoption of innovative technologies from startups like Celestial AI by major semiconductor companies like Marvell indicates the industry's direction in shaping the future of AI infrastructure. Such strategic partnerships are indispensable for accelerating technological innovation and enhancing market competitiveness.

Strategic Significance & Outlook

Marvell's strategy to leverage Celestial AI's Photonic Fabric technology will significantly strengthen its competitiveness in the AI data center market. Through this technology integration, Marvell will be able to offer higher-performance and more energy-efficient AI networking solutions, expected to further capture demand from hyperscalers and AI accelerator vendors. The surge in stock price indicates that investors recognize the long-term potential value of this strategy. Moving forward, Marvell is projected to establish standards for optical connectivity in next-generation AI infrastructure based on Photonic Fabric technology, cementing its position as an indispensable technology leader in maximizing AI capabilities. This will serve as a catalyst for further growth across the entire AI industry.

Source: https://stocktwits.com/news-articles/markets/equity/mrvl-stock-jumps-14-percent-keybanc-lifts-ai-networking-outlook-raises-marvell-price-target/cZKkSG2R77w

Collected: June 26, 2026 | Automated Research System (Gemini API)

#12 GitHub Hosts Diverse Open-Source Silicon Photonics Projects, Leveraging for Optical Computing and Analog Links

Published June 24, 2026 GitHub Topics USA

OVERVIEW

GitHub actively hosts numerous open-source silicon photonics projects, including RF simulations for microwave photonic analog links and databases of integrated photonics-based companies and foundries. Projects involving parameter-driven silicon photonics layouts and optical computing primitives using Python and GDSFactory are also underway. These collaborative efforts promote the widespread adoption and research and development of silicon photonics technology within the community.

IN DEPTH

Key Findings

On GitHub, the world's largest software development platform, a diverse array of open-source projects related to silicon photonics are actively being published, signaling a growing interest in this technology within the R&D community. These projects include initiatives for radio frequency (RF) simulations of microwave photonic analog links and comprehensive databases of integrated photonics-based companies and foundries relevant to optical computing and interconnects. Furthermore, efforts are underway to develop parameter-driven silicon photonics layouts and optical computing primitives using tools such as Python and GDSFactory. These activities are democratizing silicon photonics technology and accelerating collaborative innovation.

Technical / Clinical Details

The silicon photonics projects hosted on GitHub span a wide range from theoretical research to practical design tools. For instance, simulation projects for microwave photonic analog links contribute to the development of next-generation communication systems by studying the interaction between electromagnetic waves and light in high-speed wireless communication and radar systems. Databases of integrated photonics companies and foundries serve as valuable resources for researchers and engineers seeking appropriate manufacturing partners or technology providers. Parameter-driven layout generation using GDSFactory significantly reduces the design cycle of silicon photonics chips by enhancing design automation and reusability. This enables efficient development of optical computing primitives such as optical switches, modulators, and filters, facilitating their integration into high-performance devices like AI accelerators and high-speed transceivers.

Background & Context

The skyrocketing demand for data processing in fields like AI, data centers, and 5G/6G communication is exposing the limitations of traditional electronic technologies. Silicon photonics, with its advantages of low power consumption, high bandwidth, miniaturization, and compatibility with existing CMOS manufacturing infrastructure, is recognized as one of the most promising technologies to address these challenges. The activity within the open-source community is crucial for lowering the learning curve and entry barriers for this complex technology, enabling more developers to contribute to the silicon photonics ecosystem. This fosters accelerated innovation and wider adoption of the technology.

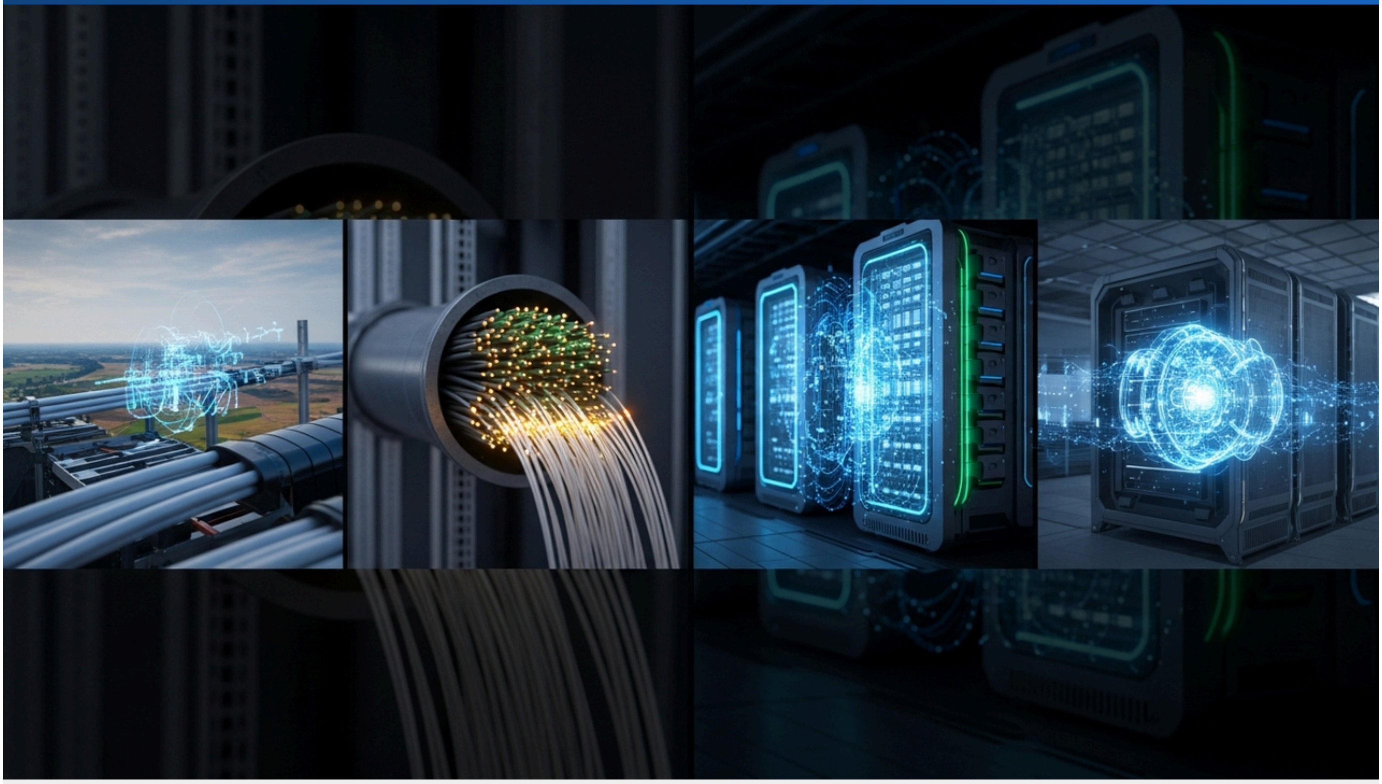
Strategic Significance & Outlook

The revitalization of open-source activities related to silicon photonics through platforms like GitHub will accelerate the practical application of this technology and its expansion into diverse application areas. Collaborative development and knowledge sharing will expedite the resolution of technical challenges and foster new breakthroughs. Particularly in fields such as AI, quantum computing, and LiDAR, silicon photonics is becoming an indispensable component, and open-source tools and libraries will strongly support the evolution of these technologies. Ultimately, silicon photonics is expected to be adopted as a standard technology across a broader range of industries, laying the foundation for next-generation digital infrastructure and innovative products.

Source: https://github.com/topics/silicon-photonics?o=desc&s=updated

#13 Nokia, t3 Broadband, Aureon Deploy Ultra-High-Capacity AI-Optimized Optical Network in US Midwest, Scalable to 400Tbps

Published June 18, 2026 Nokia USA



OVERVIEW

Nokia and t3 Broadband announced the deployment of a new ultra-high-capacity, AI-optimized optical transport network for broadband provider Aureon in the US Midwest. This infrastructure connects a major North Dakota data center development with the Chicago metropolitan area, launching with 100Tb/s capacity and scalable to 400Tb/s. It leverages Nokia's 1830 Global Express platform, Super C and L-band optical line systems, and 1.2T ICE7 coherent optics. This deployment underscores the need for scalable, high-performance connectivity supporting rapid AI, cloud, and hyperscale data center growth.

IN DEPTH

Key Findings

Nokia and t3 Broadband have announced the completion of a new ultra-high-capacity, AI-optimized optical transport network deployment for Aureon, a broadband network operator based in the U.S. Midwest. This state-of-the-art infrastructure directly links a major data center development in North Dakota with the Chicago metropolitan area, launching with an initial capacity of 100 terabits per second (Tb/s) and designed to be scalable up to 400 Tb/s in the future. This large-scale deployment clearly demonstrates the imperative for scalable, high-performance connectivity to support the rapid growth of artificial intelligence (AI), cloud services, and hyperscale data center workloads.

Technical / Clinical Details

At the core of this AI-optimized optical network are Nokia's advanced optical networking solutions. Specifically, the network is built upon Nokia's 1830 Global Express platform, employing Super C and L-band optical line systems. This maximizes optical fiber utilization efficiency, enabling data transmission across an extended wavelength range. A notable feature is the integration of 1.2T ICE7 coherent optics technology. ICE7 achieves data rates of 1.2 Tb/s on a single wavelength, and by utilizing coherent modulation techniques, it significantly enhances signal quality and spectral efficiency over long distances. This combination of technologies allows the network to deliver both extremely high transmission capacity and low latency, efficiently handling the massive data movement essential for AI training and inference.

Background & Context

The explosive growth of AI and data center expansion is placing unprecedented demands on network infrastructure. High-speed, high-capacity links connecting new data center hubs, such as those in North Dakota, with major internet exchange points like the Chicago metropolitan area, are crucial for the geographical distribution of AI workloads and the consolidation of processing capabilities. Traditional networks are finding it increasingly difficult to provide the required bandwidth and low latency, making capacity expansion and efficiency improvement in optical fiber networks an urgent priority. The partnership between Nokia, t3 Broadband, and Aureon addresses these market needs, building infrastructure to support the next generation of the digital economy.

Strategic Significance & Outlook

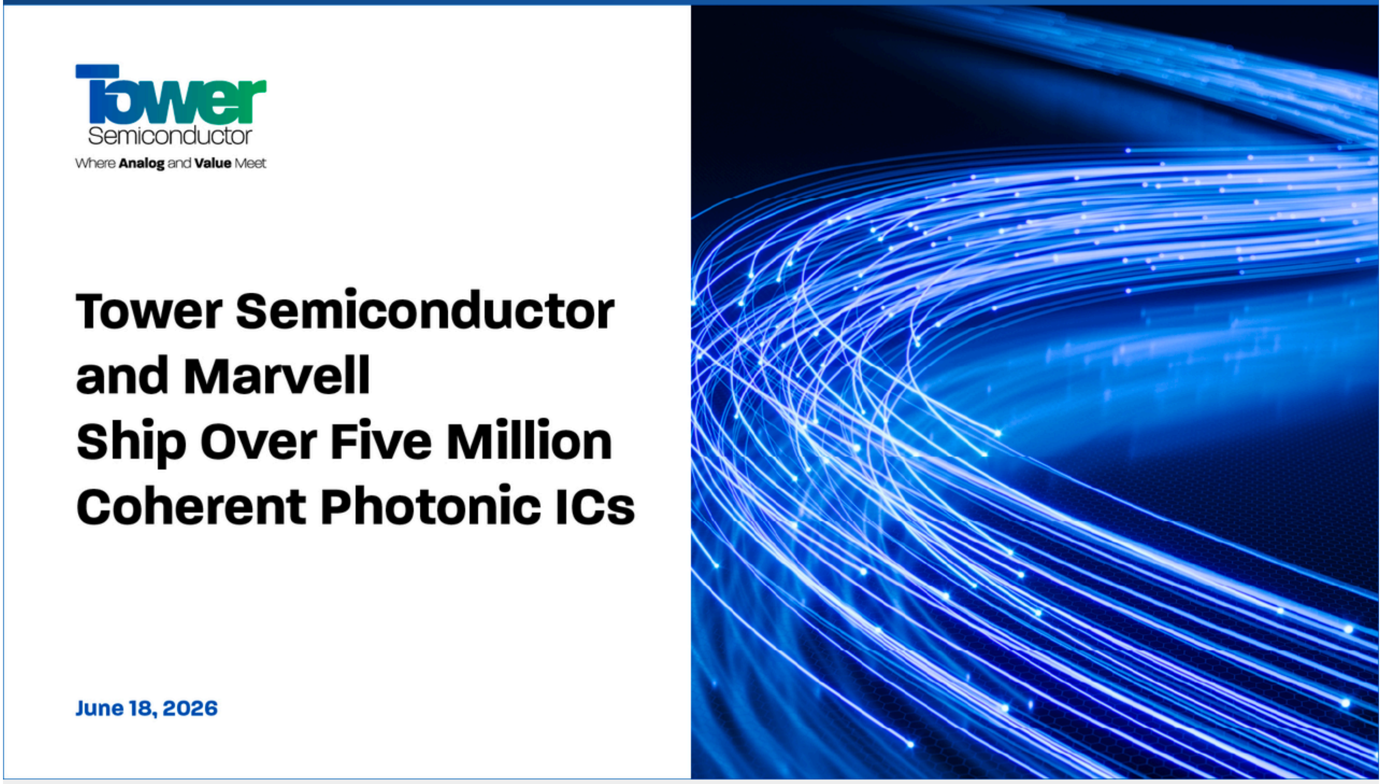
The deployment of this ultra-high-capacity, AI-optimized optical network will significantly strengthen digital infrastructure in the U.S. Midwest and foster the growth of new AI-related industries. Its scalability from an initial 100 Tb/s to 400 Tb/s means it can flexibly accommodate future unpredictable increases in AI demand. This project demonstrates that Nokia's optical networking technology plays a central role in building the backbone networks for an AI-driven society. Moving forward, similar AI-optimized networks are expected to be deployed globally, serving as a foundation to maximize AI capabilities and accelerate the creation of new services and applications. This marks a critical milestone in building 'optical highways' between data centers.

Source: https://www.nokia.com/newsroom/nokia-t3-broadband-and-aureon-partner-to-deploy-hyperscale-class-ai-connectivity-with-ultra-high-capacity-optical-network/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#14 Tower Semiconductor and Marvell Ship Over 5 Million Coherent PICs for AI Data Centers, Enabling High Bandwidth and Energy Efficiency

Published Published June 18, 2026 Tower Semiconductor イスラエル



OVERVIEW

Tower Semiconductor and Marvell Technology have announced the shipment of over 5 million coherent photonic integrated circuits (PICs) for AI data center interconnect networks. This milestone highlights Tower's advanced silicon photonics platform, crucial for enabling the high bandwidth and energy efficiency required by AI-driven networks. These complex PICs, incorporating 3D integration and advanced optical packaging, are a critical step towards future AI infrastructure, with both companies actively developing next-generation coherent technologies.

IN DEPTH

Background & Context

The escalating demands of AI workloads, particularly the training and inference of large language models (LLMs) and generative AI, have exacerbated critical bandwidth and power efficiency bottlenecks within intra-data center interconnects. Traditional electrical interconnects and conventional pluggable optical modules are increasingly struggling to meet the stringent performance criteria for these applications, thereby accelerating the industry's transition towards more efficient optoelectronic integration solutions such as co-packaged optics (CPO) and near-package optics (NPO). The collaboration between Tower Semiconductor and Marvell directly addresses these pressing market needs, providing crucial foundational technology essential for the sustainable growth and scalability of AI.

Key Findings

Tower Semiconductor and Marvell Technology have jointly announced the shipment of over 5 million coherent photonic integrated circuits (PICs) for Artificial Intelligence (AI) data center interconnect networks. This groundbreaking milestone highlights the critical role of Tower Semiconductor's advanced silicon photonics platform in addressing the unprecedented demands for high bandwidth and exceptional energy efficiency within AI-driven Data Center Interconnect (DCI) networks. This achievement marks a significant advancement towards enabling the scalable infrastructure required for the next generation of AI.

Technical Details

Unlike traditional direct detection methods, coherent photonic integrated circuits (PICs) necessitate precise control over the phase and polarization of light, rendering their design and manufacturing exceptionally complex. Tower Semiconductor's advanced silicon photonics platform is engineered to meet these intricate requirements, delivering highly integrated, high-performance PICs. These PICs serve as high-speed optical transmission links, facilitating the connection of large GPU clusters and efficiently managing the massive data movement within data centers. Technically, these components leverage 3D integration technology and advanced optical packaging techniques, which minimize signal loss and power consumption by densely co-integrating optical and electrical components within a single package. Both companies are actively committed to further evolving next-generation coherent technologies, including the heterogeneous integration of non-silicon materials and even more advanced optical packaging techniques.

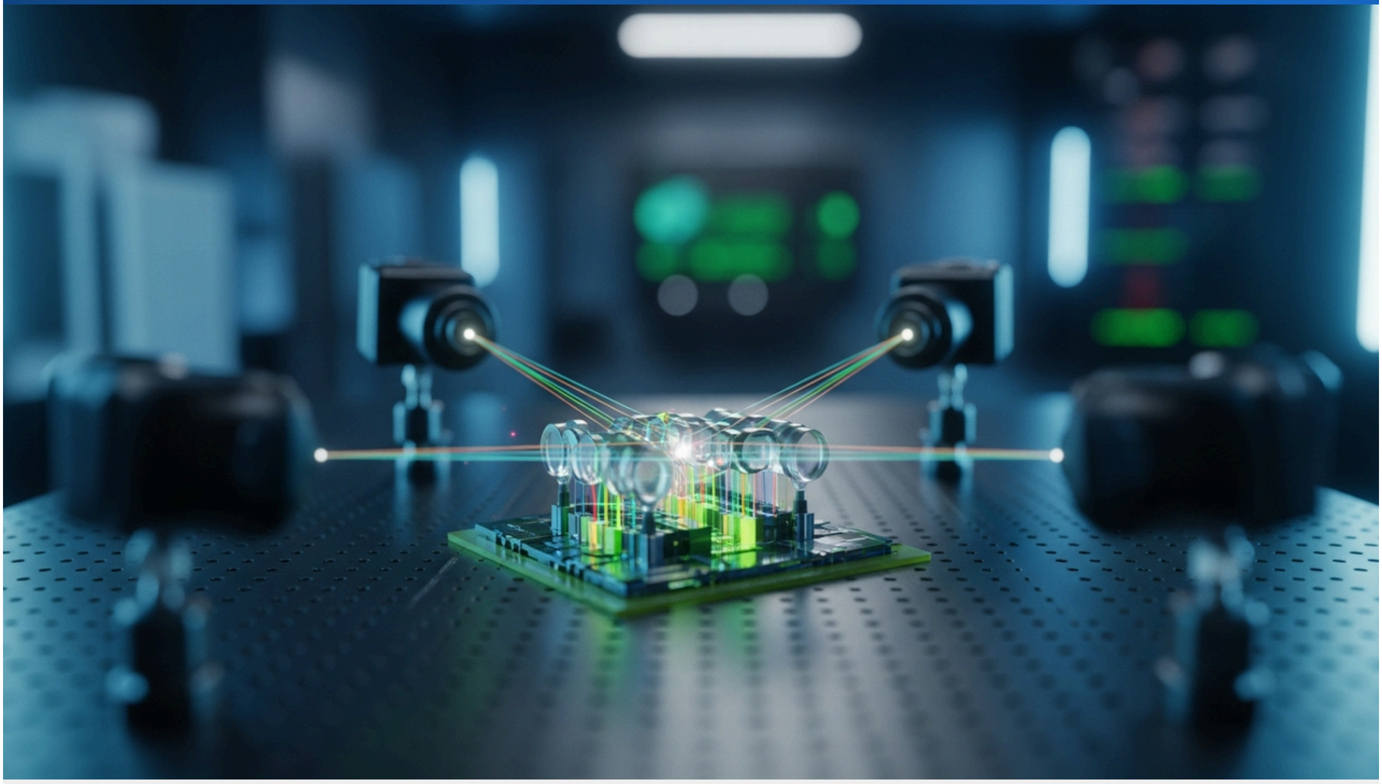
Strategic Significance & Outlook

The shipment of over 5 million coherent PICs unequivocally underscores the accelerating adoption of advanced optical connectivity within AI data centers. This foundational technology significantly enhances the power efficiency and computational density of AI clusters, thereby contributing to reduced operational expenditures and a lower environmental footprint. Tower Semiconductor and Marvell's ongoing commitment to technological evolution is critical for maximizing the performance of next-generation AI accelerators and switch ASICs. Moving forward, the companies' collaborative technologies are anticipated to set de-facto standards for optical connectivity in AI infrastructure and play a pivotal role in unlocking the full capabilities of AI. This will, in turn, serve as a catalyst for transformative growth across the broader AI industry.

Source: https://towersemi.com/2026/06/18/06182026/

#15 arXiv Demonstrates Broadband, Compact, Training-Free Optical Processors for Parallel Image Classification

Published Published June 19, 2026 arXiv (光学および電磁気学) USA



OVERVIEW

A new optical processor offers a groundbreaking solution for energy-efficient AI computation, addressing the limitations of traditional electronic processors. Utilizing wavy diffractive structures, this compact and training-free device performs parallel image classification, overcoming previous hurdles like bulkiness, wavelength specificity, and the need for complex training. This innovation promises to significantly accelerate the practical adoption of optical computing across diverse AI applications.

IN DEPTH

Background

The burgeoning field of artificial intelligence (AI), particularly in image recognition and computer vision, demands immense computational resources and power. Traditional electronic processors are increasingly encountering limitations in improving power efficiency and performance, largely due to the deceleration of Moore's Law. Optical computing presents an attractive alternative, offering inherent advantages such as ultra-high speed, low latency, and significantly lower power consumption by leveraging photons as information carriers instead of electrons. However, its widespread practical implementation has been hindered by persistent challenges including physical bulk, design complexity, and a lack of versatility. This research directly addresses these obstacles, proposing a pragmatic solution specifically tailored for image classification, a cornerstone task in numerous AI applications.

Key Findings

The rapid proliferation of artificial intelligence (AI) has underscored the limitations of traditional electronic computing, creating an urgent demand for faster and more energy-efficient computational approaches. Addressing this critical challenge, a recent research paper introduces and validates a groundbreaking "broadband, compact, and training-free" optical processor designed for parallel image classification. This innovative device is constructed upon novel wavy diffractive structures. This breakthrough promises to effectively surmount the primary limitations of prior optical computing implementations—specifically, their bulky physical footprint, inherent wavelength specificity, and reliance on intricate training protocols—thereby substantially enhancing both scalability and parallel processing capabilities.

Technical Details

This novel optical processor ingeniously harnesses the fundamental physical laws governing light's interaction with diffractive structures to process image data in parallel. Specifically, as incident light traverses microstructures meticulously engineered with a wavy pattern, different angles and patterns of light are precisely focused to designated output positions. This mechanism facilitates sophisticated feature extraction and classification without the need for any prior training. Consequently, computationally intensive operations—particularly convolutional operations typically central to deep learning models—can be executed directly through optical phenomena. The training-free nature of the system dramatically simplifies deployment and operation, concurrently achieving substantial reductions in energy consumption. Furthermore, its broadband capability allows for the simultaneous processing of diverse light wavelengths, significantly enhancing information throughput. The miniaturized design is a key enabler for seamless integration into edge AI devices and embedded systems, thus unlocking new frontiers for AI applications.

Strategic Significance and Outlook

This broadband, compact, and training-free optical processor is poised to significantly accelerate the adoption of optical computing within the AI domain. Its combination of high performance and remarkably low power consumption will offer a decisive advantage, particularly for edge AI applications demanding real-time image recognition, such as autonomous driving, sophisticated surveillance systems, and advanced medical imaging. The training-free characteristic notably reduces development costs and timelines, facilitating the rapid market introduction of innovative AI solutions. Looking ahead, it is anticipated that the design principles underpinning these wavy diffractive structures will be further applied to develop optical processors capable of tackling even more complex AI tasks, including advanced object detection and segmentation. This technology holds profound potential to physically extend the capabilities of AI without encountering fundamental electronic limitations, thereby contributing to the creation of a more sustainable and powerful AI ecosystem.

Source: https://pubmed.ncbi.nlm.nih.gov/42319964/

#16 Optalysys Leverages Photonics for Lattice-Based Cryptography to Enhance Security in Quantum Computing Era

Published June 19, 2026 Optalysys UK

OVERVIEW

While quantum computing promises to transform the technological landscape, it also necessitates robust new security solutions. Optalysys highlights that photonics (optical computing) is uniquely suited to accelerate the mathematical structures underlying lattice-based cryptography, a key post-quantum candidate. Photonics generates negligible heat, offers no electrical resistance, and supports extremely high levels of parallelism, making it highly effective for computationally intensive, bandwidth-heavy workloads. This enables future-proof encryption, preparing for an era where quantum computers can break current ciphers.

IN DEPTH

Key Findings

The advent of quantum computing holds the potential to fundamentally transform the current technological landscape, from drug discovery to financial modeling and artificial intelligence. However, it also carries the inherent capability to invalidate existing cryptographic techniques, thus creating an urgent demand for more robust security solutions. Optalysys points out that photonics (optical computing) possesses exceptional characteristics that make it particularly well-suited for accelerating the computations of mathematical structures foundational to lattice-based cryptography, which is considered quantum-resistant. Compared to electronic approaches, photonics offers inherent advantages such as negligible heat generation, absence of electrical resistance, and extremely high levels of parallelism. These attributes enable highly efficient performance in computationally intensive, bandwidth-heavy workloads, thereby providing future-proof security measures for the 'post-quantum era' when quantum computers become prevalent.

Technical / Clinical Details

Lattice-based cryptography is considered one of the most promising post-quantum cryptography (PQC) candidates due to its mathematical security and efficiency. The security of these ciphers relies on the difficulty of solving hard problems on lattices (grid-like mathematical structures). However, their key generation, encryption, and decryption processes involve extensive matrix operations, posing a high computational load for classical electronic computers. This is where photonics demonstrates its true value. Optical computing can perform linear operations like matrix multiplication at the speed of light by utilizing the wave nature of light, dramatically reducing the computational burden of lattice-based cryptography. Photons can propagate in parallel without interfering with each other, enabling simultaneous processing of vast amounts of data. Optalysys' approach aims to apply this parallel processing capability of light to lattice-based cryptographic computations, facilitating ultra-fast and secure encrypted communications.

Background & Context

Current major public-key cryptosystems (such as RSA and elliptic curve cryptography) are at risk of being efficiently broken by quantum algorithms like Shor's algorithm. The progress of quantum computers poses a significant threat to national security and financial systems. Consequently, governments and corporations worldwide are accelerating their transition to PQC algorithms that are resistant to quantum computers. However, PQC algorithms often require more computational resources and bandwidth, raising concerns about performance bottlenecks when implemented on existing electronic systems. Photonics is positioned as a promising hardware accelerator to address these PQC implementation challenges.

Strategic Significance & Outlook

The fusion of photonics and post-quantum cryptography, as advocated by Optalysys, represents a critical strategy for securing future digital security. As this technology matures, quantum-resistant secure communication will become achievable for all sensitive data communications, including financial transactions, government communications, and cloud services. The low-power, high-speed computational capabilities of photonics will accelerate the practical deployment of PQC algorithms and promote their implementation in IoT devices and edge computing environments. This is expected to build a future where information security is maintained and the reliability of digital society is preserved, even in an era where quantum computers are widely adopted. Optalysys will likely expand its role as a company at the forefront of this security transformation.

Source: https://optalysys.com/resource/post-quantum-cryptography-and-photonics-a-future-proof-approach-to-security/

#17 TSMC Accelerates Advanced Packaging Strategy: Addressing CoWoS Capacity Shortfall, Driving AI Accelerator Demand

Published June 21, 2026 Umbrex Taiwan

OVERVIEW

TSMC's strategy is founded on advanced process technology, manufacturing yield, reliable execution, and a broad design ecosystem. As chip architectures shift towards chiplets and 3D integration, advanced packaging becomes a crucial differentiator. The company openly states that demand for CoWoS capacity, used in AI accelerators and high-bandwidth memory integration, outstrips supply. Consequently, expanding CoWoS and other 3D Fabric technology capacity is TSMC's top short-term strategic priority.

IN DEPTH

Key Findings

TSMC's business strategy is fundamentally centered on advanced process technology, superior manufacturing yield, reliable execution capabilities, and a comprehensive design ecosystem. However, as chip architectures evolve from single monolithic dies to more flexible chiplets and 3D integration, advanced packaging technologies have emerged as an even more critical differentiator. The company has publicly acknowledged that the demand for CoWoS (Chip-on-Wafer-on-Substrate) packaging capacity, which is indispensable for artificial intelligence (AI) accelerators and high-bandwidth memory (HBM) integration, significantly outstrips its current supply. To address this situation, the expansion of manufacturing capacity for CoWoS and other 3D Fabric technologies has become TSMC's top short-term strategic priority.

Technical / Clinical Details

CoWoS is an advanced 2.5D/3D packaging technology developed by TSMC, which tightly integrates multiple chiplets (such as CPUs, GPUs, and HBM) onto a silicon interposer, which is then mounted onto a substrate. This technology dramatically shortens the length of electrical connections between chiplets, enabling ultra-high-speed data transmission and reduced power consumption. Particularly for AI accelerators, terabytes-per-second data transfer is required between GPUs and HBM, and technologies like CoWoS are key to resolving this bottleneck. In the CoWoS manufacturing process, TSMC utilizes cutting-edge technologies such as micro-bump technology, Through-Silicon Via (TSV) connections, and high-precision wafer bonding. Capacity expansion involves the construction of new cleanrooms, installation of manufacturing equipment, and process optimization, further advancing the integration of HBM stacks with AI chips.

Background & Context

The training and inference of AI, especially large language models (LLMs) and generative AI, demand unprecedented computational power and data bandwidth. AI chip design companies like NVIDIA, AMD, and Intel are developing products that integrate GPUs and HBM with advanced packaging to meet this demand. CoWoS is an essential technology for manufacturing these high-performance AI accelerators, and its supply capacity is a factor that dictates the growth of the entire AI hardware market. As a leader in the foundry industry, TSMC is at the forefront of this AI boom, and the shortage of CoWoS capacity is recognized as an industry-wide challenge. Therefore, TSMC's capacity expansion is critically important for the healthy development of the entire AI ecosystem.Strategic Significance & Outlook

TSMC's expansion of CoWoS and 3D Fabric technology capacity will alleviate the supply shortage of AI accelerators and enable further growth of the AI industry. This will shorten AI model training times and accelerate the development of larger and more complex AI models. Moreover, continuous investment in advanced packaging technologies is essential for TSMC to maintain its technological leadership in the semiconductor industry and establish a competitive advantage in the AI era. The evolution of chiplet technology and 3D integration could also pave the way for the integration of next-generation technologies such as Co-Packaged Optics (CPO), further increasing TSMC's role in shaping the future of semiconductor manufacturing and packaging. Ultimately, it will contribute to the widespread adoption of more powerful and energy-efficient AI systems.

Source: https://umbrex.com/resources/company-profiles/taiwan-semiconductor-manufacturing-company-limited/

#18 NVIDIA Invests $4B in Optical Interconnects as US Quantum Foundry Leverages $4.6B to Become Next TSMC

Published June 23, 2026 The Futurum Group USA

OVERVIEW

The U.S. Commerce Department committed $2 billion to nine quantum companies on May 21, 2026, with $1.8 billion allocated to quantum foundry builders or partners, signaling a push for U.S. quantum autonomy. NVIDIA invested $4 billion in Coherent and Lumentum, reflecting AI infrastructure's serious commitment to optical interconnects. GlobalFoundries, already manufacturing PsiQuantum's Q1 silicon photonic chips in Malta, NY, is investing $375 million to expand capacity. These investments position the U.S. to become the 'next TSMC' in quantum and AI-related semiconductor manufacturing.

IN DEPTH

Key Findings

On May 21, 2026, the U.S. Department of Commerce announced a substantial financial commitment totaling $2 billion to nine quantum companies, as part of a robust effort to strengthen the nation's quantum technology ecosystem. Of this, $1.8 billion is specifically allocated to companies building quantum foundries or forming strategic partnerships with them. This move is a strong indicator of the U.S.'s ambition to enhance its independence and establish global leadership in quantum computing and related semiconductor manufacturing. Concurrently, the artificial intelligence (AI) infrastructure layer is keenly aware of the critical importance of optical interconnects, with NVIDIA making significant investments, including a combined $4 billion into Coherent and Lumentum. Notably, GlobalFoundries is already manufacturing PsiQuantum's Q1 silicon photonic chips in Malta, New York, and is investing an additional $375 million to expand this capability. These concerted investments suggest the potential for the U.S. to emerge as the 'next TSMC' in quantum and AI-related semiconductor manufacturing.

Technical / Clinical Details

Quantum foundries are specialized semiconductor manufacturing facilities designed for producing quantum devices such as quantum computers and quantum sensors. These facilities require advanced process capabilities to accommodate diverse qubit technologies, including superconducting, ion trap, and photonics. Silicon photonics plays a central role in quantum computers that utilize photons as qubits, offering scalability due to its compatibility with existing CMOS manufacturing technology. The Q1 silicon photonic chips, manufactured by GlobalFoundries in collaboration with PsiQuantum, integrate optical waveguides, optical switches, and single-photon detectors, providing the foundation for quantum information processing. NVIDIA's investments are accelerating technological innovation in optical component manufacturers like Coherent and Lumentum, contributing to performance improvements and mass production of optical interconnects in AI data centers. Specifically, these investments support the realization of 1.6T and 3.2T optical modules and co-packaged optics (CPO).

Background & Context

Amidst intensifying technological competition between the U.S. and China, the U.S. government is strongly committed to enhancing domestic manufacturing capabilities in semiconductors and advanced technologies. Through policies like the CHIPS Act, massive investments are being made in domestic R&D, manufacturing, and workforce development. Quantum computing and AI are recognized as two pivotal technologies that will shape the economy and national security in the 21st century, making the secure availability of manufacturing capabilities in these sectors strategically indispensable. Given that TSMC in Taiwan currently dominates a significant portion of global advanced semiconductor manufacturing, the U.S. aims to build a robust domestic foundry ecosystem to mitigate supply chain vulnerabilities. AI leaders like NVIDIA investing in optical interconnects clearly indicate that the AI infrastructure bottleneck is shifting from computational power to data movement.

Strategic Significance & Outlook

The large-scale funding for quantum companies by the U.S. Department of Commerce, coupled with strategic investments from NVIDIA and GlobalFoundries, will dramatically bolster the U.S. quantum and AI-related semiconductor manufacturing ecosystem. The expansion of GlobalFoundries' Malta facility for PsiQuantum chip manufacturing will accelerate the practical realization of utility-scale fault-tolerant quantum computers. Simultaneously, investments in optical interconnects will drastically improve the performance and energy efficiency of AI data centers, enabling further AI scaling. If successful, these initiatives will establish the U.S. as a global leader in quantum and AI technology manufacturing, providing a strategic advantage in geopolitical competition. This represents not merely technological progress but a critical strategic turning point with long-term implications for national economy and security.

Source: https://futurumgroup.com/insights/will-a-u-s-quantum-foundry-leverage-4-6-billion-in-new-capital-to-become-the-next-tsmc/

#19 Semiconductor Industry Prioritizes Optical I/O and Co-Packaged Optics with Significant Investments to Fortify AI Infrastructure

Published June 18, 2026 New Market Pitch USA

OVERVIEW

The semiconductor industry is robustly funding areas like optical I/O, Co-Packaged Optics (CPO), memory, and packaging to bolster AI infrastructure scalability. A prime example is Ayar Labs' $500 million Series E funding in March 2026, aimed at scaling CPO production. This concentrated investment highlights optical technology as indispensable for resolving AI computing bottlenecks and powering next-gen systems.

IN DEPTH

Key Findings

Funding in the semiconductor industry is exceptionally strong, with a particular focus on the infrastructure layer supporting AI scalability. Significant investments are pouring into optical I/O, interconnects, memory, and advanced packaging technologies, reflecting a growing industry consensus that optical solutions are crucial for overcoming the limitations of electrical signaling in the AI era.

Technical and Market Details

A prime illustration of this trend is Ayar Labs' $500 million Series E funding round in March 2026, specifically aimed at scaling the production of its Co-Packaged Optics (CPO) technology. CPO integrates optical engines with electrical chips (such as switch ASICs or GPUs) within a single package, dramatically increasing data transfer bandwidth and significantly reducing power consumption. This enables high-speed, energy-efficient data movement vital for inter-accelerator and accelerator-to-memory communication in AI systems.

Beyond Ayar Labs, other startups like Neurophos and Xscape Photonics have also secured substantial funding for their optical processing and photonic platform technologies, respectively. These investments signal a broad recognition that optical technologies are integral to achieving the performance gains required by advanced AI computing. The influx of capital is accelerating innovation in photonic integrated circuit (PIC) design, manufacturing, and testing, fostering the development of more powerful and cost-effective optical solutions.

Background and Industry Context

As the scale of generative AI models rapidly expands, the volume of data movement within data centers has exploded, pushing traditional electrical interconnects to their limits in terms of both throughput and power efficiency. This 'data bottleneck' is a major impediment to the further scaling of AI systems. Optical technologies, with their inherent advantages in bandwidth, latency, and power consumption, are seen as the most promising solution to alleviate this bottleneck. The semiconductor industry is responding to this paradigm shift by aggressively investing in innovative optical I/O and CPO technologies.

Strategic Significance and Outlook

This concentrated investment in optical technologies is poised to define the next phase of AI infrastructure evolution. The commercialization of CPO technologies by companies like Ayar Labs will enhance the performance and energy efficiency of AI data centers, enabling the deployment of larger and more complex AI models. This trend is expected to create new business opportunities across the entire optical communication supply chain and drive further innovation in semiconductor manufacturing processes. Optical technology is becoming a key enabler of 'Moore's Law for AI' and is set to lay the foundation for future computing platforms.

Source: https://newmarketpitch.com/blogs/news/semiconductor-funding

Collected: June 26, 2026 | Automated Research System (Gemini API)

#20 Broadcom Fortifies Cash Flow with $3B Share Buyback to Accelerate AI ASIC and Optical Interconnect Strategy

Published Published June 18, 2026 富途资讯 China

OVERVIEW

Broadcom is reinforcing its financial bedrock with a $3 billion debt-financed share repurchase, strategically bolstering its 'optical interconnects + AI ASIC' computing power strategy. This initiative focuses on advanced technologies like Ethernet switching, Co-Packaged Optics (CPO), and silicon photonics networking, aiming to establish the company as a foundational supplier for exascale custom cloud-based AI inference resources and future data center optical interconnect systems, thereby capitalizing on the escalating demand for AI ASICs and XPUs.

IN DEPTH

Background

The explosive growth of generative AI is imposing unprecedented demands on data center infrastructure. AI workloads necessitate processing vast amounts of data at extremely high speeds with minimal latency, pushing the fundamental limits of traditional electrical interconnects in both bandwidth and power efficiency. Within this demanding context, optical interconnects have emerged as an indispensable technology for circumventing computing power bottlenecks prevalent in the AI era. Broadcom's unique strengths, spanning both electrical and optical technologies, position it to lead this critical paradigm shift.

Key Findings

Broadcom has bolstered its cash flow foundation with a $3 billion debt-funded share repurchase, further solidifying its assertive strategy built on 'optical interconnects + AI ASIC' computing power. This financial maneuver strategically positions the company for sustained leadership in data center infrastructure throughout the AI era.

At the core of Broadcom's AI computing strategy lies the synergistic integration of high-speed Ethernet switching, SerDes (Serializer/Deserializer), Co-Packaged Optics (CPO), optical Digital Signal Processors (DSPs), and silicon photonics networking technologies. CPO, specifically, is critical for dramatically enhancing data transfer bandwidth and significantly reducing power consumption by physically co-locating optical modules with switching ASICs. Broadcom's cutting-edge Tomahawk 6 switch already boasts a 102.4 Tbps switching capacity, and at OFC 2026, the company demonstrated advanced AI interconnect solutions, including CPO and 400G-per-lane optical DSP core components.

Broadcom is aggressively expanding its custom AI chip business through robust partnerships with leading cloud providers including Google, Anthropic, OpenAI, and Meta. The company reported a remarkable 143% year-over-year surge in AI semiconductor revenues, reaching $10.8 billion in Q2 FY2026, with projections to surpass $100 billion in AI chip revenue by the next fiscal year. This aggressive trajectory is designed to solidify Broadcom's position as a foundational supplier for exascale custom cloud-based AI inference compute resources and advanced data center optical interconnect systems.

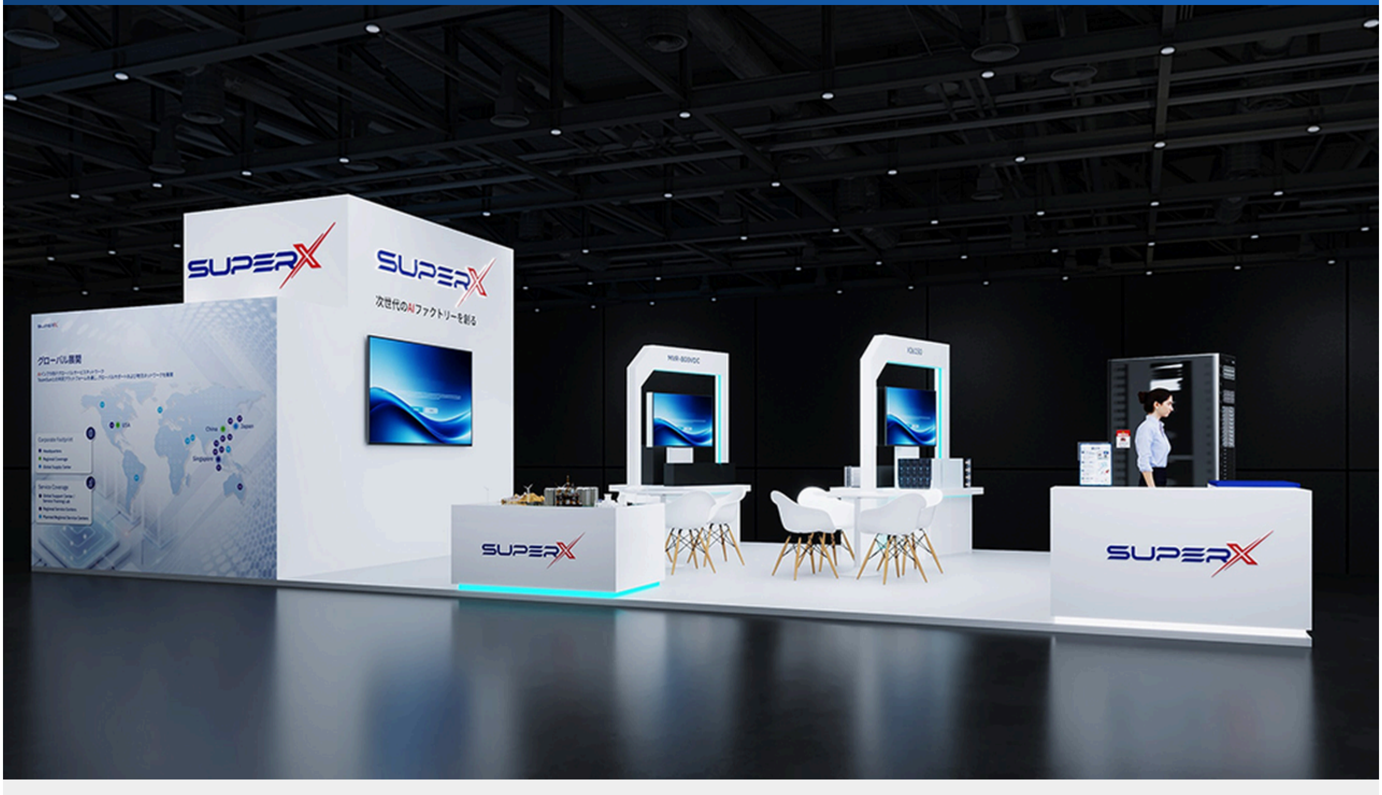
Broadcom's strategic trajectory is poised to significantly expand its influence in tandem with the ongoing advancements in AI. The synergistic combination of its high-speed networking solutions and custom AI chips will be instrumental in enabling the construction of next-generation AI factories and propelling the evolution of cloud-based AI infrastructure. Critically, the widespread adoption of Co-Packaged Optics (CPO) technology is anticipated to substantially reduce data center power consumption, thereby contributing to more sustainable AI computing. Broadcom is thus expected to cement its position as a 'full-stack enabler' within the semiconductor industry, driven by the convergence of optical interconnects and AI ASICs, ensuring its central role in the unfolding AI revolution.

Source: https://news.futunn.com/en/post/74772996/broadcom-avgous-standing-in-the-spotlight-has-reinforced-its-cash

Collected: June 26, 2026 | Automated Research System (Gemini API)

#21 SuperX to Unveil 1.6T Optical Modules for AI Data Centers at Interop Tokyo 2026

Published June 18, 2026 The Data Center Engineer Japan



OVERVIEW

SuperX is set to debut its 1.6T optical module solution at Interop Tokyo 2026, designed to address the demanding bandwidth requirements of large-scale AI training and inference networks. The solution is built on a full DSP architecture with silicon photonics integration and is intended for deployment across both Ethernet and InfiniBand AI infrastructures. This represents a significant advancement in optical interconnects for high-performance AI computing.

IN DEPTH

Key Findings

SuperX is scheduled to unveil its cutting-edge 1.6T optical module solution at Interop Tokyo 2026, specifically engineered to meet the escalating bandwidth demands of large-scale AI training and inference networks within data centers.

Technical and Market Details

The new 1.6T optical module from SuperX is founded on an advanced full Digital Signal Processing (DSP) architecture combined with silicon photonics integration. The full DSP architecture enables sophisticated signal modulation (e.g., PAM4) and advanced error correction techniques, crucial for maintaining signal integrity and achieving high data rates over longer distances. Silicon photonics integration allows for the cost-effective and scalable manufacturing of optical components using standard CMOS processes, contributing to smaller form factors and lower power consumption for optical modules.

This solution targets high-bandwidth connectivity in AI-scale clusters and is designed for deployment in both Ethernet and InfiniBand AI infrastructures. In AI data centers, ultra-high-speed data transfer between GPUs and accelerators is essential, and next-generation optical interconnects like the 1.6T module are key to resolving bottlenecks that traditional electrical interconnects or slower optical modules cannot address. SuperX aims to enhance AI workload performance and optimize power efficiency through this new module.

Background and Industry Context

The increasing scale and complexity of generative AI models have led to an exponential rise in bandwidth requirements for both internal and external data center connectivity. AI training clusters, in particular, require frequent data exchange among thousands of GPUs, with data movement being a critical factor determining overall performance and power consumption. Current 800G optical modules are becoming insufficient, making higher-speed optical interconnects, such as 1.6T and even 3.2T, indispensable. The combination of silicon photonics and advanced DSP technology is central to enabling these next-generation optical modules.

Strategic Significance and Outlook

The introduction of SuperX's 1.6T optical module marks a significant step forward in optical communication technology for AI data centers. Its deployment is expected to substantially improve the efficiency of AI training and enable the development of larger and more complex AI models. Debuting at a major exhibition like Interop Tokyo signifies SuperX's ambition to establish leadership in this rapidly expanding market. Moving forward, SuperX is expected to pursue further advancements in speed and integration to meet the evolving needs of AI infrastructure, playing a crucial role in shaping the future of AI.

Source: https://thedatacenterengineer.com/news/superx-to-debut-1-6t-optical-modules-for-ai-data-centers-at-interop-tokyo-2026/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#22 NTT Demonstrates 30% Energy Reduction in AI Training via Remote Distributed Deployment Leveraging IOWN Photonic Network

Published June 26, 2026 Techstrong.ai Japan

OVERVIEW

NTT has successfully completed a proof of concept as part of the IOWN Global Forum, demonstrating that AI training can be shifted to remote sites powered by renewable energy with minimal performance impact, cutting overall energy use by up to 30%. This achievement is realized by leveraging low-latency, all-photonic networking, marking a significant step towards sustainable AI and freeing it from geographical constraints. The results have the potential to reduce AI's energy footprint and stimulate regional development.

IN DEPTH

Key Findings

NTT, as part of the IOWN (Innovative Optical and Wireless Network) Global Forum, has successfully demonstrated a proof of concept (PoC) showing that AI training workloads can be distributed to remote sites utilizing renewable energy sources, resulting in up to a 30% reduction in overall energy consumption with negligible impact on AI performance. This innovative approach was made possible through the deployment of low-latency, all-photonic networks.

Technical and Market Details

The PoC aimed to shift the enormous power demand of AI training to regions with lower energy costs and abundant renewable energy. NTT's core all-photonic network (APN) transmits optical signals end-to-end, offering ultra-low latency (light-speed transmission) and significant energy savings compared to conventional electrical signal transmission. This capability minimizes data transfer latency between remote sites and central data centers, even with geographically distributed AI training computation, thus maintaining AI computational efficiency and performance.

In the PoC, specific phases of AI workloads (e.g., data pre-processing, model training, result aggregation) were orchestrated to execute at optimal locations. This allowed for leveling out power consumption peaks and maximizing the utilization of renewable energy. The 30% energy reduction represents a concrete metric for operational cost savings in AI data centers and a significant reduction in carbon emissions, demonstrating the practical viability of the approach.

Background and Industry Context

The rapid advancement of generative AI has dramatically increased data center power consumption, raising concerns about global energy issues and environmental impact. The power footprint of AI systems continues to grow with increasing computational power, necessitating fundamental measures for sustainable AI. NTT's IOWN concept aims to provide a comprehensive solution to this challenge, with APN as its core technology. Optimizing the geographical placement of AI resources, considering data generation/consumption locations and renewable energy supply points, is becoming a crucial design principle for next-generation data centers.

Strategic Significance and Outlook

The success of NTT's PoC is highly significant for enhancing AI's sustainability and geographical flexibility. Widespread adoption of this technology would enable AI data centers to maximize renewable energy utilization, substantially reducing energy costs and environmental impact. This would also facilitate AI development and service deployment in regions previously constrained by power supply or land availability, thereby contributing to regional economic revitalization. In the future, IOWN technologies are expected to be widely adopted across global AI infrastructure, accelerating the realization of a greener and more efficient digital society.

Source: https://techstrong.ai/techstrong-council/rethinking-the-geography-of-ai-to-build-a-more-sustainable-future/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#23 Global Optical Chip Capacity Expands Dramatically Driven by Surging AI Data Center Demand; STMicroelectronics and Source Photonics Announce Major Investments

Published June 20, 2026 HTX Insights Global

OVERVIEW

The global optical chip industry is undergoing a massive capacity expansion fueled by surging AI data center demand. STMicroelectronics plans to quadruple its 300mm silicon photonics capacity by 2027 to meet demand for 800G and 1.6T optical transceivers. Simultaneously, China's Source Photonics is investing $1.2 billion in optical chip and module production, signifying aggressive capital expenditure by major players.

IN DEPTH

Key Findings

The global optical chip industry is experiencing a massive wave of capacity expansion, driven by the explosive demand from AI data centers. Leading chip manufacturers are making aggressive capital investments and pushing technological innovations to supply the ultra-high-speed and energy-efficient optical interconnects required by next-generation AI infrastructure.

Technical and Market Details

This capacity expansion is spearheaded by companies like STMicroelectronics and Source Photonics. STMicroelectronics has announced ambitious plans to quadruple its 300mm silicon photonics production capacity by 2027. Their PIC100, built on a 300mm wafer platform, integrates optical modulators, photodetectors, and waveguides to create highly efficient and low-power optical transceivers. This strategic move aims to stabilize the supply of 800G and 1.6T optical transceivers, which are becoming indispensable in AI data centers.

Meanwhile, Source Photonics, a major Chinese supplier, is investing a significant $1.2 billion in expanding its production of optical chips and high-speed optical modules, including 800G and 1.6T products for AI servers. This investment will play a crucial role in supporting the build-out of AI infrastructure, particularly within China. These large-scale investments are accelerating the adoption of technologies like Co-Packaged Optics (CPO) and Near-Package Optics (NPO), which bring optical engines even closer to electrical chips, dramatically improving data transmission efficiency.

Background and Industry Context

The rapid development of generative AI has led to a dramatic increase in data center traffic and power consumption, creating 'data bottlenecks' that traditional electrical interconnects and slower optical modules can no longer handle. AI workloads require vast amounts of data to be moved at high speeds with low latency within GPU clusters. Consequently, optical interconnects have become an indispensable technology for resolving computing power bottlenecks in the AI era. Silicon photonics, due to its compatibility with CMOS manufacturing processes, is considered a core technology in this paradigm shift, enabling cost-effective, large-scale integration of optical circuits onto semiconductor chips.

Strategic Significance and Outlook

The aggressive expansion of global optical chip manufacturing capacity is critical for sustaining the continuous growth of AI data centers. This will ensure a stable supply of next-generation optical modules, including 800G, 1.6T, and soon 3.2T, thereby accelerating further advancements in AI technology and its application across various industrial sectors. Large-scale investments will create new business opportunities throughout the optical communication supply chain and drive technological innovation. The optical chip industry is poised to stand at the forefront of the AI revolution, playing a central role in building the foundation of future digital infrastructure.

Source: https://www.htx.com/news/optical-chips-collective-capacity-expansion-MTJAcD3B/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#24 Qatar Investment Authority Backs HyperLight's $80M Round to Accelerate Thin-Film Lithium Niobate PIC Deployment for AI Infrastructure

Published Published June 23, 2026 Middle East AI News カタール

OVERVIEW

The Qatar Investment Authority (QIA) has participated in HyperLight's $80 million Series C funding round, strategically investing in its thin-film lithium niobate (TFLN) photonic integrated circuit (PIC) platform. This capital infusion will significantly scale manufacturing capacity to accelerate the deployment of next-generation 400G-per-lane optical solutions critical for burgeoning AI infrastructure. QIA's repeated investments in optical I/O developers like HyperLight and Ayar Labs underscore a strong belief in optical communication as a cornerstone technology for the AI era.

IN DEPTH

Background and Industry Context

The explosive growth of generative AI is exerting unprecedented pressure on data center bandwidth and power consumption. As AI models continue to scale, traditional electrical interconnects and even existing optical technologies are increasingly struggling to resolve the critical data movement bottlenecks. In response, Thin-Film Lithium Niobate (TFLN) Photonic Integrated Circuits (PICs) have emerged as a highly promising technology, offering ultra-high-speed data transmission capabilities combined with high density and low power consumption. Strategic investments from sovereign wealth funds like the Qatar Investment Authority (QIA) underscore a growing international recognition of TFLN's indispensable role in shaping the future of AI infrastructure.

Key Findings

The Qatar Investment Authority (QIA) has formally joined HyperLight's $80 million Series C funding round. This substantial investment is earmarked to accelerate the commercial deployment of HyperLight's cutting-edge thin-film lithium niobate (TFLN) photonic integrated circuit (PIC) platform, specifically targeting advanced AI infrastructure. The move signifies QIA's strategic foresight and strong interest in next-generation optical technologies critical for enabling faster, more efficient, and scalable AI computing.

Technical and Market Details

HyperLight's TFLN PIC platform capitalizes on the exceptional electro-optic properties inherent to lithium niobate, meticulously integrated with advanced thin-film technology. This unique combination enables high integration density, remarkably low power consumption, and ultra-high-speed optical modulation – features paramount for the demands of modern AI. This technology is indispensable for actualizing next-generation 400G-per-lane optical solutions in advanced optical interconnects, including Co-Packaged Optics (CPO) and Near-Package Optics (NPO), which are vital for mitigating data bottlenecks within AI data centers.

The newly secured capital will be strategically allocated to significantly scale HyperLight's TFLN PIC manufacturing capacity. This expansion is crucial for ensuring a robust and stable supply of high-performance optical components, which are essential to support the immense data processing capabilities demanded by increasingly complex AI workloads. QIA's prior investments in other prominent optical I/O developers, such as Ayar Labs, further underscore its acute recognition of the strategic imperative of advanced optical communication technologies in the AI era. Notably, TFLN distinguishes itself from competing platforms like silicon photonics and indium phosphide (InP) due to its superior modulation speed and inherently low optical loss characteristics, positioning it as a formidable contender in the rapidly evolving high-speed optical module market.

Strategic Significance and Outlook

This substantial $80 million investment in HyperLight is poised to dramatically accelerate the commercialization and large-scale deployment of its TFLN PIC platform. This will, in turn, drive wider adoption of advanced 400G-per-lane optical solutions across global AI data centers, significantly enhancing AI workload performance and energy efficiency. QIA's consistent strategic investments underscore the critical and transformative role of optical technologies within the burgeoning AI infrastructure landscape, hinting at the Middle East's growing potential to become a pivotal player in technological innovation in this field. HyperLight's TFLN technology is strategically positioned to unlock new frontiers and opportunities across AI, high-performance data centers, and next-generation communication networks.

Source: https://www.middleeastainews.com/p/qia-backs-eighty-million-hyperlight-round

#25 Coherent and NVIDIA Scale Data Center Connectivity: Texas InP Fab Quadruples Wafer Production with $2B NVIDIA Investment

Published June 23, 2026 [News/Blog] USA

OVERVIEW

Coherent is expanding its indium phosphide (InP) wafer fab in Sherman, Texas, with a major $2 billion investment from NVIDIA to quadruple wafer production capacity and secure supply for AI infrastructure. This expansion is crucial for producing optical interconnects and compound semiconductors used in NVIDIA's AI platforms, such as the Vera Rubin Ultra NVL576, which require optical links due to the bandwidth and power limits of copper.

IN DEPTH

Key Findings

Coherent is significantly expanding its indium phosphide (InP) wafer fabrication facility in Sherman, Texas, following a substantial $2 billion strategic investment from NVIDIA. This expansion aims to quadruple InP wafer production capacity, securing a vital supply of optical interconnects and compound semiconductors essential for AI infrastructure.

Technical and Market Details

Indium phosphide (InP) is a critical compound semiconductor material, indispensable for manufacturing laser diodes and modulators due to its superior light-emitting properties and high-speed modulation capabilities. It plays a central role in realizing high-efficiency optical signal generation and transmission in ultra-high-speed optical modules, such as 800G, 1.6T, and future 3.2T components, required by AI data centers. NVIDIA's next-generation AI platforms, like the Vera Rubin Ultra NVL576, necessitate immense data transfer speeds between GPUs. Traditional copper interconnects face physical limitations in terms of bandwidth and power consumption, making optical links indispensable. Thus, Coherent's InP technology is a crucial component in NVIDIA's AI strategy.

This factory expansion will dramatically boost Coherent's supply capabilities for InP-based components required for high-density, low-power optical engines used in AI accelerators and switching ASICs. This is also vital for accelerating the adoption of advanced optical technologies like Co-Packaged Optics (CPO) and Near-Package Optics (NPO) across AI data centers.

Background and Industry Context

As the scale of generative AI models expands exponentially, data centers are facing severe challenges in power consumption and cooling. AI workloads require vast amounts of data to be processed at high speeds with minimal latency among thousands of GPUs, demanding bandwidth and power efficiency that traditional electrical interconnects cannot provide. In this context, optical interconnects have become an indispensable technology for resolving computing power bottlenecks in the AI era. NVIDIA's unprecedented direct investment in Coherent underscores the strategic value of optical components in AI growth and the critical importance of securing their supply.

Strategic Significance and Outlook

Coherent's quadrupling of InP manufacturing capacity will significantly impact the supply of optical interconnects for AI data centers, accelerating the build-out of AI infrastructure globally. The close collaboration with NVIDIA will drive the development and production of high-performance optical components tailored to the needs of next-generation AI platforms, fostering further advancements in AI technology and its application across various industries. This investment reaffirms the importance of compound semiconductor manufacturing and clearly demonstrates that optical technology plays a central role at the forefront of the AI revolution.

Source: https://datacentremagazine.com/news/coherent-nvidia-break-ground-at-texas-semiconductor-site

Collected: June 26, 2026 | Automated Research System (Gemini API)

#26 Quandela Validates Ultra-Low Latency Photonic QPU Integration with NVIDIA GPU Infrastructure via NVQLink

Published June 24, 2026 Quantum Computing Report France

OVERVIEW

Quandela has validated the ultra-low latency integration of its photonic Quantum Processing Unit (QPU) with NVIDIA's NVQLink infrastructure, establishing a real-time hybrid computing pipeline where a quantum processor functions as a tightly coupled hardware accelerator alongside GPU clusters. This eliminates asynchronous queue latency, enabling direct communication between GPU kernels and the Quantum System Controller via a ConnectX-7 network interface, accelerating real-world quantum computing applications.

IN DEPTH

Key Findings

Quandela has successfully validated ultra-low latency integration of its photonic Quantum Processing Unit (QPU) with NVIDIA's NVQLink infrastructure. This breakthrough establishes a real-time hybrid computing pipeline where the quantum processor functions as a tightly coupled hardware accelerator alongside GPU clusters.

Technical and Market Details

NVQLink, NVIDIA's technology for high-speed, low-latency communication between GPUs and external devices, was applied to Quandela's photonic QPU during this validation. This integration effectively eliminates the asynchronous queue latency that has traditionally plagued quantum computing systems. Specifically, it enables direct communication between GPU kernels and the Quantum System Controller via a ConnectX-7 network interface, dramatically streamlining the cooperative execution of quantum and classical algorithms.

Quandela's photonic QPU utilizes photons as information carriers, making it robust against noise and inherently capable of operating at room temperature. This validation indicates that 'hybrid quantum computing'—where quantum computers operate in conjunction with powerful classical hardware like GPUs—is nearing practical implementation, rather than existing as standalone machines. The tight coupling between GPUs and QPUs is expected to yield significant performance enhancements, particularly in areas where quantum computation offers advantages, such as complex optimization problems and machine learning tasks.

Background and Industry Context

While quantum computing holds immense potential, solving complex real-world problems often requires collaboration with classical computers. Hybrid quantum computing, an approach where classical computers handle data control, pre-processing, and post-processing while quantum computers perform specific quantum-accelerated tasks, has become the dominant paradigm for early practical applications of quantum technology. The active engagement of major technology companies like NVIDIA in quantum computing infrastructure integration is a clear sign that the commercialization of this field is accelerating.

Strategic Significance and Outlook

Quandela's validation of low-latency integration between its photonic QPU and NVIDIA infrastructure opens up new avenues for quantum computing applications. Real-time hybrid computing capabilities enhance the potential for tackling previously intractable calculations and simulations in fields such as financial modeling, novel materials design, drug discovery, and even foundational AI technologies. This achievement promotes seamless interaction between quantum and classical hardware, marking a crucial step towards quantum computing becoming a practical tool adopted across a broader range of industries. Over the coming years, such hybrid systems are expected to become more sophisticated and contribute significantly to solving complex challenges.

Source: https://quantumcomputingreport.com/quandela-validates-low-latency-photonic-qpu-integration-with-nvidia-infrastructure-using-nvqlink/amp/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#27 Ayar Labs Joins NVIDIA NVLink Fusion Ecosystem to Deploy Co-Packaged Optics in Rack-Scale AI Infrastructure

Published June 25, 2026 Forge Global USA

OVERVIEW

Ayar Labs, an optical I/O data platform, announced its participation in NVIDIA's NVLink Fusion ecosystem in June 2026 to bring Co-Packaged Optics (CPO) technology to rack-scale AI infrastructure. The company aims to resolve connectivity bottlenecks in AI data centers by transferring data using light instead of electricity with silicon processing techniques. Ayar Labs' products include the SuperNova™ Multi-Wavelength Light Source and TeraPHY™ In-Package Optical I/O Chiplet.

IN DEPTH

Key Findings

Ayar Labs, a leading innovator in optical I/O data platforms, announced in June 2026 its strategic entry into NVIDIA's NVLink Fusion ecosystem. This partnership aims to integrate Co-Packaged Optics (CPO) technology into rack-scale AI infrastructure, thereby accelerating the performance and efficiency of AI computing.

Technical and Market Details

Ayar Labs' CPO technology fundamentally addresses the bandwidth and power consumption bottlenecks faced by AI data centers by transmitting data using light instead of traditional electrical signals. The company's core products include the SuperNova™ Multi-Wavelength Light Source and the TeraPHY™ In-Package Optical I/O Chiplet. The SuperNova™ generates multiple wavelengths of light, enabling high-density data transmission. The TeraPHY™ chiplet is designed to convert these optical signals to electrical and integrate directly with host chips like CPUs and GPUs, minimizing latency and energy loss over ultra-short data transfer distances.

NVIDIA's NVLink Fusion is a technology that provides ultra-high-speed connectivity between GPUs. Its integration with Ayar Labs' CPO technology will dramatically improve data movement efficiency in AI supercomputers and large-scale training clusters. Deploying CPO in rack-scale AI infrastructure is an indispensable step to move beyond the limitations of electrical interconnects and maximize the performance of AI models. This collaboration signifies the deepening convergence of AI hardware and optical communication technologies.

Background and Industry Context

The explosive growth of generative AI is placing unprecedented demands on internal and external connectivity within data centers. Particularly in AI training clusters where thousands of GPUs operate in concert, the volume of data movement between GPUs has become a dominant factor determining overall system performance and power consumption. Traditional electrical wiring is increasingly struggling to handle this immense data volume at high speeds with low power, leading to a severe 'data bottleneck.' Co-Packaged Optics (CPO) is recognized as one of the most promising solutions to this challenge, and its commercialization is accelerating in conjunction with advancements in semiconductor manufacturing technology.

Strategic Significance and Outlook

Ayar Labs' participation in NVIDIA's powerful ecosystem is critically important for CPO technology to become a mainstream solution in AI data centers. This collaboration is expected to accelerate the adoption of Ayar Labs' CPO technology by enabling its widespread integration into NVIDIA's next-generation AI platforms. This will lead to a dramatic improvement in AI workload performance, facilitating the training and inference of larger and more complex AI models. The partnership between Ayar Labs and NVIDIA is anticipated to redefine 'Moore's Law' for the AI era through optical technology, playing a central role in building the foundation of future AI infrastructure.

Source: https://forgeglobal.com/ayar-labs_stock/

#28 Ciena Develops 3.2 Tbps Optical Networking Technology for NVIDIA's AI Platform, Accelerating Commercialization

Published June 24, 2026 The Elec South Korea

OVERVIEW

Ciena is actively developing next-generation 3.2 Tbps coherent optical networking technology to meet the escalating bandwidth requirements for inter-data center connectivity, accelerated by AI infrastructure expansion. The company successfully demonstrated 3.2 Tbps coherent optical transmission over 2 km and anticipates commercial products within one to two years. Ciena, already commercially deploying 1.6 Tbps products, is strengthening its leadership in ultra-high-speed optical communications for the AI era.

IN DEPTH

Key Findings

Ciena is actively developing next-generation 3.2 Tbps coherent optical networking technology to address the accelerating bandwidth requirements for inter-data center connectivity, driven by the rapid expansion of AI infrastructure. The company has successfully demonstrated 3.2 Tbps coherent optical transmission over a 2 km distance and expects to bring commercial products to market within one to two years.

Technical and Market Details

This innovative technology from Ciena is crucial for meeting the unprecedented demands for data center connectivity in the AI era. Ultra-high-speed 3.2 Tbps data transmission is key to resolving data movement bottlenecks, particularly in next-generation AI architectures like NVIDIA's "Feynman" platform, which is specialized for AI training and inference with massive GPU clusters. Leveraging its extensive expertise in coherent optical technology, Ciena efficiently utilizes the phase, amplitude, and polarization of light to achieve higher data rates and spectral efficiency over existing optical fiber infrastructure.

Ciena already has 1.6 Tbps coherent optical products in commercial deployment, which serves as a foundation for the development of its 3.2 Tbps technology. The 3.2 Tbps products are expected to significantly boost network capacity while further reducing power consumption and footprint of optical transmission systems. This will enable data center operators to cope with the surge in AI workloads and optimize operational costs. Ciena is also working closely with NVIDIA to ensure optimal integration and performance enhancement of optical technologies in AI infrastructure.

Background and Industry Context

As the scale and complexity of generative AI models increase, the bandwidth requirements for internal and inter-data center data movement are growing exponentially. Conventional 100G and 400G optical modules are becoming insufficient to meet this demand, making next-generation optical interconnects—800G, 1.6T, and 3.2T—indispensable. Leading AI hardware companies like NVIDIA are aggressively pursuing advanced optical communication technologies to maximize the performance of their platforms, which is a primary factor accelerating Ciena's development efforts.

Strategic Significance and Outlook

The development and commercialization of Ciena's 3.2 Tbps coherent optical networking technology represents a landmark achievement in the evolution of AI data center connectivity. This technology is expected to significantly improve the efficiency of AI training and enable the deployment of larger and more complex AI models. Ciena's establishment of leadership in this ultra-high-speed domain will strengthen its market competitiveness and stimulate further technological innovation across the entire optical communication industry. Looking ahead, this technology is anticipated to form the backbone of digital infrastructure in the AI era, facilitating further advancements in AI and its application across a wide range of industries.

Source: https://www.thelec.net/news/articleView.html?idxno=11632

#29 Nokia Announces Major 10x Expansion of U.S. Semiconductor Advanced Test and Packaging Capacity in Pennsylvania to Bolster AI Growth

Published June 24, 2026 I-Connect007 USA

OVERVIEW

Nokia is significantly expanding its advanced test and packaging (ATP) operations in Allentown, Pennsylvania, to boost domestic production of optical networking technologies for scalable AI infrastructure. This strategic investment aims to increase the site's production capacity by up to 10 times and nearly double its Pennsylvania workforce, enhancing supply chain resilience to meet AI demands.

IN DEPTH

Key Findings

Nokia has announced a substantial expansion of its semiconductor Advanced Test and Packaging (ATP) operations in Allentown, Pennsylvania. This major investment is designed to bolster domestic production capacity for optical networking technologies, critical for scalable AI infrastructure. Nokia plans to increase the site's production capacity by up to 10 times and nearly double its workforce in Pennsylvania.

Technical and Market Details

This expansion is specifically aimed at addressing the increasing demand for high-performance optical modules and photonic integrated circuits (PICs) for AI data centers and 5G infrastructure. The ATP facility will play an essential role in the testing and packaging of advanced optical technologies such as Co-Packaged Optics (CPO) and Near-Package Optics (NPO). These technologies involve highly complex integration of electrical and optical signals, demanding ultra-precise alignment and reliable packaging.

Nokia's investment in semiconductor test and packaging aims to strengthen domestic production capabilities within the optical component supply chain, enhancing resilience against geopolitical risks and supply chain disruptions. This will allow Nokia to improve the competitiveness of its optical networking products and provide more reliable, high-performance optical connectivity solutions to AI-related enterprises. Specifically, the facility will test and package Nokia's cutting-edge coherent optical engines (e.g., ICE7), supporting the demand for 800G and 1.6T modules in AI data centers.

Background and Industry Context

The explosive growth of generative AI is dramatically increasing data center traffic and power consumption, driving an unprecedented demand for optical communication technologies. AI workloads require vast amounts of data to be moved at high speeds with low latency between GPU clusters, making optical interconnects indispensable for resolving computing power bottlenecks in the AI era. Initiatives like the U.S. CHIPS Act are promoting the domestic manufacturing of semiconductors, and Nokia's investment can be seen as part of this broader strategy.

Strategic Significance and Outlook

Nokia's expansion of its semiconductor ATP operations in Pennsylvania clearly indicates the growing importance of domestic production in building AI infrastructure. The up to 10x increase in production capacity and doubling of employment underscore Nokia's commitment to the rapid growth of the AI market. This investment will accelerate innovation in optical networking technologies and play a crucial role in improving the performance and energy efficiency of AI data centers. In the future, this initiative is expected to strengthen the U.S. semiconductor ecosystem and solidify the foundation of digital infrastructure in the AI era.

Source: https://iconnect007.com/article/150550/nokia-announces-major-expansion-of-us-semiconductor-advanced-test-and-packaging-in-pennsylvania-to-bolster-ai-growth/150547/ein

Collected: June 26, 2026 | Automated Research System (Gemini API)

#30 Nokia Enhances Autonomous Networks Portfolio with Upgraded Agentic AI Capabilities, Automating Optical Network Operations

Published Published June 23, 2026 Nokia フィンランド

OVERVIEW

Nokia is significantly upgrading its autonomous networks portfolio, integrating advanced agentic AI capabilities to streamline operations and enhance network performance. A key development is the WaveSuite agentic framework, tailored for optical networks, which enables proactive detection of KPI anomalies and photonic equipment failures before impacting service. This innovation marks a crucial step in automating and intelligent network management, revolutionizing operations in the AI era.

IN DEPTH

Background

The proliferation of generative AI and the continuous growth of IoT devices are driving an unprecedented surge in network traffic volume and diversity, escalating network management complexity. Traditional manual management and reactive operational models are increasingly insufficient to meet the demands of modern, dynamic networks. In response, autonomous networks leverage AI to automate critical functions such as monitoring, analysis, planning, execution, and optimization. Nokia's strategy aims to empower telecommunication providers with the agility, efficiency, and resilience essential for the AI era.

Key Findings

Nokia has introduced significant upgrades to its autonomous networks portfolio, embedding advanced agentic AI capabilities to both simplify operations and substantially enhance network performance. This development is poised to redefine network management, accelerating the adoption of automated and intelligent operations within the AI landscape.

A cornerstone of these upgrades is the new WaveSuite agentic framework, specifically engineered for optical network operations. This framework employs sophisticated AI and machine learning algorithms to proactively identify anomalies in key performance indicators (KPIs) and potential failures in photonic equipment, critically averting service disruptions. Unlike conventional reactive network management systems, Nokia's agentic AI is designed for real-time data analysis, pattern recognition, and the automated recommendation or execution of corrective actions.

Key functionalities include predictive analytics for traffic patterns, optimized capacity planning, automated root cause analysis for network faults, and self-configuration of network parameters. This significantly reduces the burden of routine tasks on network operations teams, allowing them to focus on strategic initiatives. The increasing complexity of optical networks, driven by the rapid expansion of AI data centers and 5G backbones, underscores the vital role of agentic AI in efficiently managing this complexity and minimizing downtime.

Nokia's enhancement of agentic AI capabilities represents a pivotal advancement towards fully autonomous networks, setting a new trajectory for the telecommunications industry. The widespread deployment of this technology is expected to yield substantial benefits for telecom operators, including reduced operational costs, improved service quality, and enhanced reliability. Furthermore, the self-optimization capabilities of AI will contribute to faster deployment of new services and greater energy efficiency. Looking ahead, the realization of fully autonomous 'zero-touch' networks is rapidly approaching, heralding a future where AI is integral to every facet of digital infrastructure.

Source: https://www.nokia.com/newsroom/nokia-advances-autonomous-networks-portfolio-with-upgraded-agentic-ai-capabilities-dtw26-a/

#31 Nokia Partners with Symphony Communication to Upgrade MCT Subsea Cable to 30Tbps, Enhancing AI Infrastructure in Southeast Asia

Published Published June 18, 2026 [News/Blog] フィンランド

OVERVIEW

Nokia has been selected by Symphony Communication to significantly upgrade the Malaysia-Cambodia-Thailand (MCT) subsea cable system. This project will integrate Nokia's sixth-generation Photonic Service Engines (PSE-6) coherent optics, increasing network capacity to 30 Tbps per fiber pair—a threefold increase—while simultaneously reducing power consumption by 60%. This critical infrastructure enhancement is designed to bolster Southeast Asia's burgeoning AI and cloud service capabilities.

IN DEPTH

Background

The Southeast Asian region is experiencing an unprecedented surge in its digital economy, driven by the rapid proliferation of artificial intelligence (AI) technologies and the expansive growth of cloud-based services. This transformative landscape is significantly increasing inter-data center traffic and international data transmission volumes, placing immense pressure on existing digital infrastructure. Consequently, subsea cable systems, which form the backbone of global connectivity, are facing escalating demands for higher capacity, lower latency, and superior energy efficiency. It is within this context that Symphony Communication selected Nokia to undertake a crucial upgrade of the Malaysia-Cambodia-Thailand (MCT) subsea cable system, addressing the growing imperative for robust AI infrastructure and advanced digital services across the region.

Key Findings

The core of the MCT subsea cable system upgrade involves replacing the legacy optical infrastructure with Nokia's cutting-edge sixth-generation Photonic Service Engines (PSE-6) coherent optics. This advanced technology combines industry-leading spectral efficiency with unparalleled long-haul transmission performance, enabling the upgraded network to achieve an impressive capacity of up to 30 Tbps per fiber pair. This represents approximately a threefold capacity increase over the previous system, providing substantial bandwidth uplift for critical data flows.

Beyond the raw capacity gains, the deployment of PSE-6 technology delivers a significant benefit by reducing overall network power consumption by 60%. This contributes to a more sustainable data transmission ecosystem, aligning with global efforts to minimize the environmental footprint of digital infrastructure. Technologically, the PSE-6 employs sophisticated signal modulation schemes and advanced Digital Signal Processing (DSP) algorithms. These innovations are critical for maintaining signal integrity and quality in the challenging and harsh subsea environments, thereby facilitating ultra-high-speed data transmission over vast distances.

This enhanced capability allows for efficient and robust support of a wide array of digital applications that demand both high bandwidth and low latency. These include, but are not limited to, real-time AI inference, large-scale data analytics, and resource-intensive cloud-based services. The upgrade of the MCT subsea cable system thus forms a fundamental backbone, vital for driving digital transformation and fostering economic growth across the entire Southeast Asian region.

Nokia's PSE-6 coherent optics offer a cost-effective and inherently future-proof solution to the challenges posed by the escalating demands of the digital era. This investment in the MCT system strengthens digital connectivity within the region, preparing it for the demands of the burgeoning AI era. The increase in network capacity to 30 Tbps and a substantial 60% reduction in power consumption will yield immense benefits for AI-related industries and cloud service providers throughout Southeast Asia. This strategic upgrade lays a strong foundation for the region to maintain its competitiveness in the global digital economy and to fully leverage emerging technologies like artificial intelligence. Nokia is committed to continuing its support for telecommunications operators worldwide in building sustainable, high-performance networks through such transformative infrastructure enhancements.

Source: https://southeastasiainfra.com/nokia-selected-to-upgrade-malaysia-cambodia-thailand-subsea-cable-system/

#32 Lumentum Stock Surges Amid Strong Optical Networking Demand; McKinsey Forecasts 800G and 1.6T Transceiver Shortages to Boost Margins

Published June 22, 2026 Intellectia AI USA

OVERVIEW

Lumentum is experiencing strong demand for optical networking components, driven by a projected 9x increase in demand for AI optical components over the next two years. McKinsey predicts significant supply shortages for 800 Gbps and 1.6 Tbps optical transceivers by 2027, which will further drive price increases and enhance margins for companies like Lumentum. Lumentum dominates the EML and continuous-wave laser markets and has secured strategic investments from NVIDIA.

IN DEPTH

Key Findings

Lumentum Holdings' stock is rising, driven by robust demand for optical networking components and the surging demand from AI data center infrastructure. Demand for AI optical components is projected to increase ninefold over the next two years, indicating that the market highly values Lumentum's growth potential.

Technical and Market Details

According to McKinsey's market forecasts, 800 Gbps and 1.6 Tbps optical transceivers are expected to face significant supply shortages by 2027. This shortage, attributed to the explosive growth of AI workloads, is anticipated to lead to increased product pricing and improved profit margins for key optical component suppliers like Lumentum. Lumentum holds a dominant market share in the Electro-absorption Modulated Laser (EML) and continuous-wave (CW) laser markets, with these products being essential components in high-speed optical modules for AI data centers.

In AI data centers, ultra-high-speed data transfer between GPU clusters is indispensable, accelerating the transition from traditional copper interconnects to optical solutions. Lumentum's products play a critical role in enabling advanced optical interconnects like Co-Packaged Optics (CPO) and Near-Package Optics (NPO). Furthermore, strategic investments from NVIDIA have strengthened Lumentum's market position, noted as a crucial move to secure future optical capacity. This investment aims to support Lumentum's manufacturing capacity expansion and technological development, building a stable supply system to meet AI infrastructure needs.

Background and Industry Context

The rapid development of generative AI has dramatically increased data center traffic and power consumption, pushing the demand for optical communication technology to unprecedented levels. As AI models grow in size, data movement between chips, servers, and data centers becomes a bottleneck, hindering improvements in computational power. In this context, next-generation high-speed optical transceivers, such as 800G and 1.6T, have become indispensable for enhancing AI computing performance. The forecast of supply shortages indicates that market demand will significantly outstrip supply, creating a favorable environment for optical component manufacturers.

Strategic Significance and Outlook

Lumentum is well-positioned to significantly benefit from the growth of the AI-driven optical networking market. The anticipated supply shortages, as forecasted by McKinsey, are expected to drive up product prices and enhance the company's profitability. Strategic support from major customers like NVIDIA will further solidify Lumentum's position as a leading supplier of optical components for next-generation AI infrastructure. Moving forward, Lumentum is expected to focus on developing even faster and more energy-efficient optical solutions to keep pace with the evolution of AI technology, playing a central role in the advancement of the AI revolution.

Source: https://intellectia.ai/news/monitor/lumentums-stock-rises-amid-strong-demand-for-optical-networking

Collected: June 26, 2026 | Automated Research System (Gemini API)

#33 HyperLight Secures $80 Million Series C Funding Led by MediaTek to Accelerate Thin-Film Lithium Niobate PIC Manufacturing for AI Infrastructure

Published June 18, 2026 Business Wire USA

OVERVIEW

HyperLight announced an $80 million Series C funding round led by MediaTek to accelerate the deployment of its thin-film lithium niobate (TFLN) photonic integrated circuit (PIC) platform for AI infrastructure. The funding will significantly boost TFLN PIC manufacturing capacity and support 400G-per-lane optical solutions. This is expected to stabilize the supply of high-speed, energy-efficient optical connectivity essential for AI workloads.

IN DEPTH

Key Findings

HyperLight has announced an $80 million Series C funding round, led by MediaTek, to accelerate the deployment of its thin-film lithium niobate (TFLN) photonic integrated circuit (PIC) platform for AI infrastructure. This capital infusion will be utilized to substantially enhance TFLN PIC manufacturing capacity and support next-generation 400G-per-lane optical solutions.

Technical and Market Details

HyperLight's TFLN PIC platform combines the exceptional electro-optic properties of lithium niobate with thin-film technology, enabling ultra-high-speed and highly efficient optical modulation alongside high integration density and low power consumption. This technology is critically important for enabling next-generation high-speed optical solutions, such as 400G-per-lane, in advanced optical interconnects like Co-Packaged Optics (CPO) and Near-Package Optics (NPO) within AI data centers. TFLN differentiates itself from silicon photonics and indium phosphide (InP) with particularly high modulation speeds and low loss characteristics, positioning it as a strong contender in the evolving high-speed optical module market.

The $80 million raised will be used to significantly scale HyperLight's TFLN PIC manufacturing capacity, ensuring a stable supply of optical components required to support the immense data processing capabilities demanded by AI workloads. Furthermore, these funds will be allocated to R&D, fostering the creation of even higher-performance TFLN-based optical solutions. This investment signals that the commercialization of TFLN technology in the AI infrastructure market is gaining significant momentum.

Background and Industry Context

The development of generative AI is placing unprecedented pressure on data center bandwidth and power consumption. Traditional electrical interconnects and existing optical technologies are struggling to resolve data movement bottlenecks as AI models scale. TFLN PICs have emerged as a promising technology to address this challenge, enabling high-density, low-power, and ultra-high-speed data transmission. Investment from a leading semiconductor company like MediaTek in HyperLight suggests a growing industry-wide recognition that this technology is indispensable for shaping the future of AI.

Strategic Significance and Outlook

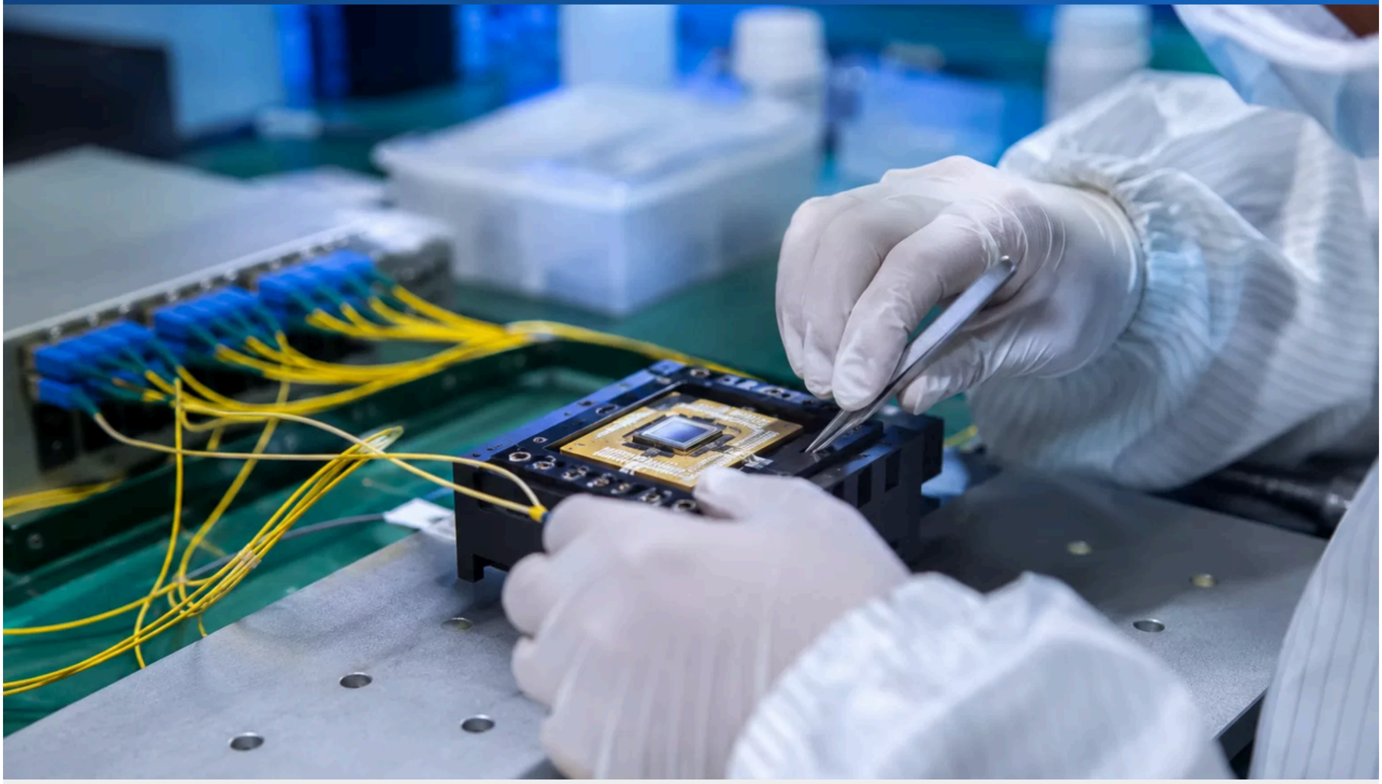
The $80 million investment in HyperLight will accelerate the commercialization and large-scale deployment of the TFLN PIC platform. This is expected to lead to wider adoption of 400G-per-lane optical solutions in AI data centers, further enhancing AI workload performance and energy efficiency. HyperLight's TFLN technology is poised to create new opportunities in AI, data centers, and next-generation communication networks, playing a central role in the evolution of AI infrastructure. This funding is anticipated to further intensify competition in AI-era optical communication technologies.

Source: https://www.businesswire.com/news/home/20260618064171/en/HyperLight-Announces-%2480-Million-Series-C-to-Accelerate-TFLN-Deployment-for-AI-Infrastructure

Collected: June 26, 2026 | Automated Research System (Gemini API)

#34 The 1.6T Era: Silicon Photonics, InP, and Thin-Film Lithium Niobate Clash for the 'Heart' of Optical Modules

Published June 25, 2026 [Analysis/Blog] Global



OVERVIEW

As the 1.6T era unfolds, silicon photonics (SiPh), indium phosphide (InP), and thin-film lithium niobate (TFLN) are fiercely competing as core materials for next-generation optical modulators. SiPh offers scalability due to CMOS compatibility, InP provides efficient light emission, and TFLN boasts superior electro-optic modulation performance. Surging AI data center demands accelerate these developments, with each material's unique characteristics serving as a differentiator for specific applications.

IN DEPTH

Key Findings

With the advent of the 1.6T (Terabits per second) era, three primary technologies—silicon photonics (SiPh), indium phosphide (InP), and thin-film lithium niobate (TFLN)—are locked in intense competition to become the core material, or 'heart,' of next-generation optical modulators. Each material possesses distinct strengths, acting as differentiators for specific applications.

Technical and Market Details

- **Silicon Photonics (SiPh):** Recognized as the most scalable platform due to its high compatibility with CMOS manufacturing processes. It leverages existing semiconductor foundry infrastructure, making it cost-effective and suitable for large-scale integration of optical circuits. SiPh holds advantages in mass-production applications such as data center interconnects (DCI) and Co-Packaged Optics (CPO). However, silicon itself does not emit light, necessitating heterogeneous integration with III-V semiconductor lasers.
- **Indium Phosphide (InP):** As a direct bandgap semiconductor, InP can natively integrate highly efficient laser sources and photodetectors, making it exceptional in optical signal generation and detection. It particularly excels in long-haul coherent communication and transceivers requiring high optical output. However, manufacturing costs are higher, and integration density is more limited compared to SiPh.
- **Thin-Film Lithium Niobate (TFLN):** TFLN achieves superior electro-optic properties and lower propagation losses than conventional bulk lithium niobate, with high integration density through thin-film technology. Capable of ultra-high-speed modulation (hundreds of GHz and beyond) at ultra-low power consumption, TFLN holds significant potential for applications demanding the highest electro-optic modulation performance in quantum computing, LiDAR, and next-generation AI infrastructure for ultra-fast optical modules.

Background and Industry Context

The explosive growth of generative AI is dramatically increasing data center traffic and power consumption, creating 'data bottlenecks' that traditional electrical interconnects cannot handle. AI workloads require vast amounts of data to be moved at high speeds with low latency between GPU clusters, making optical interconnects indispensable for resolving computing power bottlenecks in the AI era. The choice of material is determined by balancing performance, cost, and manufacturing scalability, heavily depending on specific application requirements.

Strategic Significance and Outlook

Beyond the 1.6T era, these three materials will continue to evolve within their respective niche markets and key applications. SiPh is expected to establish dominance in mass production and cost efficiency, InP in high-power lasers and long-haul transmission, and TFLN in ultra-high-speed modulation and extreme performance. Advances in heterogeneous integration techniques are expected to lead to the coexistence of these materials, complementing each other's strengths to support the evolution of various cutting-edge technologies like AI, quantum computing, and autonomous systems. The ultimate 'winner' will not be a single material, but rather companies that can identify the optimal combination of these materials and efficiently mass-produce them.

Source: https://www.sic-wafers.com/silicon-photonics-vs-inp-vs-thin-film-lithium-niobate-in-the-1-6t-era/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#35 New Coherent LiDAR System Measures Depth, Velocity, and Polarization Simultaneously, Expanding 3D Sensing Capabilities

Published June 25, 2026 Lidar News USA

OVERVIEW

Researchers have developed a novel coherent LiDAR system that simultaneously measures depth, velocity, and polarization properties, building on coherent optical modem technology used in high-speed telecommunications. This breakthrough promises to provide richer and more precise information for autonomous vehicles and other 3D sensing applications, significantly enhancing environmental perception capabilities.

IN DEPTH

Key Findings

Researchers have developed an innovative coherent LiDAR system capable of simultaneously measuring three crucial pieces of information: depth, velocity, and polarization properties. This new system, which applies coherent optical modem technology widely used in high-speed telecommunications, holds the potential to dramatically enhance environmental perception capabilities for autonomous vehicles and other advanced 3D sensing applications.

Technical and Market Details

While traditional LiDAR systems primarily measure depth information (distance to an object), this new coherent LiDAR leverages optical interference to acquire highly accurate relative velocity (using the Doppler effect) and polarization information (indicating surface properties of objects) in addition to distance, all at the same time. This capability allows for the addition of temporal and material-specific data to the 3D information captured by LiDAR, enabling the construction of richer environmental models.

Coherent optical modem technology, by utilizing the phase information of light, offers a high signal-to-noise ratio (SNR) and enables high-precision measurements over long distances. Applying this to LiDAR allows, for example, autonomous vehicles to not only determine the distance to a vehicle or pedestrian ahead but also gather more detailed information such as their speed, direction of movement, and even road conditions or the presence of puddles. This contributes to improved visibility in adverse weather conditions and safer decision-making in complex traffic scenarios. Furthermore, integration with technologies like silicon photonics is expected to lead to miniaturization and cost reduction of LiDAR units.

Background and Industry Context

As autonomous driving technology advances, LiDAR sensors are positioned as one of the primary sensors for environmental perception. However, conventional LiDAR has faced challenges such as degraded performance in adverse weather and a lack of direct velocity information. Coherent LiDAR is attracting attention as a next-generation technology to overcome these issues, with particular interest from automotive manufacturers and robotics companies. The growing demand for 3D sensing in various fields, including industrial robots, drones, and smart infrastructure, is also driving the market adoption of this technology.

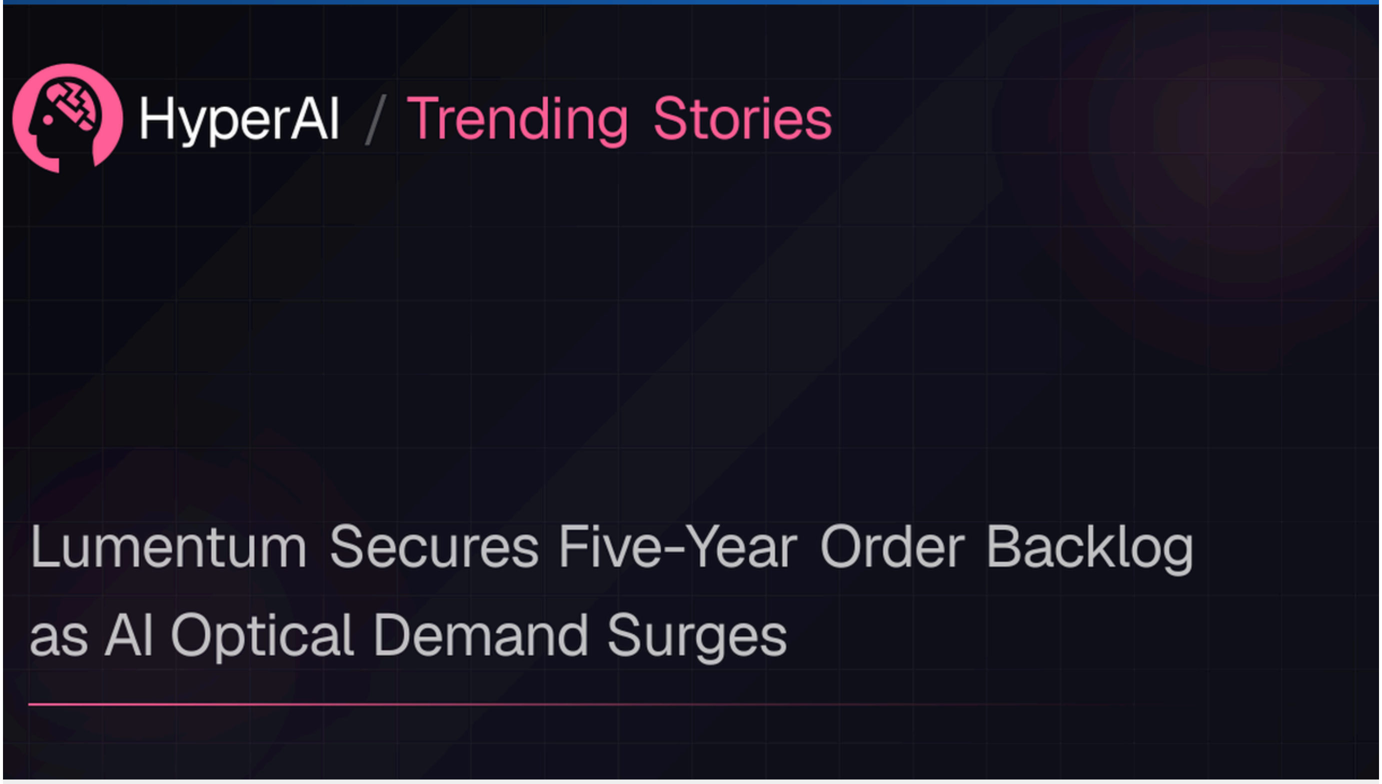
Strategic Significance and Outlook

The development of this new coherent LiDAR system represents a major breakthrough in 3D sensing technology. The ability to acquire multi-dimensional information—depth, velocity, and polarization—in real-time not only enhances the safety and reliability of autonomous vehicles but also has the potential to create new applications across a wide range of fields, including smart city management, precision agriculture, medical imaging, and security surveillance. As this technology undergoes further miniaturization, cost reduction, and mass production, its adoption is expected to accelerate across various industries, contributing to the realization of a more intelligent society.

Source: https://lidarnews.com/new-coherent-lidar-expands-what-3d-sensing-can-see/

#36 Lumentum Secures Five-Year Order Backlog Amid Surging AI Optical Demand; NVIDIA Strategic Investment Strengthens Supply

Published June 23, 2026 HyperAI USA



HyperAI / Trending Stories

Lumentum Secures Five-Year Order Backlog as AI Optical Demand Surges

OVERVIEW

Lumentum Holdings is experiencing a significant increase in demand for AI data center infrastructure, securing a remarkable five-year order backlog. This is driven by the industry's shift from copper to optical solutions for GPU connectivity (800Gbps and 1.6Tbps). Lumentum dominates the EML and continuous-wave laser markets and has received strategic investments from NVIDIA to secure future optical capacity and reinforce its supply chain.

IN DEPTH

Key Findings

Lumentum Holdings has achieved a remarkable business milestone by securing a five-year order backlog, driven by the surging demand from AI data center infrastructure. This clearly positions the company as a leading supplier of optical networking solutions in the AI era.

Technical and Market Details

This surge in demand is specifically fueled by the industry-wide transition from traditional copper interconnects to 800Gbps and 1.6Tbps optical solutions for GPU connectivity. AI workloads require vast amounts of data to be processed at high speeds with minimal latency, and traditional electrical interconnects are facing physical limitations in terms of bandwidth and power consumption. Lumentum holds a dominant market share in the Electro-absorption Modulated Laser (EML) and continuous-wave (CW) laser markets, with these products being essential components in high-speed optical modules for AI data centers.

Securing a five-year order backlog indicates strong market confidence in Lumentum's products and suggests that the build-out of AI infrastructure is a long-term trend. Furthermore, strategic investments from NVIDIA have further strengthened Lumentum's market position, noted as a crucial move to secure future optical capacity. NVIDIA recognizes that a stable supply of optical components is indispensable for maximizing the performance of its AI platforms, deepening its collaboration with Lumentum, similar to its investment in Coherent. This investment aims to support Lumentum's manufacturing capacity expansion and technological development, building a stable supply system to meet AI infrastructure needs.

Background and Industry Context

The rapid development of generative AI has dramatically increased data center traffic and power consumption, pushing the demand for optical communication technology to unprecedented levels. As AI models grow in size, data movement between chips, servers, and data centers becomes a bottleneck, hindering improvements in computational power. In this context, next-generation high-speed optical transceivers, such as 800G and 1.6T, have become indispensable for enhancing AI computing performance. The long-term order backlog and strategic investments indicate sustained market growth in this sector.

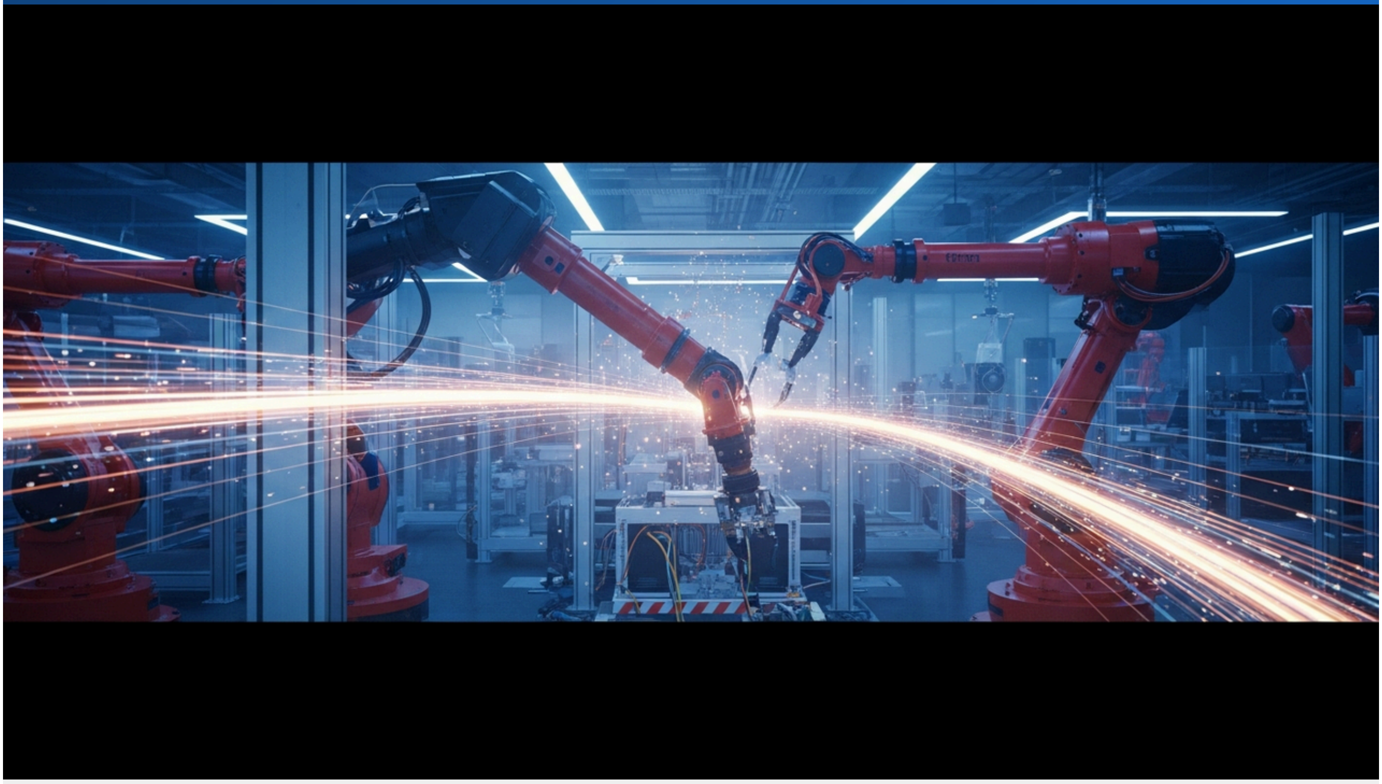
Strategic Significance and Outlook

Lumentum is well-positioned to continue benefiting significantly from the growth of the AI-driven optical networking market. The five-year order backlog ensures a stable revenue base and positive long-term growth outlook for the company. Strategic support from major customers like NVIDIA will be highly advantageous for Lumentum in establishing its position as a primary supplier of optical components for next-generation AI infrastructure. Moving forward, Lumentum is expected to focus on developing even faster and more energy-efficient optical solutions to keep pace with the evolution of AI technology, playing a central role in the advancement of the AI revolution.

Source: https://hyper.ai/en/stories/cbc9b5cbc49b2919d6b1eff080b4e016

#37 Qualcomm Extends Dragonfly Ecosystem with 1.6T/3.2T Optical Modules to Power Next-Gen AI Factories

Published June 24, 2026 Wccftech USA



OVERVIEW

Qualcomm is expanding its Dragonfly Connectivity Platform for AI data centers with new coherent-lite optical solutions and PAM4 Optical SerDes. Its roadmap includes 1.6T optical modules (O200) and Active Electrical Cables (AECs) (CU200) for 2026-2027, and 3.2T optical modules (O400) and AECs (CU400) by 2028. This aims to support high-bandwidth connectivity in AI factories and drive next-generation AI computing.

IN DEPTH

Key Findings

Qualcomm is expanding its Dragonfly Connectivity Platform, integrating AI accelerators, custom silicon, and networking capabilities, to empower next-generation AI factories. The company's roadmap includes 1.6T optical modules (O200) and Active Electrical Cables (AECs) (CU200) for 2026-2027, and 3.2T optical modules (O400) and AECs (CU400) by 2028, all designed to support the high-bandwidth connectivity essential for demanding AI workloads.

Technical and Market Details

Qualcomm's expanded Dragonfly Connectivity Platform features new coherent-lite optical solutions for scale-out applications (up to 20 km) and PAM4 Optical SerDes (Serializer/Deserializer) for shorter distances (up to 2 km). The coherent-lite optical solutions optimize signal quality and power efficiency for long-distance data transmission, enabling inter-data center connectivity and distributed AI clusters. PAM4 Optical SerDes facilitates high-density data transmission over shorter distances, making it suitable for integration with in-packaging solutions like Co-Packaged Optics (CPO) and Near-Package Optics (NPO).

The company's roadmap is designed to keep pace with the rapid evolution of bandwidth requirements in AI data centers. The 1.6T optical modules will address the primary demands of current AI training and inference workloads, while the 3.2T optical modules are engineered to meet the needs of even larger and more complex AI models in the future. These optical modules and AECs will integrate tightly with Qualcomm's custom AI chips and Ethernet switching solutions, providing a comprehensive 'one-stop' computing platform for AI data centers.

Background and Industry Context

As the scale of generative AI models expands exponentially, bandwidth requirements for both internal and external data center connectivity are increasing exponentially. Traditional electrical interconnects are increasingly struggling to handle this immense data volume efficiently and with low latency, leading to a severe 'data bottleneck.' The focus of chip manufacturers like Qualcomm on not only AI accelerators but also the underlying connectivity technologies highlights the importance of system-level optimization in the AI era. Optical technology is an indispensable component for resolving this bottleneck, and Qualcomm's comprehensive approach aims to deliver the scalability and performance required by AI factories.

Strategic Significance and Outlook

Qualcomm's expansion of its Dragonfly Connectivity Platform and its ambitious optical module roadmap will significantly impact the construction of next-generation AI factories. The introduction of 1.6T and 3.2T optical modules will substantially improve the efficiency of AI training and enable the development and deployment of larger and more complex AI models. By integrating optical technology with AI accelerators, custom silicon, and networking, Qualcomm is strengthening its competitiveness in the AI infrastructure market and is expected to play a crucial role in shaping the future of AI. This initiative will accelerate 'Moore's Law for AI' from the perspective of connectivity technology.

Source: https://wccftech.com/qualcomm-dragonfly/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#38 Silicon Nitride (Si3N4) Photonic Integrated Circuits Emerge as Integrated Platform for IoT, AI, LiDAR, and Quantum Computing

Published June 21, 2026 [Scientific Paper/Academic] Global

OVERVIEW

Silicon nitride (Si3N4) photonic integrated circuits (PICs) are gaining attention as a promising platform for diverse applications, including IoT, AI, LiDAR, and quantum computing, due to their low propagation loss and high integration capabilities. This research highlights SiN's CMOS compatibility and advances in heterogeneous integration with other platforms like silicon-on-insulator (SOI) and indium phosphide (InP), forming a foundation for next-generation photonics technologies.

IN DEPTH

Key Findings

Silicon nitride (Si3N4) photonic integrated circuits (PICs) are attracting widespread attention as a promising platform for a diverse range of cutting-edge applications, including IoT, AI, LiDAR, and quantum computing. This is primarily due to their exceptionally low propagation loss and high integration capabilities. The research suggests that SiN PICs will play a crucial role in forming the foundation of next-generation photonics technology.

Technical and Market Details

Silicon nitride is an ideal material for various photonics applications due to its wide transparency spectrum, high refractive index contrast (enabling high integration density), and excellent chemical stability. Specifically, SiN PICs can enable high-performance optical sensors, frequency combs, and microwave photonics devices by allowing ultra-low-loss waveguides and high-Q resonators in the millimeter-wave and terahertz bands. Its high compatibility with CMOS manufacturing processes means it can be mass-produced relatively easily using existing semiconductor fabrication lines, offering significant advantages in terms of cost efficiency and scalability.

This article emphasizes the advancements in heterogeneous integration of SiN with other photonic platforms, such as silicon-on-insulator (SOI) and indium phosphide (InP). Heterogeneous integration makes it possible to combine SiN's low loss with SOI's electronic circuit integration capabilities or InP's superior light emission/detection properties. This leads to the development of high-performance photonic devices with complex functionalities not achievable with single materials. Such devices offer innovative solutions in various fields, including integrated quantum light sources for quantum information processing, optical interconnects for AI accelerators, and beam steering arrays in LiDAR systems.

Background and Industry Context

Modern information society demands exponentially increasing data volumes and faster, more energy-efficient information processing capabilities. The proliferation of IoT devices, the evolution of AI, the emergence of high-resolution LiDAR, and advancements in quantum computing research all rely on high-performance photonics technology. Silicon nitride PICs are a key technology for meeting the stringent performance requirements (high bandwidth, low latency, high signal-to-noise ratio, miniaturization) demanded by these fields. Their versatility and scalability offer a powerful solution to the challenges faced by the semiconductor industry.

Strategic Significance and Outlook

The continuous technological development and commercialization of silicon nitride PICs will accelerate the realization of next-generation applications across IoT, AI, LiDAR, and quantum computing. In particular, the further maturation of heterogeneous integration technologies will drive the emergence of 'system-on-chip' type photonic devices, where optical and electronic functionalities are highly fused. This is expected to embed optical technology deeply into all aspects of digital infrastructure, providing an indispensable foundation for a smarter, more efficient, and higher-performance future society.

Source:
https://www.researchgate.net/publication/405672072_Porous_silicon_as_an_integrated_platform_for_producing_

Collected: June 26, 2026 | Automated Research System (Gemini API)

#39 Optical Communications: Critical Role in Resolving Bottlenecks for AI Infrastructure, 5G, and Data Centers

Published June 20, 2026 QCLS | Advancing the Future of Photonics, Light-Based Computing, and Optical Innovation USA

OVERVIEW

Optical communication plays a critical role in modern systems, particularly for AI infrastructure, 5G, and data centers, by providing extreme bandwidth over distance with manageable power, heat, and latency. Coherent optics, in particular, enhances these capabilities by leveraging light's phase and polarization for higher data rates and spectral efficiency in long-haul and subsea links. This technology forms the foundation for information processing in the AI era.

IN DEPTH

Key Findings

Optical communication plays a pivotal role in the most demanding modern systems, including AI infrastructure, 5G networks, and data centers. Its capability lies in delivering extreme bandwidth over long distances while maintaining manageable levels of power consumption, heat generation, and latency, thereby resolving bottlenecks faced by traditional electrical communication.

Technical and Market Details

The advantages of optical communication stem from its physical properties. Problems such as resistance, signal attenuation, and electromagnetic interference, which electrical signals encounter when transmitted through copper wires, are significantly mitigated by using optical fibers. This allows data to be transmitted much faster and over longer distances with less energy loss.

In particular, coherent optics stands out as a technology that further enhances the capabilities of optical communication. Coherent optics ingeniously utilizes multiple physical aspects of light, such as phase, amplitude, and polarization, to encode and transmit more information over a single optical fiber. This enables significantly higher data rates and spectral efficiency—previously unattainable with conventional optical communication technologies—in long-haul optical transmissions, especially across continents or beneath the sea. Specifically, coherent technology plays a central role in next-generation high-speed optical modules such as 800G, 1.6T, and even 3.2T.

In AI data centers, where massive data movement between GPU clusters requires high speed and low latency, coherent optics is indispensable for enabling advanced optical interconnects like Co-Packaged Optics (CPO) and Near-Package Optics (NPO). Similarly, the backbones of 5G networks demand analogous technologies to efficiently process vast amounts of mobile data traffic.

Background and Industry Context

The rapid development of generative AI, the expansion of cloud computing, and the proliferation of 5G are driving an exponential increase in data volume and demand for faster, more responsive network infrastructure. Traditional electrical communication technologies are reaching their physical and economic limits in meeting these demands. Optical communication, especially coherent technology, is attracting industry-wide interest and investment as the most promising solution to overcome these challenges and resolve digital infrastructure bottlenecks.

Strategic Significance and Outlook

Optical communication technology will continue to be the foundation for the evolution of AI infrastructure, 5G, and data centers. Further advancements in coherent optics will enable higher-density, faster, and more energy-efficient networks, facilitating AI performance improvements, the creation of new cloud services, and broader digital transformation. The progress in optical technology is expected to play a central role in solving the connectivity and power challenges facing digital society, fundamentally transforming the future of information processing.

Source: https://www.qcls.ai/optical-communications/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#40 PhotonPath and XIVER Partner to Scale Oxyn Platform Manufacturing on 200mm Wafer Infrastructure

Published June 18, 2026 Optica Global

OVERVIEW

PhotonPath and XIVER have partnered to scale the manufacturing of PhotonPath's Oxyn platform, an integrated photonics platform for telecom and datacom applications. This collaboration transitions Oxyn manufacturing to XIVER's 200mm wafer infrastructure, expanding capacity and improving lead times for high-performance photonic devices. This is a crucial step to address increasing demand in the optical communication sector.

IN DEPTH

Key Findings

PhotonPath and XIVER have announced a strategic partnership to scale up the manufacturing of PhotonPath's Oxyn platform. Oxyn, an integrated photonics platform designed for telecom and datacom applications, will benefit from this collaboration, which marks a significant step towards addressing the increasing demand in the optical communication sector.

Technical and Market Details

Through this cooperation, the manufacturing of the Oxyn platform will transition to XIVER's advanced 200mm wafer infrastructure. Manufacturing on 200mm wafers significantly increases production volume and improves cost efficiency by leveraging larger wafer sizes. This will enable PhotonPath to expand its production capacity for high-performance photonic devices and reduce lead times for customers.

The Oxyn platform delivers integrated photonics solutions characterized by high bandwidth, low power consumption, and high reliability. These features are essential for meeting the growing demands driven by AI data centers, 5G networks, and the acceleration of optical fiber communication. Integrated photonics technology achieves miniaturization, performance enhancement, and cost reduction by integrating multiple optical components (such as lasers, modulators, waveguides, and detectors) onto a single chip. This scale-up is particularly significant for accelerating the market introduction of next-generation optical interconnects like Co-Packaged Optics (CPO) and Near-Package Optics (NPO).

Background and Industry Context

The rapid development of generative AI, the expansion of cloud computing, and the proliferation of 5G are accelerating an explosive increase in data volume and the demand for faster, more responsive network infrastructure. Traditional electrical communication technologies are reaching their physical and economic limits in meeting these demands, making optical communication, particularly integrated photonics technology, key to resolving these bottlenecks. Improving manufacturing scalability is paramount for the widespread adoption of this technology, and the partnership between PhotonPath and XIVER addresses this challenge.

Strategic Significance and Outlook

The partnership between PhotonPath and XIVER will play a crucial role in driving manufacturing capabilities and technological innovation in the integrated photonics industry. The transition to 200mm wafers will enhance the market competitiveness of the Oxyn platform, enabling the provision of high-performance optical solutions to a broader customer base. This will accelerate the evolution of AI infrastructure, the deployment of 5G networks, and the further increase in speed of optical communication technologies. The collaboration clearly demonstrates that optical technology is an indispensable component in shaping the future of digital society and is expected to strengthen the foundation of next-generation information and communication infrastructure.

Source: https://opg.optica.org/oe/abstract.cfm?uri=oe-34-12-5813

Collected: June 26, 2026 | Automated Research System (Gemini API)

#41 Applied Optoelectronics Plunges 13%, Coherent Drops 9%, Lumentum Falls 8%: AI Infrastructure Spending Uncertainty Shakes Optical Market

Published June 23, 2026 24/7 Wall St. USA

OVERVIEW

Applied Optoelectronics, Coherent, and Lumentum experienced sharp stock declines (13%, 9%, 8% respectively), reflecting a strong correlation to hyperscaler capex plans. Despite recent strong fundamentals, market concerns regarding AI infrastructure spending, particularly potential delays in Co-Packaged Optics (CPO) deployment, are impacting valuations and creating broad volatility across the optical components sector.

IN DEPTH

Key Findings

Shares of Applied Optoelectronics plummeted by 13%, with Coherent and Lumentum also dropping by 9% and 8% respectively. These declines in optical transceiver and laser manufacturers are strongly correlated with hyperscalers' (large data center operators) capital expenditure plans. Despite recent strong fundamental performance, concerns about AI infrastructure spending, particularly potential delays in the deployment of Co-Packaged Optics (CPO), are negatively affecting market valuations and causing widespread turbulence across the optical components sector.

Technical and Market Details

The optical components market has been heavily driven by surging demand from AI data centers, but recent stock fluctuations suggest market uncertainty regarding the pace of AI infrastructure investment and the timing of technological transitions. CPO, in particular, is highly anticipated technology that integrates optical engines and electrical chips (e.g., switch ASICs) within the same package, dramatically increasing data transfer bandwidth and significantly reducing power consumption. However, technical challenges in CPO's commercial deployment, such as high-precision alignment, manufacturing yield, and system maintainability, remain, leading to concerns that its large-scale introduction might be delayed beyond initial forecasts.

While this delay might offer a temporary reprieve for the existing pluggable optical transceiver market, it creates revenue uncertainty for companies that have made substantial investments in CPO. Hyperscalers continue to invest in optical interconnects to meet the surging AI workloads but are carefully assessing the transition to the most cost-effective and mature technologies. Such uncertainties in investment pace and technology selection are impacting individual company stock prices and increasing overall sector volatility.

Background and Industry Context

As the scale of generative AI models expands exponentially, data centers face growing challenges in power consumption and cooling, demanding bandwidth and power efficiency that traditional electrical interconnects cannot provide. Optical interconnects are indispensable for resolving this bottleneck, with CPO considered its ultimate form. However, large-scale adoption of new technologies always carries risks. The market, while confident in the long-term growth trend of AI, is reacting sensitively to short-term uncertainties in its implementation path.

Strategic Significance and Outlook

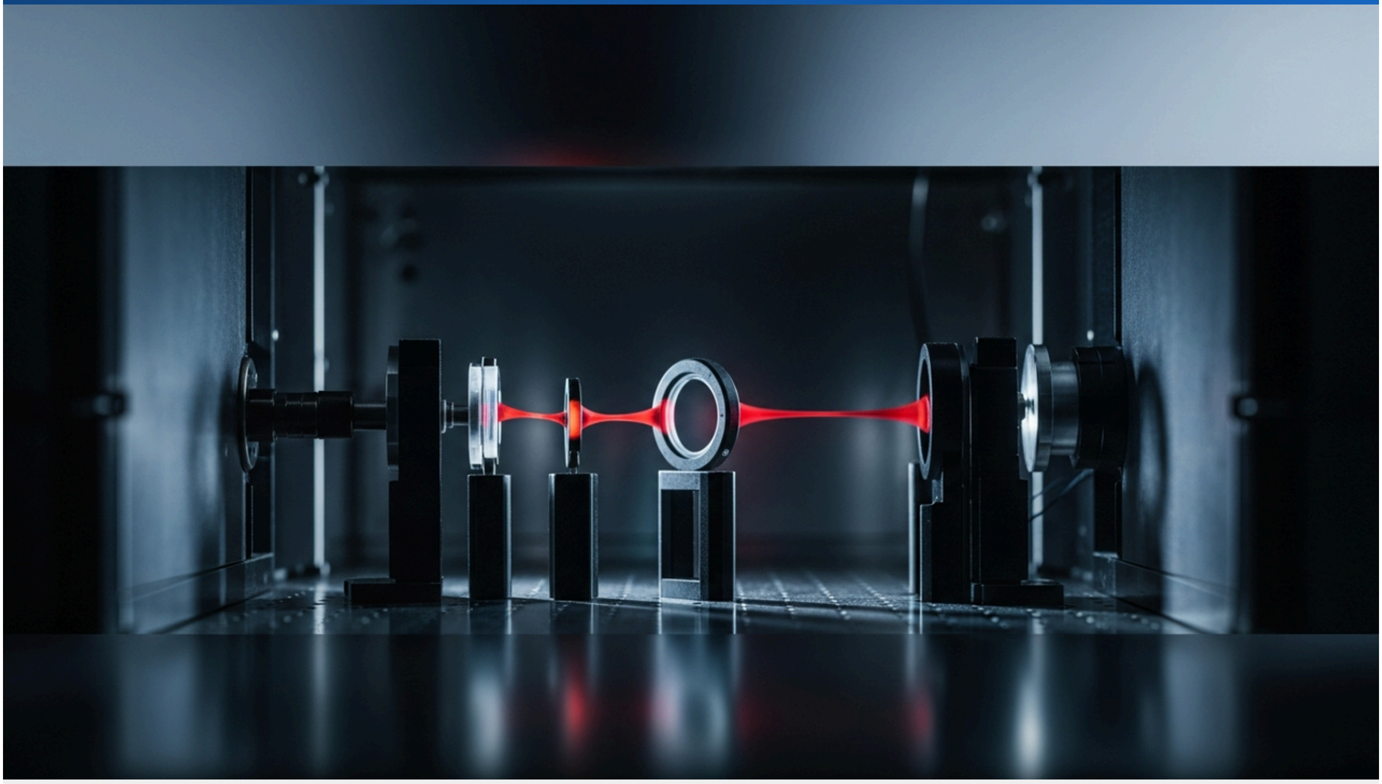
The sharp decline in optical component stocks suggests that the growth of the AI infrastructure market will not be linear, but the fundamental demand for optical interconnects remains very strong. Once CPO's technical challenges are overcome and mass production capabilities are established, market confidence is expected to rebound, and growth will accelerate. Companies must continue technological innovation, optimize manufacturing processes, and minimize risks associated with CPO adoption through close collaboration with customers. This temporary market turbulence may serve as an opportunity to re-emphasize the importance of optical technology in the AI era and to build more robust supply chains and technology roadmaps.

Source: https://247wallst.com/investing/2026/06/23/applied-optoelectronics-plunges-13-coherent-drops-9-lumentum-falls-8-has-an-optics-valuation-reckoning-begun/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#42 Material-Anisotropy-Driven Topological Optical Lattices Generated on Thin-Film Lithium Niobate Open Door to Next-Gen Photonic Devices

Published June 21, 2026 arXiv USA



OVERVIEW

This research explores the generation of topological optical lattices by leveraging material anisotropy in X-cut thin-film lithium niobate (TFLN) microring vortex emitters. The intrinsic birefringence in TFLN introduces an azimuthally varying effective index, enabling continuous azimuthal phase modulation and efficient generation of coherent topological sideband lattices. This discovery contributes to advancements in sophisticated optical control and quantum information science.

IN DEPTH

Key Findings

This research explores an innovative method for generating topological optical lattices by ingeniously exploiting material anisotropy in X-cut thin-film lithium niobate (TFLN) microring vortex emitters. The intrinsic birefringence of TFLN introduces an azimuthally varying effective refractive index, which enables continuous azimuthal phase modulation, leading to the efficient generation of coherent topological sideband lattices.

Technical and Market Details

Topological optical lattices are a technology that allows for the realization of robust optical devices by creating 'topologically protected' pathways for photons, making them resilient to defects and noise. While conventional optical devices are sensitive to manufacturing imperfections and environmental noise, topological protection promises more stable light propagation.

This study specifically leverages the material properties of TFLN, particularly its anisotropy. TFLN is a material that combines the excellent electro-optic properties of lithium niobate with high integration density and low loss through thin-film technology. X-cut TFLN exhibits different light propagation characteristics depending on the crystal axis orientation. When combined with a microring resonator, this creates an effect where the phase of light is continuously modulated as it circulates the ring. This azimuthal phase modulation is a crucial mechanism for controlling the orbital angular momentum (OAM) states of light, leading to the efficient generation of coherent topological sideband lattices.

This technology holds promise for a wide range of applications, including the generation of entangled photon states in quantum information science, advanced optical sensing, and the design of new optical interconnects for AI computing. Particularly, robust photon sources and photon manipulation devices are critical components for realizing fault-tolerant quantum computers.

Background and Industry Context

In the fields of quantum information science and advanced optical technologies, precisely controlling the state of photons and propagating them robustly against noise is paramount. Topological photonics has garnered significant attention in recent years as a promising approach to this challenge. Thin-film lithium niobate is rapidly establishing itself as a mainstream material for photonic devices due to its exceptional electro-optic properties and CMOS-compatible manufacturing processes. Leveraging the intrinsic anisotropy of this material allows for the effective utilization of previously difficult-to-access degrees of freedom of light, such as OAM.

Strategic Significance and Outlook

The generation of material-anisotropy-driven topological optical lattices in thin-film lithium niobate opens a new paradigm in optical device design. This discovery will directly contribute to the development of more robust and high-performance quantum photonic chips, ultra-high-speed optical communication systems based on new principles, and highly sensitive optical sensors. In particular, controlling the OAM states of photons holds the potential for dramatic increases in information capacity and the realization of more secure quantum communication. As further research and applications of this technology advance, it is expected to become an indispensable component in optical systems for quantum computing and next-generation AI infrastructure.

Source: https://arxiv.org/html/2606.22569v1

Collected: June 26, 2026 | Automated Research System (Gemini API)

#43 Quantum Computing Inc. Acquires NHanced Semiconductors to Expand TFLN Photonic PIC Manufacturing Capacity for Quantum Computing, AI, and Secure Communications

Published June 23, 2026 [Corporate Announcement] USA

OVERVIEW

Quantum Computing Inc. (QCi) has completed the acquisition of NHanced Semiconductors, an advanced packaging foundry. This acquisition launches QCi's 'Fab 2' production framework, significantly expanding its manufacturing capabilities and accelerating the commercialization and scaling of its thin-film lithium niobate (TFLN) photonic integrated circuit platform for applications in quantum computing, AI, and secure communications. This is a crucial step to accelerate quantum computing commercialization and scaling.

IN DEPTH

Key Findings

Quantum Computing Inc. (QCi) has finalized the acquisition of NHanced Semiconductors, an advanced semiconductor packaging foundry. This strategic acquisition enables QCi to launch its 'Fab 2' production framework, significantly expanding its manufacturing capabilities and accelerating the commercialization and scaling of its thin-film lithium niobate (TFLN) photonic integrated circuit (PIC) platform for cutting-edge applications in quantum computing, AI, and secure communications.

Technical and Market Details

NHanced Semiconductors specializes in providing advanced semiconductor packaging services, including 3D packaging, heterogeneous integration, and chiplet technology. QCi's acquisition is critical for transitioning its TFLN PIC technology from R&D to high-volume production. TFLN is a material that combines the excellent electro-optic properties of lithium niobate with high integration density and low power consumption through thin-film technology, enabling ultra-high-speed and highly efficient optical modulation.

The establishment of the 'Fab 2' production framework means QCi can vertically integrate and manage the entire process from TFLN PIC design to manufacturing, packaging, and testing. This integration is expected to shorten product development cycles, improve yields, and reduce the cost of the final product. This expanded manufacturing capacity is particularly important for meeting the growing demand in potential application areas for TFLN PICs, such as quantum information processing, AI acceleration, high-bandwidth optical interconnects, and secure optical communication systems. NHanced Semiconductors' expertise will be indispensable in robustly and reliably packaging these high-performance photonic chips.

Background and Industry Context

Quantum computing, AI, and secure communications represent the next generation of computing and information processing technologies. These fields require ultra-high-speed, low-latency, and highly efficient information processing capabilities that cannot be achieved with conventional electronic devices. TFLN PICs are emerging as a promising solution to meet these demands, and their commercialization and large-scale deployment are key to accelerating the evolution of each field. Semiconductor packaging technology is essential for maximizing the performance and ensuring the reliability of such high-performance chips in practical applications.

Strategic Significance and Outlook

QCi's acquisition of NHanced Semiconductors is a strategically critical move for accelerating the commercialization and scaling of TFLN photonic PIC technology. The establishment of the 'Fab 2' framework provides QCi with a strong foundation to enhance its market competitiveness and establish leadership in the quantum computing and AI sectors. Moving forward, QCi is expected to contribute to the realization of high-performance quantum computers, acceleration of AI systems, and the construction of more secure communication networks through the mass production of TFLN PICs. This acquisition clearly demonstrates that photonics technology is an indispensable element in shaping the future of computing and communication.

Source: https://www.prnewswire.com/news-releases/quantum-computing-inc-completes-acquisition-of-nhanced-semiconductors-inc-302804008.html

Collected: June 26, 2026 | Automated Research System (Gemini API)

#44 Quantum Computing Inc. Partners with Planck Dynamics to Deploy NeuraWave Photonic Reservoir Computer as Foundational Platform for Next-Gen Edge AI Applications

Published June 18, 2026 PR Newswire USA

OVERVIEW

Quantum Computing Inc. (QCi) has received a purchase order and entered a framework agreement with Planck Dynamics to deploy QCi's NeuraWave photonic reservoir computer as a foundational platform for next-generation AI applications, particularly for real-time intelligence at the edge. This collaboration aims to accelerate the adoption and commercialization of photonic computing technologies in emerging AI markets, addressing power efficiency and speed challenges in AI processing.

IN DEPTH

Key Findings

Quantum Computing Inc. (QCi) has secured a purchase order and entered into a framework agreement with Planck Dynamics to deploy QCi's NeuraWave photonic reservoir computer as a foundational platform for next-generation AI applications. This partnership specifically targets real-time intelligence at the edge, aiming to accelerate the adoption and commercialization of photonic computing technologies in emerging AI markets.

Technical and Market Details

QCi's NeuraWave photonic reservoir computer leverages the physical properties of photons to perform certain types of computations, particularly time-series data analysis and pattern recognition, with higher efficiency and speed than traditional electronic computers. Reservoir computing is a type of machine learning well-suited for dynamic systems and complex time-series data processing. The photonic implementation overcomes bottlenecks associated with resistance and latency in electrical signal transmission, enabling ultra-fast and low-power information processing.

Through this framework agreement, Planck Dynamics will deploy the NeuraWave system in environments requiring real-time responsiveness, such as edge devices and IoT gateways. In edge AI applications, processing data directly near its generation point is crucial to avoid latency and bandwidth limitations associated with cloud data transfer, thereby achieving immediate responsiveness. QCi's photonic technology is a highly promising solution for meeting these edge computing requirements. Combined with NHanced Semiconductors' advanced packaging technology (acquired by QCi), the robustness and miniaturization of photonic reservoir computers will be further enhanced.

Background and Industry Context

The proliferation of AI demands enhanced processing capabilities not only in the cloud but also at edge devices. Real-time data processing and rapid decision-making are essential for many applications, including autonomous vehicles, smart sensors, and industrial IoT. However, edge devices face stringent constraints on power, size, and heat dissipation, making the integration of traditional high-performance electronic chips challenging. Photonic computing, due to its low power consumption and high speed, is gaining attention as an innovative approach to overcome these constraints and expand the capabilities of edge AI.

Strategic Significance and Outlook

The partnership between QCi and Planck Dynamics represents a significant step towards positioning photonic computing as a practical solution in the edge AI market. The deployment of the NeuraWave photonic reservoir computer will bring real-time intelligence capabilities to edge devices, accelerating the realization of smarter and more autonomous systems. This technology is expected to foster the creation of new AI applications and contribute to the evolution of the overall AI ecosystem. QCi, as a leader in photonics technology, is anticipated to play a central role in shaping the future of computing in the AI era.

Source: https://www.prnewswire.com/news-releases/quantum-computing-inc-announces-framework-agreement-with-planck-dynamics-to-deploy-neurawave-photonic-reservoir-computer-as-a-foundational-platform-for-next-generation-ai-applications-302804008.html

Collected: June 26, 2026 | Automated Research System (Gemini API)

#45 Fujitsu Awarded Frost & Sullivan's 2026 Asia-Pacific Enabling Technology Leadership Recognition for Advancing AI Integration and Hybrid Computing

Published June 24, 2026 NewswireToday Japan

OVERVIEW

Fujitsu was awarded Frost & Sullivan's 2026 Asia-Pacific Enabling Technology Leadership Recognition for its innovation, hybrid computing strategy, and scalable quantum-inspired computing solutions. This recognizes Fujitsu's pivotal role in digital transformation, particularly in integrating AI into its core network offerings and addressing complex enterprise optimization challenges. The award highlights Fujitsu's significant contributions to digital transformation and next-generation computing.

IN DEPTH

Key Findings

Fujitsu has received Frost & Sullivan's "2026 Asia-Pacific Enabling Technology Leadership Recognition." This award acknowledges the company's innovation, hybrid computing strategy, and scalable quantum-inspired computing solutions. Specifically, Fujitsu's capability to integrate AI into its core network offerings and address complex enterprise optimization challenges contributed significantly to this recognition.

Technical and Market Details

Fujitsu's hybrid computing strategy focuses on combining traditional high-performance computing (HPC) with emerging technologies such as quantum computing and quantum-inspired computing. Quantum-inspired computing aims to find faster solutions to specific optimization problems than traditional computers by mimicking the principles of quantum algorithms on classical hardware. Fujitsu has demonstrated leadership in this area through its proprietary digital annealer technology and other solutions.

Furthermore, Fujitsu deeply integrates AI technology into its core network products. This includes automating network operations, enhancing security, and optimizing traffic. By leveraging AI, networks become more intelligent, capable of efficiently allocating resources, predicting faults, and improving service quality. This provides enterprise customers with powerful tools for solving complex optimization problems, such as supply chain optimization, logistics planning, and financial modeling.

Background and Industry Context

The acceleration of digital transformation and the widespread adoption of AI technologies are making the challenges faced by enterprises and organizations increasingly complex. As the number of problems that cannot be solved with traditional computing power alone grows, there is increasing anticipation for advanced technologies such as quantum-inspired computing and AI-integrated networks. Evaluations by independent research firms like Frost & Sullivan serve as important indicators of how companies are leveraging these emerging technologies and demonstrating market leadership.

Strategic Significance and Outlook

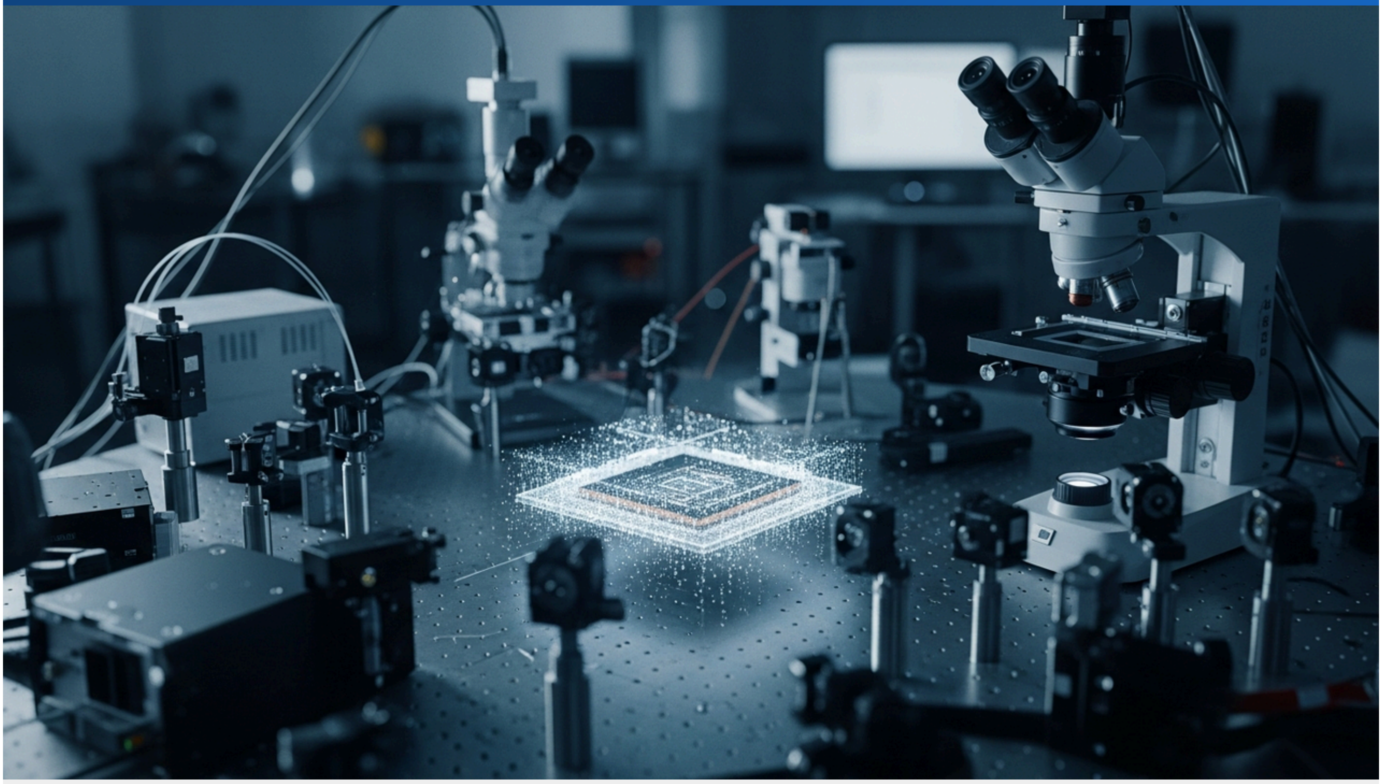
Fujitsu's latest award clearly demonstrates the company's significant contributions to digital transformation and next-generation computing. The continuous development and deployment of AI-integrated networks and quantum-inspired computing solutions will open new possibilities for enterprises to operate businesses more efficiently and sustainably. Fujitsu is expected to play a central role in solving the most complex challenges faced by its customers and driving business innovation in the AI era through these technologies. This award will further strengthen the company's technological leadership and market influence.

Source: https://www.newswiretoday.com/news/1628189/Fujitsu-Receives-Frost--Sullivans-2026-Asia-Pacific-Enabling-Technology-Leadership-Recognition-for-Advancing/

Collected: June 26, 2026 | Automated Research System (Gemini API)

#46 University of Michigan Team Secures $4M NSF Funding to Accelerate Scandium Aluminum Nitride Quantum Photonic Chip Design

Published June 26, 2026 [News/Blog] USA



OVERVIEW

A University of Michigan-led team received $4 million in Phase 2 funding from the National Science Foundation to advance their Quantum Photonic Integration and Deployment (QuPID) project. The project focuses on designing robust, plug-and-play quantum photonic chips using scandium aluminum nitride (ScAlN) material. This aims to bring quantum precision to microelectronics for applications like GPS-free navigation.

IN DEPTH

Key Findings

A research team led by the University of Michigan has secured $4 million in Phase 2 funding from the National Science Foundation (NSF) to advance their innovative Quantum Photonic Integration and Deployment (QuPID) project. This project focuses on the design and development of robust, plug-and-play quantum photonic chips utilizing scandium aluminum nitride (ScAlN) material.

Technical and Market Details

The goal of the QuPID project is to manufacture high-precision and stable quantum photonic chips, as required by fields such as quantum computing and quantum sensing, in a practical form. ScAlN is an emerging material possessing a high electro-optic coefficient, excellent piezoelectric properties, and compatibility with CMOS manufacturing processes, thus opening new possibilities in quantum photonics. Particularly, ScAlN-based devices are expected to contribute to maintaining stable quantum states resilient to temperature fluctuations and external noise, owing to their robustness.

The 'plug-and-play' concept signifies that quantum chips can be easily integrated into existing microelectronic systems, promoting widespread application of quantum technology. Specifically, this technology could be utilized for high-precision navigation systems independent of GPS (quantum inertial sensors), more secure quantum communication, and the manipulation of photon-based qubits in quantum computing. The $4 million funding will accelerate the next phase of R&D, including chip design, prototype manufacturing, and functional verification.

Background and Industry Context

Quantum technology holds the potential to revolutionize fields such as computing, sensing, and communication. However, its practical implementation faces significant challenges in overcoming the delicate nature of quantum states and manufacturing scalable, reliable quantum hardware. Traditional quantum systems often require specialized environments like extremely low temperatures or vacuum, leading to high costs and complexity. The combination of new materials like ScAlN and integrated photonics technology offers a promising approach to solve these challenges and make quantum technology more accessible.

Strategic Significance and Outlook

The development of ScAlN-based quantum photonic chips through the QuPID project represents a significant advance towards the practical realization of quantum technology. If robust, plug-and-play quantum chips are achieved, they could enable new applications not only in GPS-free navigation but also in medical diagnostics, materials science, and AI acceleration. This research provides a foundation for integrating quantum technology into microelectronics and building next-generation systems that are higher performing and more secure. The substantial funding from the NSF underscores the national strategic importance of this technology and is expected to help strengthen U.S. leadership in quantum technology.

Source: https://quantumzeitgeist.com/university-michigan-quantum-photonic-chip-boosts/

Collected: June 26, 2026 | Automated Research System (Gemini API)