



Adam Tas Corridor Energy

Ultra-high-speed optoelectronic fusion chip technology





Overview

We have proposed the Fourier domain diffraction neural network, constructed the reconfigurable diffraction computing processor (DPU), developed the all-analog optoelectronic fusion computing chip ACCEL, and the large-scale general-purpose intelligent optoelectronic . Integrating microelectronics and optoelectronics can harness the mature processes and functions of microelectronics, with the ultra-wideband and low-power benefits of optoelectronics. Optical computing offers hardware acceleration for "compute-intensive + energy-sensitive" applications, including artificial intelligence, scientific computing, multimodal fusion sensing, and ultra-large-scale data exchange. Utilizing advanced thin-film lithium niobate photonic materials and a novel architecture, researchers in China have developed the first adaptive, full-band, high-speed wireless communication chip based on integrated optoelectronic fusion technology, Science and Technology Daily reported Thursday.



Ultra-high-speed optoelectronic fusion chip technology



The Tsinghua team develops an optoelectronic fusion chip with a

A few days ago, a team of academicians and associate researchers from Tsinghua University welcomed new achievements in chips. They created an optoelectronic fusion chip called ACCEL. The system

Optoelectronic Computing-LIMIT Tsinghua University

With the saturation of the Moore's law, the development of emerging intelligent computing carriers and basic theories is imminent. Empowered by the high-speed and high parallelism of light propagation,



Recent progress of integrated circuits and optoelectronic chips

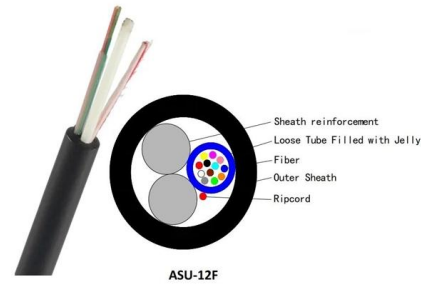
The AI chip and high-performance computing, ultra-high speed analog-to-digital converter (ADC) and millimeter-wave (MMW) and terahertz (THz) ICs are hotspots and in short-needed technologies for

Materials for ultra-efficient, high-speed optoelectronics

High-speed optoelectronics is central to many important developments in the communication,



computing, sensing, imaging, and autonomous vehicle industries.



Ultrahigh-speed graphene-based optical coherent receiver

Graphene-based optoelectronic devices 1, 2, such as high-speed photodetectors 3 (PDs) and modulators 4, take advantage of graphene's high carrier mobility 5, ultra-broadband spectral



Is a light-speed chip unveiled by China-led team the

A new 100 gigahertz chip that harnesses light - not electricity - to synchronise processors could unlock the future of high-speed AI computing, next



The Tsinghua team develops an optoelectronic fusion chip with a

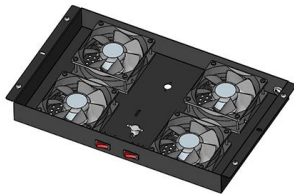
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Photonic chip integrates sensing and computing for

Photonic chip integrates sensing and computing for ultrafast machine vision Technology eliminates optical-electronic conversions, holds promise for



Advanced Ultra High Speed Optoelectronic Devices

Optoelectronic devices which play important roles in high-speed optical fiber networks can offer effective measurement methods for optoelectronic

High-speed optoelectronic devices

Introduction High-speed optoelectronic devices are key components of modern network communication systems and the backbone of information technology. In a fiber optical transmission link, a transmitter



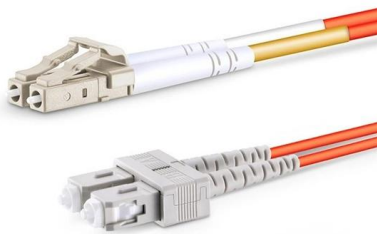
Breaking the Bottleneck: All-Optical Chip Could Unlock

Due to the inherent ultrafast nature of optical Kerr nonlinearity (on femtosecond timescales), these efforts have laid the foundation for designing and



Chinese scientists develop world's first intelligent chip enabling full

Experimental validation demonstrates that the innovative chip-based system can achieve ultra-high-speed wireless transmission rates exceeding 120 Gbps, meeting the peak rate



The integration of microelectronic and photonic circuits on a single

Such an on-chip integration of microelectronics and photonics technologies could pave the way for significant breakthroughs in realizing high-speed, low-power consumption-based advanced

Photonic Integrated Circuits: Research Advances and

Silicon photonics, serving as a cornerstone technology in modern information technology, demonstrates significant application potential in critical



Optoelectronic Computing-LIMIT Tsinghua University

Our team has carried out original explorations of large-scale reconfigurable optoelectronic intelligent computing in terms of theory, architecture, algorithms, and systems.



Ultrafast Photonic Chip Transforms Machine Vision and

Researchers have created a photonic chip capable of processing images at nanosecond speeds, significantly faster than current methods. This

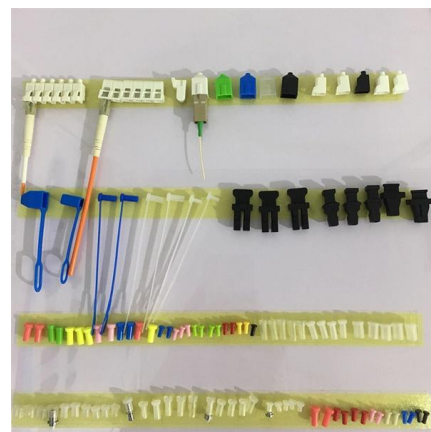


Breaking the Bottleneck: All-Optical Chip Could Unlock

Looking ahead, improvements in nanomanufacturing technology, new materials, and packaging processes are expected to further enhance the

On-Chip Optical Spectrally Sliced Synthesis for Ultra-High-Speed

The on-chip integration in the TFLN platform not only offers a higher information density compared to bulk discrete components, but also greatly enhances the stability and performance of





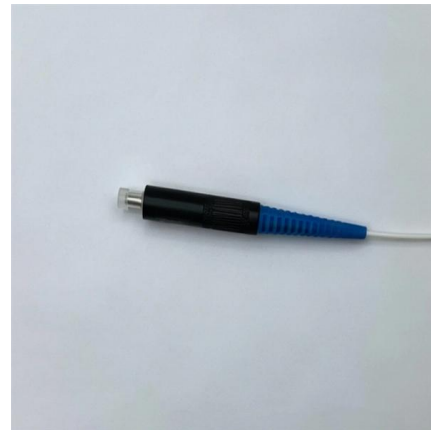
China Made Breakthrough in Ultra-Highly

Focusing on improving the parallelism of optical computing technologies, the team innovated an ultra-highly parallel computing architecture



China Made Breakthrough in Ultra-Highly

With inherent advantages such as low power consumption, low latency, and high parallelism, it is considered a promising approach to building



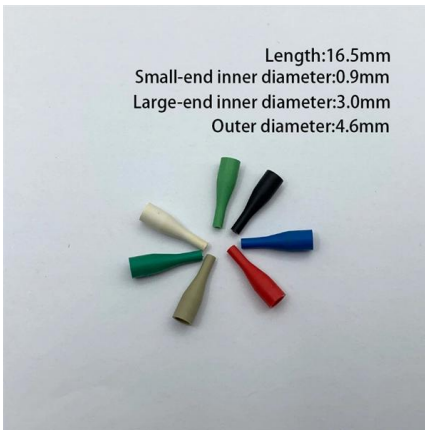
Special Issue on Advanced Ultra-High Speed

In this Special Issue, we highlight recent progress in the application of ultra-high speed optical transmitters, photoreceivers, optical modulators, and

A 10 GHz high-frequency coupled optoelectronic oscillator for RF/FSO

A high-frequency COEO is designed to realize the integration and multi-function of the RF/FSO fusion system. With the diversification and complexity of FSO, there are demands for high





Center Achieves Major Scientific Breakthrough with Ultrabroadband

Based on an advanced thin-film lithium niobate photonics platform, they successfully developed an ultrabroadband optoelectronic integrated chip that enables adaptive, reconfigurable, and

All-analog photoelectronic chip for high-speed vision tasks

Here we propose an all-analog chip combining electronics and light, named ACCEL, for energy-efficient and ultra-high-speed vision tasks with competitive task performance and scalability.



Ultrabroadband On-Chip Photonics Powers Full

In essence, the marriage of thin-film lithium niobate photonics with sophisticated optoelectronic design provides a fertile ground for continued



Ultrabroadband Integrated Photonics Empowering Full-Spectrum

Recent advancements in heterogeneously integrated III-V-on-TFLN technologies could allow high-coherence lasers via self-injection locking⁵³ and photodetectors⁵⁴ integrated on the same TFLN chip.



Optoelectronics' quantum leap: Unveiling the breakthroughs driving high

High-speed Communication: Optoelectronic devices form the backbone of modern high-speed communication networks. Light travels through optical fibers with minimal signal loss, enabling

Micromachines , Special Issue : Optoelectronic Fusion Technology

It will allow for the multi-functional integration of communications, sensing, and computing chips, as well as optoelectronic intelligent chips, promoting innovation in ultra-broadband optical networks, satellite



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