

Ultra-wideband optoelectronic fusion system



Overview

Based on an advanced thin-film lithium niobate photonic material platform, they successfully developed an ultra-wideband optoelectronic fusion integrated chip, enabling adaptive, reconfigurable, high-speed wireless communications exceeding 110 GHz. Ultra-wideband integrated optoelectronic fusion chip for full-band wireless communications ("Ultra broadband on-chip photonics for full-spectrum wireless communications") Proposed the concept of "universal optoelectronic fusion wireless transceiver engine" Successfully developed an ultra-wideband. The forthcoming sixth-generation (6G) and beyond (XG) wireless networks are poised to operate across an expansive frequency range—from microwave, millimeter-wave to terahertz bands—to support ubiquitous connectivity in diverse application scenarios. By leveraging photonic-electronic hybrid integration, a joint research team from PKU and City University of Hong. Integrating microelectronics and optoelectronics can harness the mature processes and functions of microelectronics, with the ultra-wideband and low-power benefits of optoelectronics. This integration addresses challenges like high-speed, low-power consumption and intelligence, driving the.



Article Content

Sep 02, 2025

Wideband frequency-tunable optoelectronic oscillator with ultra-narrow ...

A novel wideband tunable optoelectronic oscillator based on a microwave photonic filter (MPF) with an ultra-narrow passband is proposed and experimentally demonstrated.

Feb 19, 2026

Extreme Ultra-Wideband Radar-Based Compact 3D Terahertz Imaging System

To achieve a tunable and extremely broadband terahertz FMCW radar, photomixing phenomena is used for terahertz generation and detection. The high-resolution 3D imaging capabilities of the

Aug 08, 2025

Integrated Ultra-Wideband Tunable Fourier Domain

Here, we propose and demonstrate the first integrated tunable FDML OEO with the tunable frequency range of 342.5 GHz in the lithium niobate on

Sep 23, 2025

Ultra-wideband fiber-THz-fiber seamless integration communication system ...

Keywords 6G, THz wireless communication, optical fiber communication, seamlessly converged architecture, real-time communication Ultra-wideband fiber-THz-fiber seamless integration

Sep 07, 2025

Chinese scientists make breakthrough in ultra-wideband photonic ...

To address this challenge, the team spent four years developing an ultra-wideband photonic-electronic integrated system. This system supports high-speed transmission at any

Nov 19, 2025

Ultrabroadband on-chip photonics for full-spectrum

Powered by broadband tunable optoelectronic oscillators, our signal sources operate across a record-wide frequency range from 0.5 GHz to 115 GHz

Dec 20, 2025

Micromachines | Special Issue : Optoelectronic Fusion

It will allow for the multi-functional integration of communications, sensing, and computing chips, as well as optoelectronic intelligent chips, promoting innovation

Apr 26, 2026

Extreme Ultra-Wideband Optoelectronic Frequency-Modulated

Download Citation | Extreme Ultra-Wideband Optoelectronic Frequency-Modulated Continuous-Wave Terahertz Radar | A novel photonic terahertz measurement system based on a

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Jun 07, 2026

Ultrabroadband Integrated Photonics Empowering Full-Spectrum

Finally, although some of these demonstrations partly incorporate integrated photonic technologies, the full communication systems remain largely discrete. In short, the quest for a low-noise, wideband

Apr 16, 2026

Ultra-wideband fiber-THz-fiber seamless integration

Terahertz (THz) communication is widely regarded as the key component of future 6G mobile communication systems. Through comparative

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Here, we demonstrate an ultra-wide 145 GHz bandwidth wireless transmission of orthogonal frequency-division multiplexing (OFDM) signals over the air, covering 5–150 GHz

Jun 09, 2026

Ultrabroadband Integrated Photonics Empowering Full-Spectrum

Powered by broadband tunable optoelectronic oscillators, our signal sources operate across a record-wide frequency range from 0.5 GHz to 115 GHz with high frequency stability and consistent coherence.

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Ultrabroadband on-chip photonics for full-spectrum wireless

Third, although some of these demonstrations partly incorporate integrated photonic technologies, the full communication systems remain largely discrete. In short, the quest for a low-noise, wideband

Jul 02, 2025

Extreme Ultra-Wideband Optoelectronic Frequency-Modulated

A novel photonic terahertz measurement system based on a frequency-modulated continuous-wave (FMCW) radar approach is presented. In previous works, fast frequency modulation has been

Oct 10, 2025

Integrated ultra-wideband tunable Fourier domain mode-locked ...

Fourier domain mode-locked optoelectronic oscillator (FDML OEO) is a crucial component for the upcoming sixth-generation (6G) communication era, as it can break the limitation of mode

Feb 14, 2026

Ultra-Wideband optical transmission system applying optical

We have demonstrated real-time S+C+L triple-band WDM transmission of coherent 200-Gb/s (34-Gbaud DP-16QAM) signals by employing all-optical wavelength converters. 100-nm wavelength

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Information Sciences RESEARCH PAPER Accepted

Ultra-wideband ber-THz- ber seamless integration communication system toward 6G: architecture, key techniques, and testbed implementation

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Center Achieves Major Scientific Breakthrough with Ultrabroadband ...

The study introduces a universal optoelectronic wireless transceiver engine and demonstrates an ultrabroadband integrated optoelectronic chip with multi-band compatibility, real-time...

Jul 09, 2025

Chinese scientists make breakthrough in ultra-wideband photonic ...

BEIJING -- Chinese scientists have made a breakthrough in ultra-wideband photonic-electronic integrated technology for 6G wireless communication, according to Peking University

Oct 12, 2025

Devices and Fibers for Ultrawideband Optical Communications

Devices and Fibers for Ultrawideband Optical Communications Abstract: Wavelength-division multiplexing (WDM) has historically enabled the increase in the capacity of optical systems

Dec 16, 2025

Ultra-wideband chaotic optical communication based on electro-optic ...

A differential feedback electro-optical phase chaotic system is proposed to generate ultra-wideband optical chaos and realize high-speed long-distance chaotic communication. The nonlinear

Jun 12, 2026

Integrated ultra-wideband tunable Fourier domain mode-locked ...

Here, we propose and demonstrate the first integrated tunable FDML OEO with the tunable frequency range of 3-42.5 GHz in the lithium niobate on insulator (LNOI) photonic integrated

Aug 17, 2025

Peking University scholar publishes article in Nature!

Based on an advanced thin-film lithium niobate photonic material platform, they successfully developed an ultra-wideband optoelectronic fusion

Dec 01, 2025

Integrated Ultra-Wideband Tunable Fourier Domain Mode-Locked ...

An integrated tunable Fourier domain mode-locked optoelectronic oscillator with a record-breaking operation bandwidth (ranging from 3 to 42.5 GHz) and flexibility in generated signal type is

Feb 26, 2026

Integrated photonics enabling ultra-wideband fibre-wireless ...

Here we present an ultra-wideband (UWB) integrated photonics scheme that facilitates fibre-wireless communication over a shared-bandwidth infrastructure.

Jul 31, 2025

Extreme Ultra-Wideband Optoelectronic

In this paper, we showed that an ultra wide-band FMCW system in the terahertz range can be realized with compact optoelectronic components

Mar 23, 2026

Chinese scientists develop world's first intelligent chip enabling full ...

Based on an advanced thin-film lithium niobate photonic material platform, they successfully developed an integrated chip capable of broadband wireless and optical signal

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