Niobium Lithium Oxide-Based Optical Modulator

Overview

In this paper, we propose an improved theoretical model of a chip-scale electro-optic (EO) microring modulator (EO-MRM) based on X-cut lithium–niobate-on-insulator (LNOI) with a hybrid architecture consisting of a 180-degree Euler bend in the coupling region, double-layer. In this paper, we propose an improved theoretical model of a chip-scale electro-optic (EO) microring modulator (EO-MRM) based on X-cut lithium–niobate-on-insulator (LNOI) with a hybrid architecture consisting of a 180-degree Euler bend in the coupling region, double-layer. Heterogeneously-integrated electro-optic modulators (EOM) are demonstrated using the hybrid-mode concept, incorporating thin-film lithium niobate (LN) by bonding with silicon nitride (SiN) passive photonics. At wavelengths near 1550 nm, these EOMs demonstrated greater than 30 dB extinction ratio. Abstract: Since the emergence of optical fiber communications, lithium niobate (LN) has been the material of choice for electro-optic modulators, featuring high data bandwidth and excellent signal fidelity. Conventional LN modulators however are bulky, expensive and power hungry, and cannot meet. These modulators, based on lithium niobate, offer a unique combination of performance, robustness, and reliability, even under extreme conditions, making them prime candidates to meet rigorous requirements of laser, sensing, communications, quantum or space applications.

Article Content

Ultrahigh-Efficiency Dual-Band Thin-Film Lithium

Here, a high-performance dual-band thin-film lithium niobate EO modulator with a low

Design and Analysis of Compact High–Performance

With the ever-growing demand for high-speed optical communications, microwave

Linearity-Enhanced integrated lithium niobate modulator based on ...

Abstract Highly linear electro-optic modulators are key components in analog microwave photonic links that convert

High-performance Hybrid Lithium Niobate Electro-optic Modulators ...

Abstract Heterogeneously-integrated electro-optic modulators (EOM) are demonstrated using the hybrid-mode concept,

Lithium niobate photonics: Unlocking the electromagnetic spectrum

Furthermore, the adoption of lithium niobate–integrated photonics in foundries is a promising approach to miniaturize essential bench

Integrated photonics on thin-film lithium niobate

Lithium niobate (LN), an outstanding and versatile material, has influenced our daily life for decades—from enabling high-speed

High-speed electro-optic modulation in topological interface ...

Electro-optic modulators are key components in data communication, microwave photonics, and quantum photonics.

Lithium Niobate Electro-Optic Modulators

These modulators, based on lithium niobate, offer a unique combination of performance, robustness, and

Design and Performance Analysis of Lithium Niobate-Based Optical

This paper presents the design and performance analysis of an Electro-Optic Modulator (EOM), specifically the Mach-Zehnder

Nanophotonic lithium niobate electro-optic modulators

Abstract: Since the emergence of optical fiber communications, lithium niobate (LN) has been the material of choice for electro-optic

Hybrid Silicon Nitride/Lithium Niobate Electro-Optical Modulator with ...

This work reports a heterogeneous silicon nitride/thin-film lithium niobate electro-optic Mach-Zehnder modulator based

Lithium niobate optical modulators: Devices and applications

Abstract Optical modulators, using acousto-optic, magneto-optic or electro-optic effects, as the principal components

Ultra-Low-Loss Slow-Light Thin-Film Lithium Niobate Optical Modulator

Here it is proposed and demonstrated a low-loss high-efficiency thin-film lithium niobate Mach–Zehnder modulator

Manipulation of nonlinear optical responses in layered ...

However, the physical origin and possible tunability of nonlinear optical responses in these materials remain to be

Polarization independent lithium niobate electro-optic modulator based ...

Here, based on guided mode resonance (GMR), a polarization independent LiNbO3 nanopillar metasurface

Advances in Electro-Optical Devices Enabled by Waveguide-Based

Lithium niobate (LN) materials have become a key platform for constructing core optoelectronic devices such as

A Broadband Thin-Film Lithium Niobate Modulator Using an ...

Thin-film lithium niobate (TFLN) modulators, characterized by their large theoretical bandwidth, low half-wave voltage,

High-Frequency and High-Linearity Lithium Niobate Electro-optic ...

Thin-film lithium niobate has attracted extensive attention for microwave photonics because of its properties of large

Lithium Niobate Electro-Optic Modulation Device without an ...

Electro-optic modulation devices are essential components in the field of integrated optical chips. High-speed, low

Lithium niobate photonic-crystal electro-optic modulator

Recently, thin-film lithium niobate (LN) emerges as a promising platform for photonic integrated circuits. Here, we

High-bandwidth CMOS-level integrated thin-film lithium niobate electro ...

In this work, we have designed a Mach–Zehnder electro-optic modulator based on thin-film lithium niobate for the 1064

Optical Modulator Mode Analysis Based on Lithium Niobate Thin Film

In this paper, how to construct an electro-optical modulator capable of reaching arbitrary crystal waveguide in the frequency range of

Thin-Film Lithium Niobate Modulators with Ultra-High Modulation ...

A Thin-film lithium niobate (TFLN) electro-optic modulator with transparent conductive oxide (TCO) film is proposed,

High-performance coherent optical modulators based on thin-film lithium ...

For nearly a decade, IQ modulators based on low-index-contrast lithium niobate (LiNbO3, LN) waveguides have been the mainstay

Compact and Efficient Thin-Film Lithium Niobate Modulators

With the development of thin- film lithium niobate (TFLN), the modulator can be made with a more compact size and higher ef ciency,

Dual-Optical-Modes-Based Polarization-Insensitive Thin-Film Lithium ...

A compact and high-speed polarization-insensitive thin-film lithium niobate electro-optic modulator is experimentally demonstrated.

Ultra-broadband near

Here, we co-design the passive components and modulation electrodes and demonstrate a high-speed TFLN EO

Ultrahigh-Efficiency Dual-Band Thin-Film Lithium Niobate Modulator ...

Here, a high-performance dual-band thin-film lithium niobate EO modulator with a low dielectric constant (low-k)

Integrated lithium niobate electro-optic modulators operating ...

On the other hand, lithium niobate electro-optic modulators, the workhorse of the optoelectronic industry for decades9, have been

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