

Article Overview

High-performance low-loss optical routers are available commercially from POLATIS and Cisco, and advanced research prototypes achieve sub-2% insertion loss for quantum and telecom applications.

Commercial Optical Routers

POLATIS Series 6000 The POLATIS Series 6000 is a fully non-blocking all-optical matrix switch available in sizes from 8x8 up to 192x192 ports. It features exceptionally low optical loss, fast switching speeds, compact size, and low power requirements. The switch supports Software-Defined Networks (SDNs) via OpenFlow and NETCONF interfaces, enabling low-latency routing for time-critical traffic in data centers and telecom networks. Its patented DirectLight(TM) optical switching technology is widely used in high-performance and defense applications, making it suitable for large-scale optical networks .

Cisco Routed Optical Networking Cisco offers routed optical networking solutions that integrate coherent pluggable optics directly from router ports, supporting DWDM functionality. These routers can transmit 400G wavelengths up to 120 km unamplified and extend long-haul transmission with OpenZR+ optics. They reduce network CapEx and OpEx by minimizing the need for transponders and optical transport equipment while maintaining low insertion loss and high bandwidth efficiency. Cisco's solutions are optimized for metro, DCI, and long-haul networks, supporting 100G/400G/800G switching performance .

Research-Grade Low-Loss Routers

Telecom L-Band Polarization-Maintaining Router Recent research demonstrates a low-loss, polarization-maintaining router for single and entangled photons at the telecom L-band. This interferometer-based router achieves 1.3% transmission loss, a switching extinction ratio above 22 dB, and over 99% polarization process fidelity. It is designed for quantum photonic networks and multi-photon entanglement synthesis, offering sub-3 ns switching times .

Arrayed Waveguide Grating Router (AWGR) A silicon-on-insulator 4x4 cyclic AWGR has been fabricated with low insertion loss, achieving a minimum loss of 1.1 dB and crosstalk below -22.7 dB. The design improves coupling efficiency and uniformity across all input-output ports, and it can be scaled to larger arrays for high-performance optical routing in telecom and data center applications .

Summary

For commercial deployment, POLATIS and Cisco provide robust low-loss optical routers suitable for high-speed, large-scale networks. For quantum or experimental applications, research-grade routers such as polarization-maintaining L-band routers and AWGRs offer extremely low insertion loss and high fidelity. When selecting a router, consider port count, insertion loss, switching speed, and compatibility with your network wavelength to ensure optimal performance.

To tackle such complex integrated interconnect technology systems, three-dimensional (3D) Optical Network-on-Chip

The author proposes, for future wavelength-division-multiplexing (WDM) optical networks, new wavelength routers with reduced

Three-Dimensional Optical Network-on-Chip (3D ONoC) has recently emerged as a high-performance on-chip

Here, we demonstrate a low-loss, polarization-maintaining router that switches an optical path of arbitrarily polarized heralded single

We recommend the TP-Link Archer BE900 as the best router. It's a Wi-Fi 7 router with truly top-of-the-line specs,

The interferometer-based router is constructed by optics with a low angle of incidence and cross-aligned electro-optic

In photonic quantum applications, optical routers are required to handle single photons with low loss, high speed, and

Low Insertion Loss and Non-Blocking Microring-Based Optical Router for 3D Optical Network-on-Chip
Abstract: With

We compared the performance of the designed routers with previously reported optical routers for the power insertion

In this work, we propose and experimentally demonstrate a low-loss, polarization-maintaining EO router compatible

However, their performance suffers from power losses and limited scalability. In this paper, we present two innovative designs of five

With support for Software-Defined Networks (SDNs) via embedded NETCONF and RESTCONF control interfaces, the POLATIS

In this paper, we present two innovative designs of five port non-blocking ONoC routers constructed by using micro



Low-loss optical routers available now

Ultra-low-loss optical fiber allows carriers and cloud operators to extend optical reach at very high data

Abstract: In photonic quantum applications, optical routers are required to handle single photons with low loss, high speed, and

The best gaming routers we've tested provide the speeds and low latency required for even the most

Web: <https://www.supremeacademicresearch.co.za>

