

Two fiber optic MZI sensors



Overview

The sensor integrates two parallel Mach-Zehnder interferometers (MZIs) within a dual-side hole fiber (DSHF). One of the MZIs detects temperature with the help of polydimethylsiloxane (PDMS), and the other detects RH using polyvinyl alcohol (PVA), labeled as MZI 1 and MZI 2. We have proposed and presented a hybrid mini-two-path Mach-Zehnder interferometer (MTP-MZI) sensor based on four-mode fiber (FMF), where the reference path comprises of a section of a single-mode fiber (SMF), and the sensing path adopts a structure of SMF-FMF-SMF (SFS). By attaching an acoustic driver in between the fixed ends of an HCF, we fabricated two acousto-optic modulators (AOMs) with distinct. A novel, to the best of our knowledge, highly sensitive, and compact optical fiber sensor for measuring temperature and relative humidity (RH) is proposed and demonstrated.

Article Content

A Mini-Two-Path Mach-Zehnder Interferometer Sensor

In this paper, we propose an MTP-MZI sensor based on FMF. This sensor directly fuses an SFS and a section of SMF through discharge, forming a

Cascaded MZI and FPI Sensor for Simultaneous

In this paper, we propose and experimentally demonstrate a dual-parameter fiber optic sensor, which combines a Fabry-Perot interferometer (FPI)

Highly Sensitive Multiparametric Sensors Based on Mach-Zehnder ...

An all-fiber Mach-Zehnder interferometer (MZI) sensor for measuring temperature (low and high), curvature, strain, refractive index (RI), and taper curvature is proposed and experimentally

MZI-SPR fiber optic strain sensor with in-situ ...

Abstract Fiber optic strain and temperature sensors have important application value in fields such as petrochemicals and in-situ monitoring of batteries. This article proposes a Mach

Sensitivity-Enhanced Curvature Mini-Two-Path Mach-Zehnder ...

This paper presents a mini-two-path Mach-Zehnder interferometer (MTP-MZI) curvature sensor based on a seven-core fiber (SCF). The sensor consists of a reference path using a single

Dual-MZI sensitivity-enhanced U-shaped microfiber Vernier probe for ...

Here, the double-tapered single-mode fiber serves as the reference MZI, while the U-shaped microfiber functions as the sensing MZI. By precisely matching the free spectral ranges of

In-Fiber Mach-Zehnder Interferometers for Sensing

In-fiber Mach-Zehnder interferometers (MZIs) are based on the interference between two light beams transmitted in the functional optical fiber. They have the advantages of compact

[2409.09148] Widely tunable dual acousto-optic interferometric device ...

An all-fiber dual Mach-Zehnder interferometer (MZI) based on an acoustically modulated hollow-core fiber (HCF) is experimentally demonstrated for the first time.

Integrated temperature and humidity sensor based on

A novel, to the best of our knowledge, highly sensitive, and compact optical fiber sensor for measuring temperature and relative humidity (RH) is

Optical Fiber Sensors for High-Temperature Monitoring: A Review

Typical types of MZI sensors for high-temperature measurements realized with optical fiber tapers (a, b), core diameter mismatch (c, d), trench structure (e, f), laser micromachining (g, h): (a) MZI consists of

Highly sensitive humidity sensor based on aluminum-core liquid-metal ...

The microcavity MZI configuration is constructed by splicing three sections of single-mode fiber (SMF) and multimode fiber (MMF) with a large lateral offset. This thermo-optic transduction strategy

Multi-tapered polarization-maintaining fiber-optic sensor for ...

Abstract In this paper, a fiber-optic refractive index and temperature sensor based on Mach-Zehnder interferometer (MZI) is designed and fabricated. The sensor structure consists of a

Turning Fiber into a Sensing System: The Magic of

Imagine a world where the Internet doesn't just connect but senses—detecting earthquakes, monitoring battery health, or safeguarding

Low-Cost FBG Interrogator Using Random Nanoparticle-Doped Fiber

The use of fiber Bragg gratings (FBGs) is widespread in a broad range of applications. However, one of the main drawbacks is the cost and practicality of FBG interrogation systems, which are generally

Simultaneous Measurement of Seawater Salinity and Temperature

In this article, an optical fiber temperature sensor with high sensitivity and a wide detection range based on a Mach-Zehnder interferometer (MZI) is proposed and experimentally

Fiber-integrated acousto-optic-modulator-based phase-controlled

Here, we demonstrate a fiber-integrated MZI architecture in which the interferometric phase is controlled electronically by a pair of double-pass acousto-optic modulators (AOMs).

Fabrication and Sensing Characteristics of Long-Period Fiber Grating

The two output ends of each coupler are approximately equal in length, to ensure that the optical path variations of the MZI only result from the differences in the lengths between the two HC

The growth of the global Fiber Optic Current Sensors (FOCS)

The Fiber Optic Current Sensors (FOCS) market is poised for significant growth, projected to expand at a CAGR of 10.2% from 2026 to 2033.

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