

Classification of Fiber Optic Interferometer Sensors



Article Overview

Fiber optic interferometer sensors are primarily classified into Fabry-Perot, Mach-Zehnder, Michelson, and Sagnac types, each with unique configurations and sensing capabilities.

1. Fabry-Perot Interferometer (FPI)

Fabry-Perot interferometers consist of two parallel reflecting surfaces forming an optical cavity, where interference occurs due to multiple reflections between the surfaces. FPIs are further classified into:

- Extrinsic FPI: The cavity is external to the fiber, allowing easy access for measuring refractive index or liquids. It offers high finesse and simple fabrication.
- Intrinsic FPI: The cavity is formed within the fiber itself, often requiring precise micro-machining. This design is compact and suitable for high-sensitivity applications. FPIs are widely used for temperature, strain, pressure, and refractive index sensing due to their high resolution and sensitivity .

2. Mach-Zehnder Interferometer (MZI)

Mach-Zehnder interferometers split light into two separate paths, with one path interacting with the measurand. The recombination of the beams produces interference patterns that encode changes in optical path difference. MZIs can be implemented using photonic crystal fibers or double-cladding fibers and are suitable...

Article Content

Fiber Optic Sensors: Fundamentals, Principles & Applications

Optical Fiber (Transmission Medium, Sensing Element) Light modulated due to interaction with parameter of interest (Measurand)

Applications of Fiber-Optic Interferometry Technology in Sensor Fields

As an important branch of measurement technology, now the fiber-optic interferometry technology, based on fiber

Optical Fiber Sensors: Classification & Applications

Abstract— Beside advantages; recent advances and cost reductions has aroused interest in optical fiber sensing. So, the outgrowths

Optical Fiber Interferometers and Their Applications

optical fiber interferometer (OFI) (Freitas, 2011). The optical fiber interferometers can be employed as biochemical sensors (Gopel et

Fiber-Optic Microstructure Sensors: A Review

Each FOM sensor has been introduced in the terms of structure types, fabrication methods, and their sensing applications.

Types and Optical Characteristics of Optical Fiber Interferometers

A fiber optical sensor that operates based on the phase change of light waves due to external physical quantities is

Fiber Optic Sensors: Short Review and Applications

An extensive review of optical fiber sensors and the most beneficial applications is presented in this chapter. Although

Fiber Optic Sensor

This paper reviews the fiber optic sensors that have been developed and applied to measure cable forces, including fiber Bragg

(PDF) Optical Fiber Sensing Technology: Basics, Classifications and ...

In this paper, the current state of art of optical fiber sensing technology is reviewed. The basics of operating principle

A comprehensive review of using optical fibre interferometry for ...

Unlike existing studies, this work emphasizes the continuous adaptation and classification capabilities of deep learning

Fiber Optic Interferometer: Fundamentals and Applications

The book also classifies and discusses holistic signal processing technologies for different types of interferometers. Furthermore, it

Recent advancements and future challenges in hybrid optical fiber ...

This paper presents the recent advances and future challenges of the hybrid interferometers based on fiber optics.

Fiber optic interferometers

Fiber optic interferometers are employed to measure different physical magnitudes such as temperature, strain,

Fiber-optic sensor

A fiber-optic sensor is a sensor that uses optical fiber either as the sensing element ("intrinsic sensors"), or as a means of relaying

In-Fiber Interferometric-Based Sensors: Overview and Recent

Optical fiber interferometry is a measurement method characterized by high sensitivity and a very large dynamic range.

(PDF) Reflectometric and interferometric fiber optic sensor's ...

Both interferometric and reflectometric fiber optic sensors are becoming popular for their ease of use, flexibility, long distance

Distributed optical fiber sensing: Review and perspective

Distributed optical fiber sensors characterized by spatially resolved measurements along a

In-Fiber Interferometric-Based Sensors: Overview and Recent

In-fiber interferometric-based sensors are a rapidly growing field, as these sensors exhibit many desirable

Optical Fiber Sensing

Optical fiber sensing refers to the use of optical fibers to measure various parameters such as temperature, strain, and pressure by

Review of Fiber Optic Displacement Sensors

This article reviews specifically the advanced fiber optic displacement sensing techniques that have been developed in the past two

Interferometric Fiber Optic Sensor

There are various optical fiber sensor types being developed for health monitoring applications. The most common of these is fiber

In-Fiber Interferometric-Based Sensors: Overview and Recent Advances

This article is a comprehensive overview of the different types of in-fiber interferometric sensors that presents and discusses recent

Chronology of Fabry-Perot Interferometer Fiber-Optic Sensors and

The article presents the results of mathematical modeling of a fiber-optic humidity sensor based on an in-fiber Fabry

Optical Fiber Sensors Guide

Optical fiber sensors offer attractive characteristics that make them very suitable and, in some cases, the only viable sensing

Optical Fiber Interferometers and Their Applications

The phenomenon of interference of light is used in many high precision measuring systems and sensors. The optical path can be

Optical Fiber Sensors and Sensing Networks: Overview of the Main ...

Therefore, the integration of optical fiber sensors in WSNs introduces benefits and new capabilities for the design of advanced hybrid

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