

Function of Magnetic Ring Fiber Optic Sensor



Overview

In this paper, based on a ring-shaped structure, an intensity demodulation fiber-optic sensor is explored and experimental verified. The Higher Educational Key Laboratory for Flexible Manufacturing Equipment Integration of Fujian Province, Xiamen Institute of Technology, Xiamen 361021, China The State Key Laboratory for Mechanical Manufacturing Systems Engineering, Xi'an Jiaotong University, Xi'an 710054, China Shandong. Here we propose a high-resolution fiber ring magnetometer based on laser frequency stabilization technology. By connecting one output port to an input port of a fiber coupler with a splitting ratio of 1:99, the fiber ring resonator (FRR) generates a series of highly narrow transmission resonances. Several scalar and vector magnetometers have been proposed in the recent past by exploiting the coating of magneto-optical materials like yttrium iron garnet, silk fibroin hydrogel, Fe_3O_4 / NiFe_2O_4 plasmons, magnetostrictive materials like Trefenol-D, etc.



Article Content

Jun 10, 2026

Fiber structures and material science in optical fiber magnetic field ...

The applications of optical fiber magnetic field sensors as current sensors, geomagnetic monitoring, and quasi-distributed magnetic sensors are presented. In addition, challenges and future

Apr 12, 2026

Preparation and application of microfiber resonant ring sensors: A ...

Due to its advantages of strong evanescent field, optical limiting, easily integrating with common single-mode fiber, the micro-nano optical fiber has gotten a worldwide attention in recent

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High-resolution fiber ring magnetometer based on TbDyFe cake

To improve the resolution of the optical sensor based on magnetostrictive material, a high-resolution fiber ring magnetometer based on TbDyFe cake is proposed. By connecting one of output

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(PDF) 2D-Vector Magnetic Sensing Based on Ring

In this work, a novel fiber-optic sensor for 2D magnetic sensing is explored based on nanostructured magnetic fluid. The fiber-optic sensor

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This review provides a comprehensive overview of magneto-sensitive coating material-based interfacing technologies, including composite fiber-optic magnetic field sensors, and a

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High-resolution optical fiber ring magnetic field sensor

The high-resolution measurement of magnetic field is of great significance in scientific research and production. Here we propose a high-resolution fiber ring magnetometer based on laser

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Fiber Optic Sensors Based on the Faraday Effect

Some 175 years ago Michael Faraday discovered magnetic circular birefringence, now commonly known as the Faraday effect. Sensing the magnetic

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High-precision magnetic field sensor based on phase-shift fiber loop ...

A compact fiber-optic magnetic field sensor based on edge filtering method is proposed and experimentally demonstrated by using low-cost intensity interrogation.

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Fiber structures and material science in optical fiber magnetic field ...

Among the numerous types of optical fiber magnetic field sensors, this paper intends to present sensors based on structured fibers with functional materials. The sensing structure and

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Fiber-loop ring-down magnetic field and temperature sensing system ...

A combined magnetic field and temperature sensing system based on the principle of time-division multiplexing was developed. A fiber-loop ring-down technique was introduced to enhance the

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By converting the magnetic and electrical signals into optical phase signals, the sensitivity and stability of the sensor can be significantly optimized. The coupling of optical fiber and

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Optical Fiber Sensors Based on Fiber Ring Laser

A review for optical fiber sensors based on fiber ring laser (FRL) demodulation technology is presented. The review focuses on the principles,

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Fiber Optic Sensors: Types, Working Principle

Explore fiber optic sensors: their working principles, types (intrinsic, extrinsic, hybrid), and diverse applications in mechanical, chemical, and structural health monitoring.

Jan 09, 2026

Highly-sensitive magnetic field sensor based on fiber ring laser

Citations (25) References (20) Abstract A highly sensitive magnetic field sensor based on a fiber ring laser has been proposed and experimentally demonstrated.

Dec 21, 2025

High-sensitivity and directional-identification fiber magnetic field ...

Abstract A highly sensitive fiber magnetic field sensor with directional identification utilizing multi-longitudinal-mode fiber ring laser (FRL) based on polarization-mode beat frequency (PMBF) is

Nov 26, 2025

Magnetic sensing technology of fiber optic interferometer based on ...

Fiber optic magnetic field sensors have attracted much attention because of their high sensitivity, small size, good portability, corrosion resistance and long-distance transmission.

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A Novel Fiber Optic Ring Cavity Oscillating DC Magnetic Field

Magnetic field sensing has important application value in multiple fields. In recent years, new application requirements for magnetic field sensing technology have been proposed, such as high accuracy,

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2D-Vector Magnetic Sensing Based on Ring-Shaped

The fiber-optic sensor comprises a ring-shaped fiber structure that is coated with magnetic fluid. The unique magneto-optical characteristic of the

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All-fiber optic magnetic sensor based on PS-FLRD technique with ...

This paper proposes and experimentally demonstrates a highly stable and sensitive all-fiber magnetic field sensor based on the phase-shifted loop ring-down (PS-FLRD) technique. The

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Fiber Loop Ringdown — a Time-Domain Sensing

Fiber loop ringdown (FLRD) utilizes an inexpensive telecommunications light source, a photodiode, and a section of single-mode fiber

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Magnetic Field Sensors Based on Optical Fiber

This chapter is focused in the different optical structures and materials that have been used for the development of optical fiberOptical optical fiber magnetic field sensors and optical fiber

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FIBER OPTIC MAGNETIC SENSORS

This chapter discusses the theory and operation of fiber optic magnetic sensors, including magnetostriction-based interferometric sensors, Faraday effect sensors, and Lorentz force sensors.

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Optical Fiber Magnetic Field Sensors Based on Magnetic Fluid: A

Furthermore, magnetic fluid (MF) is a new type of functional material which possesses outstanding properties, including Faraday effect, birefringence, tunable refractive index and field

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Magnetic Field Sensing System Based on 1550 nm Ring Fiber Laser

Optical fiber magnetic field sensor plays an important role in fiber sensing field. This paper proposed a magnetic field sensing system based on ring cavity fib.

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Fiber optic magnetic field sensor based on a magnetic

A magnetic field sensing system based on a phase-shift fiber loop ring-down (FLRD) technique and multi-mode interferometer (MI) coated with

Apr 14, 2026

Special Issue "Fiber Optic Sensors and Applications": An Overview

We present here the recent advance in exploring new detection mechanisms, materials, processes, and applications of fiber optic sensors. Keywords: fiber optic sensors, detection mechanisms, materials,

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Fibre optic magnetic field sensor based on core-offset bending ...

Abstract This paper proposes a novel fibre optic magnetic field sensor based on core-offset bending structure cascaded with Fiber Bragg Grating (FBG). The sensor is fabricated by

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