

Fiber Optic Infrasound Sensing



Overview

The schematic diagram of the optical fiber EFPI sensing system is shown in Fig. 6. The optical part of the sensing system consists of a 1570 nm DFB laser source (long-term stability: $\leq \pm 0.02$ dB), a fiber optic circulator, and an EFPI infra. The schematic diagram of the optical fiber EFPI sensing system is shown in Fig. 6. The optical part of the sensing system consists of a 1570 nm DFB laser source (long-term stability: $\leq \pm 0.02$ dB), a fiber optic circulator, and an EFPI infrasound sensor head. The output optical signal will be converted into an electrical signal by the photodetector (. Acoustics is a branch of physics, an ancient and developing discipline. Along with the continuous development of science and technology, acoustic research has gradually penetrated into other various natural science fields. Besides, it is promoting the germination and growth of many marginal disciplines, and also organically combining with other dis. 2.2.1 Design Guidelines of the Sensor HeadIt is mentioned in the introduction section that in combination with the actual requirements for sensitivity and sensor element size, it is necessary to design an interference-type small-sized sensing structure. The FP structure is generally realized in the interference structure, and the infrasound acoustic coupling cavity (high-pressure microphone calibrator, B&K 4221) requires a 1/2-in. sensor head, while the FP structure inline is too small, so the external cavity FP structure is selected. 2.2.2 Manufacturing ProcessThe schematic diagram of the manufacturing process of the optical fiber EFPI infrasound sensor is shown in Fig. . The performance of the EFPI infrasound sensor in this chapter is compared with the recently reported schemes. The sensitivity value, frequency range, advantages, and disadvantages are listed in Table 1. It can be seen from the comparison that our fiber EFPI infrasound sensor has a great improvement in technical indicators and structural optimizatio.

Article Content

Aug 12, 2025

An Optical Fiber Infrasound Sensor

Abstract We have designed a new type of infrasonic sensor using optical fibers as distributed sensing elements. The design addresses the limitations of mechanical spatial filters used to average wind

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This review highlights the progress of infrasound sensing technologies (ISTs), emphasizing the transition from traditional sensors to modern microelectromechanical system (MEMS) sensors.

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An optical fiber infrasound sensor | The Journal of the Acoustical ...

The optical fiber sensor can average over kilometer-scale lengths of arbitrary geometry with an averaging bandwidth governed by the speed of light and thus should offer significant practical

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An Optical Fiber Infrasound Sensor

The Optical fiber Infrasound Sensor (OFIS) is constructed from a compliant, sealed tube wrapped with optical fibers to interferometrically sense deformations in the tube caused by pressure fluctuations.

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US6788417B1

Optical fiber infrasound sensor Abstract Infrasound signals in the band 0.02 to 4 Hz are sensed in the presence of ambient noise generated chiefly by wind as integrated pressure variations, which induce

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The fiber optic based pressure and infrasound detection system consists of an equal-arm Michelson (or Mach-Zehnder, or equivalent) interferometer having optic fiber pressure sensors...

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Fiber Optic Sensing Association (FOSA)

Fiber optic sensing is used around the world to monitor smart infrastructure, including tunnels, railways, bridges, borders, power stations and pipelines. It is also used in down hole oil and gas applications,

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The Optical Fiber Infrasound Sensor (OFIS) is an interferometric pressure transducer consisting of a pair of optical fibers helically wrapped about a

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Abstract—An infrasound sensor based on extrinsic fiber-optic Fabry-Pérot interferometer (EFPI) structure is reported and demonstrated. The transducer part of this sensor is a composite film ...

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Mechanical Filter-Based Differential Pressure Fiber-Optic Fabry-Perot ...

Abstract: A differential pressure fiber optic infrasound sensor based on a mechanical filter was developed, for the detection of infrasound within the frequency range of 0.01--1 Hz. The sensing unit

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(PDF) Mechanical Filter-Based Differential Pressure

Abstract A differential pressure fiber optic infrasound sensor based on a mechanical filter was developed, for the detection of infrasound within the

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Miniaturization and Autonomous Deployment of the Optical Fiber Infrasound Sensor
December 2010 Conference: 2010 Fall Meeting of the

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Design of a New Type of Optical Fiber Infrasound Sensor and Its U ...

In this study, the demand of optical fiber (OF) sonic sensor is analyzed, and a composite OF infrasound sensor is proposed aiming at the detection demand of low-frequency infrasound waves in specific

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Fiber-Based Infrasound Sensing

Fiber-Based Infrasound Sensing Shun Wang, Wenjun Ni, Liang Zhang, Ping Lu, Yaowen Yang, and Lei Wei Abstract With the maturity of optical fiber sensing technology, its related applica-tions have

Nov 10, 2025

Design of the Optical Fiber MEMS Infrasound Sensor

An optical fiber infrasound sensor based on Microelectromechanical System (MEMS) is designed in this paper. Static performance of several sizes of membranes which are the core elements of the

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Highly sensitive Fabry-Perot acoustic sensor based on optic fiber ...

In this letter, we have successfully developed a Fabry-Perot acoustic sensor based on the spherical end face of optical fiber. The sensor head is an external Fabry Perot cavity structure, which

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