

Applications of Fiber Bragg Grating Demodulation Systems

Article Overview

Fiber Bragg Grating (FBG) demodulation systems are widely used for precise measurement of physical parameters such as temperature, strain, pressure, and vibrations across industries like aerospace, civil engineering, and structural health monitoring.

Structural Health Monitoring (SHM)

FBG demodulation systems are extensively applied in monitoring the integrity of structures such as bridges, buildings, and pipelines. By detecting strain and stress changes, these systems provide early warnings of structural fatigue or damage, enabling preventive maintenance and enhancing safety. Their resistance to electromagnetic interference and harsh environments makes them ideal for long-term monitoring in challenging conditions .

Aerospace and Aviation

In aerospace applications, FBG sensors are used to measure strain, temperature, and vibration on aircraft components. Accurate demodulation of the FBG wavelength allows engineers to monitor structural loads and thermal effects in real time, improving safety and performance while reducing the need for bulky electrical sensors .

Civil Engineering...

Article Content

Sep 21, 2025

Review of fiber Bragg grating interrogation techniques based on array ...

The future development of fiber Bragg grating demodulation system is proposed from three aspects: new materials, system

Jun 02, 2026

Fiber Bragg grating (FBG)-based sensors: a review of technology and ...

Fiber Bragg grating (FBG)-based sensors: a review of technology and recent applications in structural health

Oct 26, 2025

Improvement of Fiber Bragg Grating Wavelength Demodulation

Abstract: A high-performance, low-cost demodulation system is essential for fiber-optic sensor-based measurement applications.

Feb 13, 2026

Fiber Bragg grating sensors: principles and applications

Their side-writing technique makes a Bragg grating directly in the fiber core using a holographic interferometer illuminated with a

Mar 25, 2026

Advances in Fiber Bragg Grating (FBG) Sensing: A Review of

Fiber Bragg grating (FBG) sensors have emerged as efficient sensing devices in various fields due to their unique

Feb 02, 2026

Accurate and fast calibration for FBG demodulation based on deep ...

Accurate and rapid demodulation plays a crucial role in fiber Bragg grating (FBG) sensing systems. The Fabry-Perot

Jun 03, 2026

Research on Wavelength Demodulation Algorithm for Fiber Bragg

Demodulation experiments show that the demodulation method used in this paper has the advantages of small

Jun 02, 2026

Demodulation method for vibration sensors of ultra-weak Fiber Bragg ...

Simulation and experimental findings demonstrate that FMD can effectively eliminate the information of environmental

Nov 03, 2025

Design of Real-Time Demodulation for FBG Sensing Signals Based

Accurate real-time temperature measurement under extreme thermal-pressure conditions remains challenging in

Mar 30, 2026

Active Wavelength Control of Fiber Bragg Gratings: A Systematic

Fiber Bragg gratings (FBGs) have evolved from passive sensing elements into actively programmable photonic components,

May 28, 2026

Fast Demodulation of Fiber Bragg Grating Wavelength From Low

Our method provides a real-time demodulation scheme to track FBG wavelength using low-resolution spectrometers or

Dec 14, 2025

Fibre Bragg Grating Based Acoustic Emission Measurement System

Fiber Bragg grating (FBG)-based acoustic emission (AE) detection and monitoring is considered as a potential and

May 18, 2026

Fiber Bragg grating

A fiber Bragg grating (FBG) is a type of distributed Bragg reflector constructed in a short segment of optical fiber that reflects

Oct 05, 2025

Design of Fiber Grating Demodulation System Based on Tunable F-P

In this paper, a photoelectric conditioning circuit for fiber Bragg grating demodulation is designed. The experimental

Sep 16, 2025

CNN-Assisted Demodulation Approach for Fiber Bragg Grating

This article presents a new demodulation method from the reflection specklegrams of fiber Bragg grating (FBG)

Dec 15, 2025

Demodulation of Fibre Bragg Grating Sensors by Using Cumulative

Fibre Bragg gratings are one of the most popular sensors with a huge number of applications. Their most important

Jun 04, 2026

A three-points tracking-based high-speed fiber Bragg grating ...

A three-points tracking-based high-speed fiber Bragg grating (FBG) demodulation method based on wavelength

Oct 01, 2025

A Tracking-Based High-Speed Demodulation Method for Fiber Bragg

In this article, a tracking-based high-speed demodulation method for FBG sensing systems based on the wavelength

Jun 20, 2026

PLC-Based Arrayed Waveguide Grating Design for Fiber Bragg

A fiber Bragg grating (FBG) interrogator is a scientific instrument that converts the wavelength change of FBG

May 21, 2026

Demodulation Algorithm for Fiber Bragg Grating Sensors

A demodulation algorithm is vital for a fiber Bragg grating (FBG) sensing system. In this paper, a novel demodulation algorithm based

Apr 13, 2026

High-Speed Demodulation of weak FBGs Based on Microwave

A high speed quasi-distributed demodulation method based on the microwave photonics and the chromatic dispersion effect is

Jul 16, 2026

Developed machine learning algorithm for fiber Bragg grating sensor ...

This research presents a novel machine learning algorithm based on the Gaussian Mixture Model (GMM) to enhance

Apr 08, 2026

Fibre Bragg Grating Wavelength Shift Demodulation with Filtering

A novel approach to fibre Bragg grating spectra processing is proposed. The method is based on the use of nonlinear

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FBG Arrays for Quasi-Distributed Sensing: A Review

Fiber Bragg grating (FBG) array is a powerful technique for quasi-distributed sensing along the entire length of

Aug 09, 2025

Fast and High-Precision Shape Sensing Based on Dual-Comb Fiber Bragg ...

This paper presents an innovative and efficient shape-sensing approach for optical fiber Bragg grating (FBG) arrays,

Apr 16, 2026

Demodulation Algorithm for Fiber Bragg Grating Sensors

Keywords: fiber Bragg grating, demodulation algorithm, variable step size, correlation coefficient A demodulation algorithm is vital for

Jan 21, 2026

Design and Verification of an 850 nm Fiber Bragg Grating

This work presents a practical and high-precision wavelength demodulation method for 850 nm FBG sensing based

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