

Using a spectrometer and fiber optic temperature sensing



Overview

This chapter briefly introduces temperature field measurement with optical fiber distributed temperature sensor (DTS), fiber Bragg gratings (FBG), and tunable diode laser absorption spectroscopy (TDLAS) based on the research content in our laboratory. This paper reviews the sensing principle, structural design, and. A generic new data processing method is developed to accurately calculate the absolute optical path difference of a low-finesse Fabry-Perot cavity from its broadband interference fringes. The method combines Fast Fourier Transformation with nonlinear curve fitting of the entire spectrum. Modular. Abstract: Fiber-optic sensing of temperature and strain over many advantages over electronic sensors. Fiber-Bragg-Gratings (FBGs) are used for spot sensing, whereas Rayleigh, Brillouin and Raman scattering are used for distributed sensing in long fibers. In this article, these sensor principles are.

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The advantages of this technique are demonstrated through high performance fiber optic temperature sensors consisting of an infrared superluminescent diode and an infrared spectrometer.



This paper describes a fiber-optic temperature sensor that uses a spectrum-modulating SiC etalon. The spectral output of this type of sensor may be analyzed to obtain a temperature measurement which is ...



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To address this, an integrated fiber-optic sensing approach is presented. A tapered fiber segment is employed to generate leaky-mode speckle patterns, with geometric parameters and a ...



A fiber-optic temperature sensor with a silicon Fabry-Perot interferometer (FPI) using spectral low-coherence interferometry (channeled spectrum) was implemented to measure cryogenic ...



A high-sensitivity fiber optic temperature sensor based on the enhanced harmonic Vernier effect (HVE) is proposed, which consists of two Fabry-Perot interferometers (FPI) that are...



In recent times, the search for improved temperature sensors has led to the inclusion of temperature-sensitive nanoparticles in optical-fiber settings. In this work, we use NaYF₄:Yb³⁺/Er ...



This paper reviews the sensing principle, structural design, and temperature measurement performance of fiber-optic high-temperature sensors, as well as recent significant progress in the transition of ...



This study addresses the issues of strong data dependency and limited prediction accuracy in temperature prediction using optical fiber spectroscopy technology by proposing a small-sample ...

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