Coupling Mechanism of Long-Period Fiber Gratings

Overview

A long-period fiber grating couples light from a guided mode into forward propagating cladding modes where it is lost due to absorption and scattering. This paper presents a review of the evolution of LPFGs, with a specific focus on the progression and current trends of mechanically induced long-period fiber gratings. It is an optical fiber. Arc-Induced Long-Period Fiber Gratings at INESC TEC. Part II: Properties and Applications in Optical Communications and Sensing - PMC As a library, NLM provides access to scientific literature. Inclusion in an NLM database does not imply endorsement of, or agreement with, the contents by NLM or the. In this paper, we rigorously deduce the coupled-mode equations of a long-period fiber grating and fiber Bragg grating in their cascaded structure (CLBG), based on coupled-mode theory. Next, through the difference iterative method, the total transfer matrix of CLBG is obtained.

Article Content

Advances on Mode-Coupling Theories, Fabrication Techniques, and ...

Abstract:In this paper, we have briefly review the developing history and recent advances made with regard to helical long-period fiber gratings (HLPGs) in three aspects, i.e., the mode-coupling

Mechanically Induced Long-Period Fiber Gratings and

Abstract and Figures Long-period fiber gratings (LPFGs) functioning as band-reject filters have played a pivotal role in the realm of optical

Long Period Gratings in New Generation Optical Fibers

2. Long period gratings: a view back Long Period Gratings are a periodic perturbation of the properties of the optical fiber, generally of the refractive index of the core and/or geometry, in a single mode fiber.

Fiber Bragg grating sensors for monitoring of physical

Fiber Bragg grating technology is popularly used in measurements of various physical parameters, such as pressure, temperature, and strain for civil

High strength coupling and low polarization-dependent long-period fiber ...

A compact helicoidal long-period fiber grating (HLPFG) was fabricated by twisting a single mode fiber with CO 2 laser beam exposure and its characteristic was experimentally investigated.

Mode-Coupling and Propagation in a Deeply-Tapered Few-Period Long ...

In this study, the underlying mechanism for mode coupling and propagation in a strongly-coupled few-period long-period fiber grating (LPG) is firstly revealed both theoretically and

Theory of Fourier mode coupling for long-period fiber gratings

A novel theory, namely, Fourier mode coupling (FMC) theory for long-period fiber gratings (LPFGs) is proposed in this paper.

Long-Period Fiber Gratings for Mode Coupling in Mode-Division ...

We study the design of such mode scramblers implemented as long-period multimode fiber gratings for systems using D = 12 modes (six spatial modes). By optimizing the grating chirp

(PDF) Long-period refractive index fiber gratings:

Experimental investigation of the cladding modes excited by long-period gratings, as well as sensitivity of the long-period grating spectrum to

Coupling mechanism and sensing properties of cascaded long

Based on the coupled-mode theory, the coupling mechanism of cascaded long-and short-period gratings (CLBGs) is analyzed, and the reflection spectrum with two reflection peaks resulting

Development of Long-Period Fiber Grating Coupling Devices

A long-period fiber grating (LPFG) formed in a single-mode fiber is considered as an effective device to tap light from the core of fiber. This light-tapping property of the LPFG allows a

Multi-Mode Coupling in Long-Period Fibre Gratings

The analytical solution to three-mode coupling equations is presented for the first time. A 3 × 3 transmission matrix is attained and can be used to calculate the transmission spectra of

Long period fiber grating-based biosensing: Recent trends and future ...

Decades have passed since the first demonstration of a long-period fiber grating (LPFG) and its practical application for sensors, and, in this period, manufacturing techniques, sensitivity

Mechanically Induced Long-Period Fiber Gratings and

It offers a concise overview of coupled-mode theory, the fabrication processes, the merits, and the limitations associated with mechanically induced

Long-period fiber grating

A long-period fiber grating couples light from a guided mode into forward propagating cladding modes where it is lost due to absorption and scattering. The coupling from the guided mode to cladding

Rigorous theoretical analysis of reflection and transmission spectra ...

In this paper, we rigorously deduce the coupled-mode equations of a long-period fiber grating and fiber Bragg grating in their cascaded structure (CLBG), based on coupled-mode theory. Next, through the

Mechanically Induced Long-Period Fiber Gratings and Applications

Nowadays, a principal application of such band-reject filters in fiber optics is embodied in the optical fiber sensor technology. This manuscript is dedicated to exploring the advancement of

Arc-Induced Long-Period Fiber Gratings at INESC TEC. Part II ...

Long-period fiber gratings (LPFGs) exhibit resonances at specific wavelengths as a result of coupling of the core mode to discrete cladding modes and can work as wavelength selective optical filters.

Long-Period Fiber Gratings

For the sensing application of the LPFGs, the characteristics of gratings on the temperature, strain, bending, torsion, and surrounding refractive index have been summarized. And their applications as

Long Period Fibre Gratings

The strain response of a long-period fibre grating arise due to the physical elongation of the fibre, changing the grating pitch and the effective refractive index of the core and cladding due to the

Advances on Mode-Coupling Theories, Fabrication

In this paper, we have briefly review the developing history and recent advances made with regard to helical long-period fiber gratings (HLPGs) in three

Long-Period Fiber Grating Sensors Based on High Order Mode Coupling

We demonstrate the fabrication of long-period fiber gratings and helical long-period gratings in specialty fibers using focused carbon dioxide laser. The mode coupling and sensing

Recent Advancement in Long-Period Fiber Grating (LPFG)

The long-period fiber gratings can reduce human involvement in the process and help for improvement in performance and operating costs. Various optical techniques like ellipsometry and

Understanding the Mode Coupling Process in a Strong Long Period Grating

A long period grating (LPG) is a longitudinal periodic optical structure that drives couplings from the fundamental core mode into phase-matched co-propagating cladding modes of an optical

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