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DISTRIBUTED CHARACTERIZATION SYSTEM AND METHOD OF VARIATIONS OF THE REFRACTIVE INDEX OF AN OPTICAL FIBER.

Patent
ES2622354

Code

TIC_UAH_17

Application areas

- Information and Communication Technologies
- Measurements and standards

Type of Collaboration

- Technical cooperation
- Commercial agreement and Technical assistance
- License agreement

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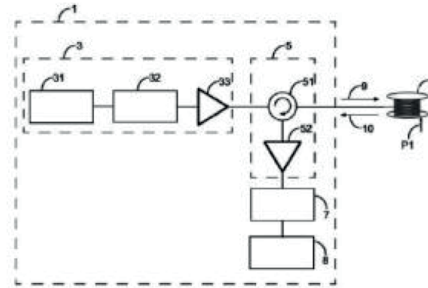
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ABSTRACT

This invention proposes a system and a method for distributed measuring of local variations of refractive index between different states of an optical fiber, for comparison of amplitude profiles of Rayleigh scattering, generated in two different states of the fiber by two light pulses of snapshot frequency, variable in time and invariant between pulses. The system consists in:

- Emission media that generate optical pulses with a same profile of instantaneous frequency, being this frequency variable along a single pulse.
- Receiving media that receive the backscattered optical signals, connected to the same end of the fiber of the emission medias (by an optical circulator)
- Detection media that measure, at least, the amplitude profile of the backscattered optical signals.
- Computing media that calculate the local variations of refractive index, occurring between different states of the optical fiber.

The system further comprises, distributed expansion means that amplify the signal emitted into the optical fiber, allowing the characterization of longer lengths of fiber. The method consists in:

- Generate and transmit the optical signals described through a fiber under test. Receive the backscattered optical signals generated in the fiber at the same end of the fiber than the transmission
- Measure the amplitude profiles of the backscattered optical signals, using a photodetector whose exit serves as an entrance to a digital mean, such as an oscilloscope.
- The method may include, the measuring of the amplitude and frequency profiles of the pulse optical signal or use some other stored. Calculate the local variations of refractive index of the fiber occurred between different states of the fiber.
- Computing media that calculate the local variations of refractive index, occurring between different states of the optical fiber.

With the system, method and computer program of the invention, a measure of the local variations of refractive index of the fiber, with high spatial resolution, high sensitivity and high speed is obtained.

ADVANTAGES AND INNOVATIONS

The invention provides a characterization of high spatial resolution, sensitivity and speed, requiring a single pulse to characterize a state of the optical fiber instead of using frequency sweeps in multiple pulses.

Limited number of elements and therefore reduced cost of the sensor system.