Docket #: S12-043

Measuring strains and other perturbations using slow light in an FBG configured in transmission or reflection

An optical device, a method of configuring an optical device, and a method of using a fiber Bragg grating is provided. The optical device includes a fiber Bragg grating, a narrowband optical source, and at least one optical detector. The fiber Bragg grating has a power transmission spectrum as a function of wavelength with one or more resonance peaks, each comprising a local maximum and two non-zero-slope regions with the local maximum therebetween. The light generated by the narrowband optical source has a wavelength at a non-zero-slope region of a resonance peak that is selected such that one or more of the following quantities, evaluated at the resonance peak, is at a maximum value: (a) the product of the group delay spectrum and the power transmission spectrum and (b) the product of the group delay spectrum and one minus the power reflection spectrum.

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Applications

- The invention is used as strain/temperature sensor with ultra high sensitivity.

Advantages

- The benefit of using this FBG sensing scheme is to improve the sensitivity to a perturbation and simplify the engineering required to stabilize the sensor.

Patents

- Published Application: WO2013109987
- Published Application: 20130193961
- Published Application: 20150211918
- Issued: 9,025,157 (USA)
- Issued: 9,347,826 (USA)

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