

光纤技术

可分离温度影响的FBG应变测量方法

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摘要 光纤布拉格光栅在通信和传感领域具有广泛的应用。利用光纤布拉格光栅中心波长的偏移, 可以测量温度和应变等多种物理量, 但必须解决光栅对温度和应变的交叉敏感问题。该文简要分析了光纤光栅作为传感器的基本原理及其优点, 设计了利用参考光栅法分离温度影响以及利用掺铒光纤的自发发射放大特性分离温度影响的2种应变测量方法。最后, 介绍了一种利用倾斜光纤光栅的主模和边模对布拉格光栅中心波长的偏移进行解调的方法, 该方法成功地分离了温度对应变测量的影响。

关键词 [光纤光栅传感器](#) [倾斜光纤光栅](#) [掺铒光纤放大器](#)

分类号

Method to measure strain by separating temperature effect with fiber Bragg grating

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Abstract he fiber Bragg gratings (FBG) have found wide applications in the field of communication and sensing. Temperature, strain and other physical parameters can be measured by detecting the shift of the central wavelength in FBGs, but cross sensitivity of FBG to temperature and strain needs to be solved. The principle and advantage of FBG sensors are investigated briefly, reference grating method and Erbium doped fiber amplifying method to separate the temperature effect are given. A method to demodulate the shift of the central wavelength in FBGs by using the main mode and the side mode of a tilted fiber grating is introduced. With this method, the effect of temperature on strain detection is discriminated successfully.

Key words [fiber Bragg grating sensor](#) [tilted fiber grating](#) [Erbium doped fiber amplifier](#)

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