

一种高灵敏度FBG加速度传感器设计与仿真

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摘要:

采用悬臂梁与垫高块结构, 设计了一种高灵敏度的光纤光栅加速度传感器, 光栅栅区两端固定在悬臂梁与垫高块之间, 提高了传感器的灵敏度, 避免了出现啁啾或多峰现象, 推导了设计计算的力学模型; 对传感器进行了过载安全保护设计、光栅预拉伸设计等; 采用有限元分析计算得出了悬臂梁应变分布情况及6阶固有频率, 证明分析结果与设计计算吻合。

关键词: 光纤光栅; 加速度传感器; 灵敏度; 固有频率

A high-sensitivity fiber grating acceleration sensor design and Simulation

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Abstract:

Using the cantilever with the booster block structure, Designed a high sensitivity of fiber Bragg grating accelerometer, both ends of the grating gate were fixed between the cantilever and the booster block, it improved the sensitivity of the sensor and avoid the emergence of the chirp or multiple peaks phenomenon, design and calculation of the mechanical model is derived; It had completed the design of sensor overload safety protection, grating pre-stretch design and so on; The strain distribution of the cantilever and six order natural frequency were obtained using finite element analysis, analysis results to be proved is consistent with the design calculations

Keywords: Fiber Bragg Grating; Acceleration sensor; Sensitivity; Natural frequency

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