

柔性-微环光波导耦合结构的集成光学加速度传感器

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摘要:

给出了一种利用柔性-微环光波导耦合结构的集成光学加速度传感器, 通过聚合物材料设计的柔性光波导, 在外力作用下产生形变, 该形变改变了柔性光波导与微环光波导的层间距, 从而改变波导耦合器的耦合比, 使得微环光波导谐振腔输出谱特性发生相应改变, 继而有效地实现了加速度的传感。本文给出了这种新型的设计, 推导了其检测原理并同时分析了其灵敏度的影响因素。

关键词: 微环光波导 柔性光波导 耦合比 加速度传感 光学谐振腔

Acceleration sensor based on flexible waveguide coupling with integrated optical microring resonator

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Abstract:

An acceleration sensor based on flexible waveguide coupling with integrated optical microring resonator is demonstrated in this paper. Deformation of a flexible polymer waveguide caused by acceleration results in change of the distance between itself and the waveguide of the microring resonator, therefore the coupling rate is altered. This variation makes the output characteristics of the microring resonator altered correspondingly. By detecting the output optical intensity of spectrum of the microring resonator under the condition of optimum resonance, the acceleration is measured effectively. The design of this novel structure is given and the measuring principle together with influence factor of sensitivity are derived and discussed.

Keywords: Microring waveguide Flexible optical waveguide Coupling rate Acceleration sensing Optical resonator

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