



## 基于镜像异质三周期光子晶体介观压光效应的加速度传感器

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摘要：

本文利用镜像异质三周期光子晶体的介观压光效应，用其来代替传统压阻式加速度传感器中的压敏电阻膜，设计出一种新型的高灵敏度加速度传感器。该加速度传感器采用四端固定梁结构，有效的消除了偏轴效应，具有很好的稳定性，在室温下其可测量的加速度范围为0-137gn。利用ANSYS软件对所设计的光子晶体加速度传感器进行静态分析和模态分析。可以看出在悬臂梁根部具有最大的应变值，而且第一模态频率与其他模态频率相差较大，可以有效降低交叉耦合。将光子晶体置于悬臂梁根部具有最大的感应灵敏度。这种加速度计具有很大的优势运用到以后的航天，军事等领域。

关键词：光子晶体；介观压光；加速度传感器，有限元模拟

## Acceleration sensor based on Mesopiezophotonic effect of mirror structure triply-periodic photonic crystal

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**Abstract:**

This paper employs mesoscopic calender effect of mirror Heterotrimer periodic photonic crystal to design a new type of high-sensitivity acceleration sensor and it replaces the pressure-sensitive resistive film of traditional piezoresistive acceleration sensor. This acceleration sensor uses four-terminal fixed beam structure and effectively eliminates the off-axis effects. Futher it also has good stability and the measurable acceleration range is 0-137gn at room temperature. Static analysis and modal analysis are tested by ANSYS software for the design of photonic crystal acceleration sensor. It can be seen that the sensor has a maximum value of strain in the root of the cantilever and the first modal frequency is different from other three modal frequencies, thus it can effectively reduce the cross-coupling. The photonic crystal is placed in the root of the cantilever to have a maximum sensitivity of the sensor. The accelerometer has a great advantage to apply to the aerospace and military fields.

**Keywords:** photonic crystals; mesoscopic calender; acceleration sensor, finite element simulation

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