

扭转式微小力传感技术研究

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摘要:

介绍了一种正在探索的基于扭转杠杆原理的微力测量及溯源技术, 并应用弯曲扭转梁的有限元模型分析了扭转杠杆的变形, 初步确定了误差来源, 而后通过对扭转杠杆的应力与灵敏度的计算, 分析出各项参数对其分辨力的影响, 同时推导出扭杆的扭转弯曲比, 及其对系统测量误差的影响, 给出设计及改进方向, 并通过实验验证其分析结果。

关键词: 微力测量 静电力 扭转杠杆 弯曲变形

Twisted tiny force sensing technology research

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Abstract:

The article describes a being explored micro-force measurement and traceability technology based on reversing lever principle, and using bending twist beam model to analyse the deformation of the torsion lever and sources of error, and according to the calculation of torsion stress and sensitivity of the leverage, analyse the influence of various parameters to its resolution, and figure out the proportion of bar torsion and bending of the torsion beam, and the influence of the measurement error in the system, then, give a improvement way of the design, and verification the results of its analysis by experiment.

Keywords: Micro- force measurement, electrostatic force, reverse leverage, Bending deformation

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