

综述与评述

激光外差干涉仪相位计的设计

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摘要: 外差信号的比相处理是决定外差干涉仪精度、分辨率等性能的重要因素。为了解决比相计的分辨率和检测速度之间的矛盾, 采用比相方法进行了测量原理、应用特点及局限性的理论分析, 给出了相应的解决方案。结果表明, 基于现场可编程门阵列的整周期采样可以提高自相关方法的测量精度, 混频过零检测方法可以提高测量速度。

关键词: 测量与计量 外差干涉 比相计 相位测量

Design of phase comparator in a laser heterodyne interferometer

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Abstract: Phase comparison of the heterodyne signal determines the performance of the heterodyne interferometer to some extent, such as precision and resolution. To resolve the conflict between the resolution and the velocity, methods used presently to design the phase comparator were introduced and analyzed. Key design points to achieve high measurable velocity with fine resolution were discussed. Solutions to the problems were also proposed. The full period sampling method based on field-programmable gate array(FPGA) can improve the precision of autocorrelation and the zero-across detection with frequency mixing can improve the test speed.

Keywords: measurement and metrology heterodyne interferometry phase comparator phase measurement

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