

MEMS周期运动测试中频闪成像与运动激励的同步控制

作者：胡晓东，孙彬，刘一，胡小唐

单位：天津大学精密测试技术及仪器国家重点实验室

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摘要：

微结构运动测试技术已成为MEMS测试技术的重要组成部分。由于MEMS器件中微结构的运动频率较高，频闪成像法得到了广泛的应用。本文针对静电型MEMS周期运动测试的要求，设计并研制了一种基于FPGA的频闪成像和运动激励同步控制系统，用于MEMS器件的周期运动激励和微结构高速周期运动过程中清晰图像的获取。实验表明，频闪照明的最小脉冲宽度为10ns，运动相位的调整间隔小于 3.75° ，能够满足周期运动频率为1 MHz微结构运动测试的要求。

关键词：MEMS测试，频闪成像，运动激励，同步控制

Synchronous Control of Stroboscopic Imaging and Motion Excitation in MEMS Periodic Motion Testing

Author's Name: Hu Xiaodong, Sun Bin, Liu Yi, Hu Xiaotang

Institution: State Key Lab of Precision Measuring Technology and Instruments, Tianjin University

Abstract:

The testing technique of microstructure motion is an important part of MEMS testing technology. Stroboscopic photography has been widely used because of higher motion frequency of microstructures in MEMS device. In order to meet testing requirements of MEMS periodic motion, a synchronous control system of stroboscopic imaging and motion excitation based on FPGA is built for the excitation of periodic motion and the image acquisition in the course of the high-speed motion of microstructures. The experimental result show that the minimum pulse width of stroboscopic light is 10 ns, the adjusting step of motion phase is less than 3.75° , which can meet the requirements of testing the periodic motion in 1 MHz frequency.

Keywords: MEMS testing, stroboscopic imaging, motion excitation, synchronous control

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