

[本期目录](#) | [下期目录](#) | [过刊浏览](#) | [高级检索](#)[\[打印本页\]](#) [\[关闭\]](#)**论文****基于微扫描镜的激光投影**

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摘要:

利用微机械加工技术制造出一种新型微扫描镜,结合半导体激光器,可用于投影显示.激光器发出的光束被两个分别沿着X轴、Y轴扭转的镜面相继反射,扫描出二维图形.实验测得扫描镜在15 V电压,频率为扫描镜谐振频率2倍的方波信号驱动下,镜子的光学扫描角度达 $\pm 12^\circ$.由于每个镜子都沿各自轴以简谐规律扭转,扫描所得投影为李萨如图形.通过分析图形的形成原理并用Matlab仿真,选出了适用于任意图案显示的扫描镜谐振频率组合(X轴2 400 Hz, Y轴2 425 Hz).该组合可以形成 194×192 个像素点,刷新频率为25 Hz.在此基础上提出了一种通过调制激光开关来进行投影显示的方法.

关键词: 微扫描镜 李萨如图 振动频率组合 激光投影**Micro Scanning Mirrors with Laser Diode for Pattern Generation**

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Abstract:

A novel micro scanning mirror based on MEMS technology with a laser diode could be used in the projection of Lissajous patterns. Two micro scanning mirrors twisted in X-axis and Y-axis are used to deflect the laser beam onto the desired projection area to draw a 2-dimensional pattern. The optical scanning angle of the mirror can reach $\pm 12^\circ$ in 15V square wave driving signal at twice the mirror's resonant frequency. Given the sinusoidal movement of the mirrors in each axis, the laser beam follows a Lissajous pattern. Through analyzing the principle of the generated patterns and simulating them with Matlab, oscillation frequency combination of 2 400 Hz(X-axis) and 2 425 Hz (Y-axis) for image generation is chosen. This combination can achieve 194×192 pixels at refresh frequency 25 Hz which is enough for movie frames. A method of projecting arbitrary images by modulating the laser diode through FPGA is given, which provides the basis for developing micro projectors.

Keywords: Micro scanning mirrors Lissajous pattern Combination of oscillation frequency Laser projection









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