

研究简报

## 一种闭环自激式驱动的硅微机械电场传感器

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摘要

该文提出了一种闭环自激式驱动的微型电场传感器方案。利用自动增益控制的原理实现闭环自激驱动, 使得微传感器能够始终工作在谐振状态, 且振动幅度保持稳定。用matlab-simulink工具对系统进行了仿真, 结果表明, 当传感器的谐振频率发生0.5%的漂移时, 系统可以重新捕捉并锁定到新的谐振频率, 和开环驱动方案相比, 传感器振幅的衰减度从30%降低到0.1%之内, 灵敏度从缩减50%改进到缩减0.1%之内。

关键词 [微型电场传感器](#) [闭环](#) [自激驱动电路](#)

分类号

## Electric Field Micro-sensor with a Closed-loop Autonomous Driving Circuit

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Abstract

A new micromechanical electric field sensor system with a closed-loop autonomous driving circuit is designed and simulated. The closed-loop autonomous driving circuit, which uses the principle of auto-gain-control, keeps the micro sensor working in the resonance state, and keeps the stable resonance amplitude. The simulation result shows, compared with the open-loop driving mode, the sensor can catch the new resonance frequency, the attenuation of libration amplitude is reduced from 30% to 0.1%, and the attenuation of the sensitivity of the sensor is reduced from 50% to 0.1%, when the resonance frequency changes 0.5%.

Key words [Micromechanical electric field sensor](#) [Closed-loop](#) [Autonomous driving circuit](#)

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