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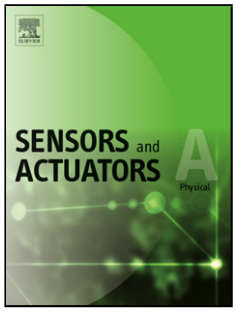

Title: An Electrostatically-Driven 2D Micro-Scanning Mirror With Capacitive Sensing for Projection Display

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Highlights

1. This work presents an electrostatically-driven bi-axial micro-scanner with capacitive position sensing for Lissajous scanning projection.

2. With the added sensing capability, a PLL (phase-locked loop)-based oscillator loop is developed to sustain mechanical resonance and to provide mirror position information, which are equally important for practical applications.

3. The micro-scanner and the required circuits are implemented using bulk micromachining silicon-on-insulator and 0.35-μm CMOS (complementary metal oxide semiconductor) technologies, respectively.

4. The measured resonant frequencies of the bi-axial micro-scanner for the slow and fast-axis scans are 1.4 and 21.9 kHz, and the associated optical scan angles are 22.5° and 40°, respectively, under 48 and 115 $V_{pp.}$

5. The fabricated micro-scanner is adopted in a laser beam scanning projection system to achieve WVGA (852 × 480) display resolution.

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