Fraunhofer
IPMS

SLM Evaluation Kit: Micro-Mirror Arrays

Micro-mirror array and address electronics

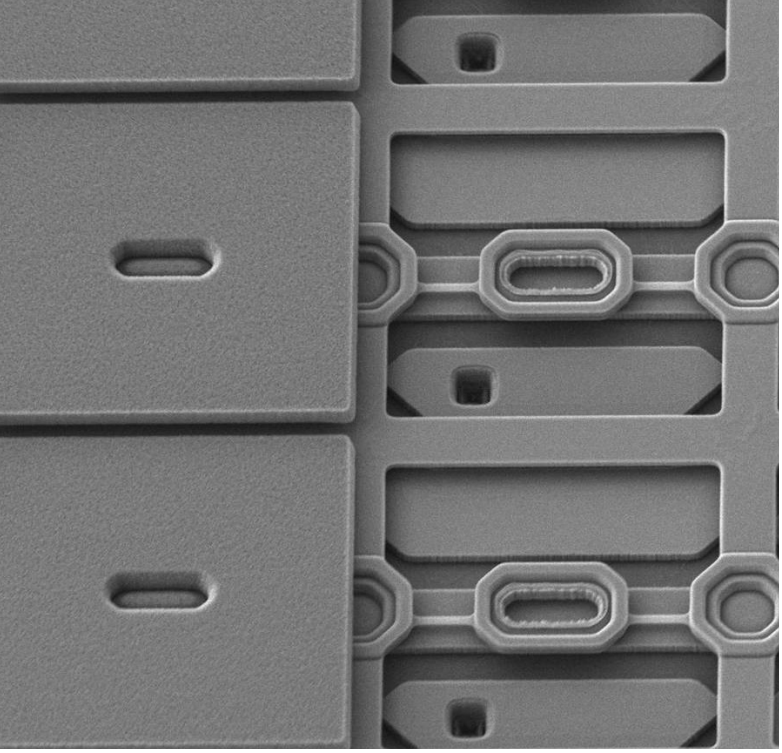
Fraunhofer IPMS develops customized micro-mirror arrays (MMA) to be used as spatial light modulators (SLMs) in the deep UV to the near infrared spectral range. The present "SLM Evaluation Kit" has been designed for proof of concept investigations in order to explore new applications as well as to support prototyping in research and development.

SLM Module

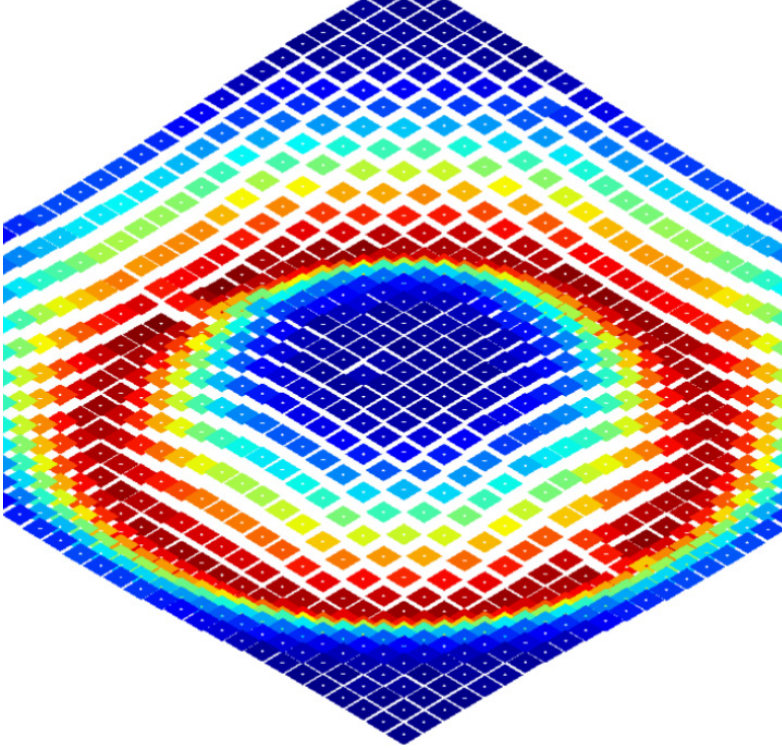
The SLM module is based on an array of analogue micro-mirrors. It supports high-resolution optical phase control at high speed. Besides the micro-mirror device itself, the "SLM Evaluation Kit" comprises the complete address electronics together with a quick-start software and a flexible PC-interface library.

MMA Device

The MMA device consists of a segmented 256 × 256 array of 16 µm mirror elements. Each mirror element can be independently addressed and deflected quasi continuously between zero up to a specific deflection usable for deep UV, VIS and partially higher wavelengths modulation. Two mirror types are available: torsion and piston type mirrors, which both are capable of phase or intensity modulation of the incident light. The SLM device itself acts as programmable diffractive element, suitable for various optical setups and applications.



SEM close-up of single tilt mirrors, 16 × 16 µm², and neighboring area where the mirror plate was removed to reveal the structure of the SLM actuator.



Exemplary pattern of an ensamble of piston type mirrors showing different mirror heights. Image recorded with White Light Interferometry tool.

Data of SLM Evaluation Kit

Micro-Mirror Array	256 x 256 mirrors, 16 µm pixel size
Mirror Types	torsion or piston mirrors
Fill Factor	> 90%
Mirror Deflection Range	0 … 350 nm (450 nm on request)
Deflection Resolution	< 5 nm
Spectral Range	193 nm … 700 nm (more on request)
Average Illumination Intensity	< 1 W / cm²
Frame Rate	1 kHz onboard, > 100 Hz PC-USB

Applications

- Pattern projection (real time grey levels)
- Structured illumination
- Optical switch
- Optical tweezers
- Programmable grating
- Wavefront modulation
- and others

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