

High-Speed Parallel Axial Imaging Using an Array of Micro-Mirrors

ID# 2012-3953

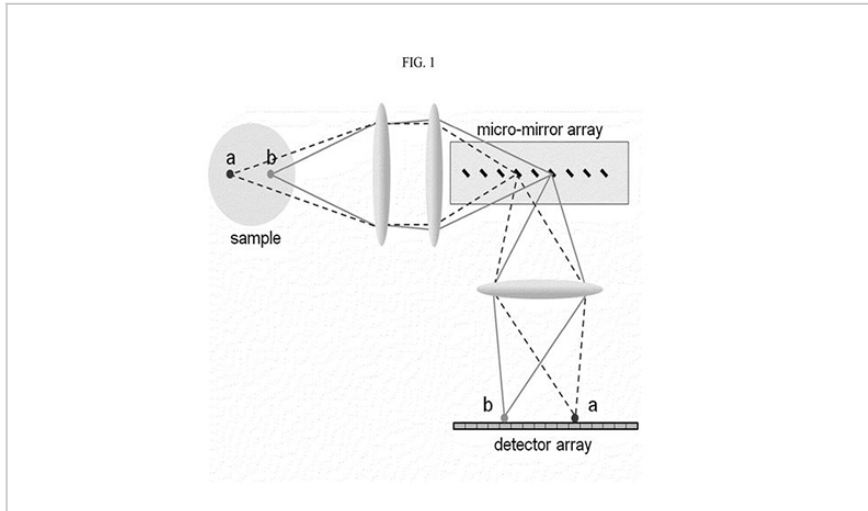


Diagram of z-microscopy

Technology Summary

The present invention provides methods for parallel axial imaging, or z-microscopy, utilizing an array of tilted micro-mirrors arranged along an axial direction of a probe. The micro-mirrors are placed at 45° angles with respect to the axial direction. These image signals emitted from different axial positions can be reflected by corresponding micro-mirrors and spatially separated for parallel detection, essentially converting the more challenging axial imaging to a lateral imaging problem. Numerical studies have shown that nearly diffracted limited axial resolution can be obtained by z-microscopy.

Application & Market Utility

In conventional optical microscopy, there is a disparity in lateral and axial imaging speed. An image in the x-y plane can be acquired at high speed, but slow scanning of the objective lens hinders the z-direction. Novel techniques have been proposed to improve imaging speed (multi-focal, holography), but these techniques lack optical sectioning capability. The present invention improves z-direction imaging speed while maintaining sectioning capability and can reach nearly diffracted limited axial resolution. This technology is protected by the U.S. 9,547,163 patent.

Next Steps

Seeking research collaboration and licensing opportunities.

TECHNOLOGY READINESS LEVEL

4-7

Seeking

Investment | Licensing | Research

Keywords

- optical microscopy
- axial imaging
- high speed imaging
- micro-mirror array
- z-microscopy

Researchers

Zhiwen Liu

Professor of Electrical Engineering

[Website](#)

Chuan Yang

Graduate Student

Kebin Shi

Post Doctoral Fellow

Other Researchers

Mingda Zhou

Originating College

College of Engineering

Office of Technology Management Contact

Ritter, Dustin

dwr18@psu.edu

814-863-7070