MicroMirror TIRF System

Features

- *Integrated imaging & motion control platform*
- *Spatially separated excitation & emission beams*
- *Adjustable micromirror mounts*
- *Open access to optical pathways*
- *Highly stable, yet flexible, platform*
- *Integrated slide holder*
- *TIRF lock feedback control*

Advantages

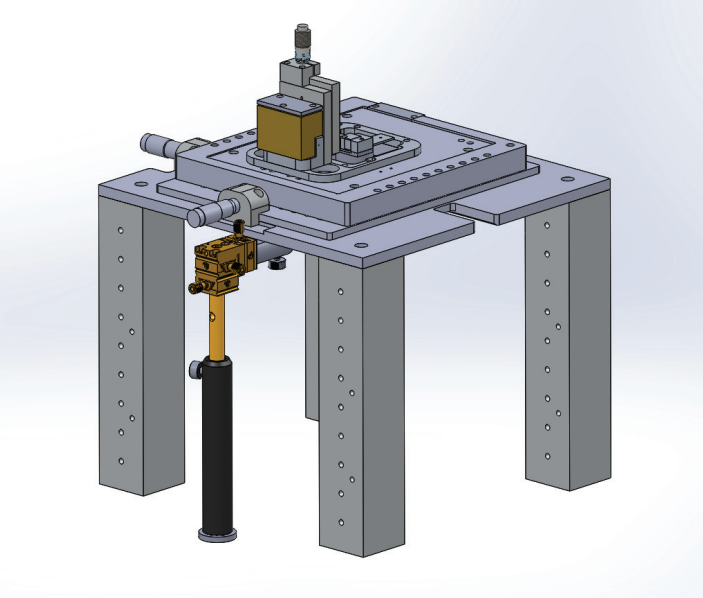
- *Superior signal-to-noise ratio*
- *Eliminates dichroic mirrors*
- *Optical pathway accessibility*
- *Facilitates multiple laser lines*
- *Proven design*
- *Enabling technology for studying complex biomolecular interactions*

Product Description

The Mad City Labs' MicroMirror TIRF system is part of our single molecule imaging instrument portfolio and draws on our expertise with high precision, high stability nanopositioning systems and microscopy solutions. The technique of micro-mirror TIRF (total internal reflection fluorescence) microscopy is the only proven method to study the ordered assembly and function of multi-component biomolecular machines.

The MicroMirror TIRF system uses through-the-objective excitation, but replaces the dichroic used in conventional TIRF systems with two broadband micro-mirrors positioned at the back aperture of the objective lens. Spatially separating the excitation and emission beams and eliminating the dichroic mirror leads to superior signal-to-noise ratios and simplifies the introduction of multiple spectral lines to your experiment. Typical biomolecular systems studied using micro-mirror TIRF incorporate 3 or more laser lines which can be difficult to accomodate in conventional dichroic TIRF instruments.

Each micro-mirror is mounted to a multi-axis precision mount allowing the user to make fine adjustments to the optical pathway. The imaging and motion control platform is designed to maximize optical pathway accessibility and flexibility, while also simplifying the optical alignment. A compelling advantage of our MicroMirror TIRF system is the open access to the entry and exit optical pathways. The motion control platform comprises an XY micropositioning platform with an integrated XYZ closed loop nanopositioning system. The XYZ closed loop nanopositioning uses proprietary PicoQ® sensors for sub-nanometer precision and high stability.



Above: Rendering of the MicroMirror TIRF system showing the integrated imaging & motion control platform with multi-axis adjustable micromirror mount (only one shown for clarity). Some components of the imaging platform have been omitted from this rendering for illustration purposes.

A z-axis micropositioner with integrated sample holder is mounted above the nanopositioning system.

Completing our MicroMirror TIRF system is the optional TIRF Lock feedback control consisting of a QPD sensor, TIRF Lock controller and software. The TIRF Lock module maintains the TIR signal through software feedback to the nanopositioner.

The MicroMirror TIRF system is a enabling technology for advanced study of complex biomolecular interactions. The MicroMirror TIRF is a proven design and offers a simple yet flexible instrument platform for single molecule research.

Technical Specifications

Imaging & Motion Control

Micropositioning motion ..... X, Y, Z
Range of motion (XY) 25mm
Range of motion (Z) 10mm
Body Material .....Anodized Aluminum

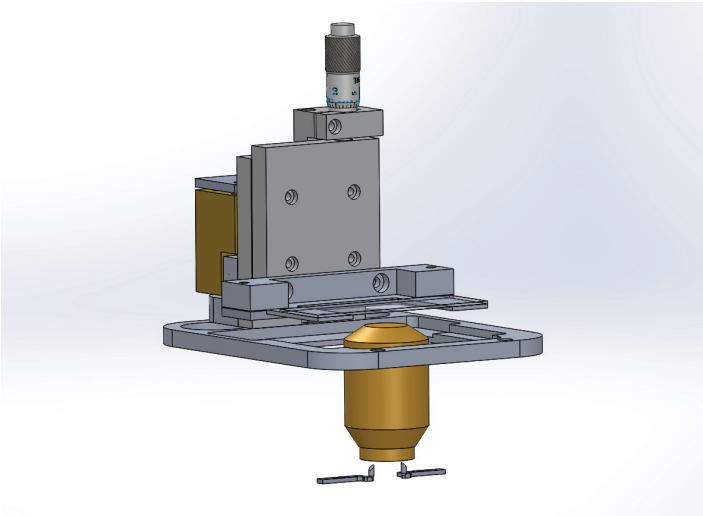
Nanopositioning motion ..... X, Y, Z
Ranges of motion ..... 200 µm
Resolution ..... 0.4 nm
Recommended max. load (horizontal)* .....0.5 kg
Body Material ..... Aluminum
Controller† ..... Nano-Drive®
Digital Interface..... USB 2.0
Analog Input .....0V to 10V
Synchronization outputs ..... TTL (4)
Nanopositioner software† ..... Nano-Route®3D
TIRF Software compatibility ..... GLIMPSE

MicroMirror Mounts

Micro-Mirror motion..... 5 axis
Micro-Mirror diameter ..... 3 mm
Mount material .....Aluminum

TIRF Lock Feedback

TIRF Lock™ Sensor..... Quadrant Photodiode
Controller..... TIRF Lock™
Digital interface..... USB 2.0
Software..... TIRF Lock™



Above: Rendering of the MicroMirror TIRF system showing the relation between the micro-mirrors, fixed objective lens and z-axis sample positioner. For illustration purposes only. Consult with a Mad City Labs sales person for more detailed information about MicroMirror TIRF system.

Compatible Software Packages

LabVIEW
Examples, tutorial, and Nano-Route® 3D supplied with Nano-Drive® USB interfaces.

Image-Pro AMS
USB and analog motion control

MetaMorph
USB and analog motion control

µManager
THE OPEN SOURCE MICROSCOPY SOFTWARE
USB motion control

SLIDEBOOK 5.0
Analog motion control, 1 or 2 axes.

* Larger load requirements should be discussed with our engineering staff.
† See box at right for 3rd party software compatibility