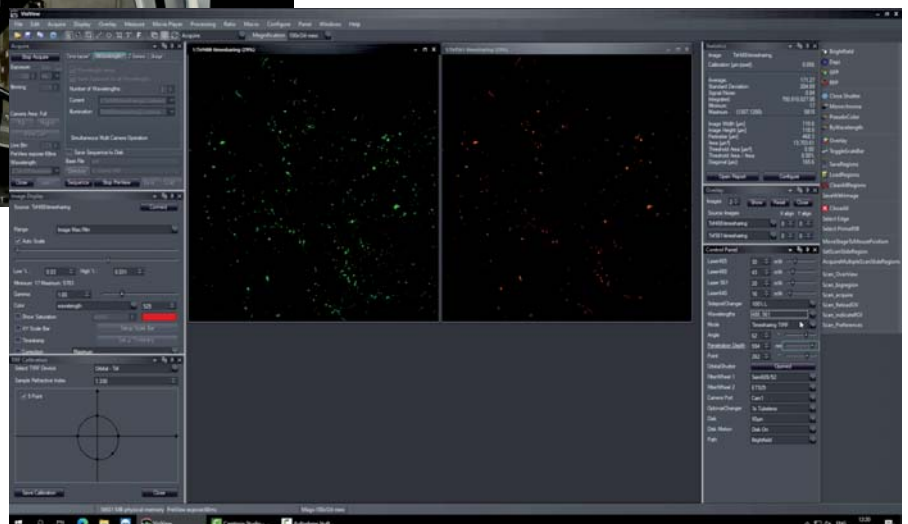


ORBITAL Ring-TIRF Technology for Total Internal Reflection Fluorescence

The Total Internal Reflection Fluorescence (TIRF) technique is the ideal method for observation of cells close to the coverslip surface. By total reflection of the excitation light (typically laser) at the coverslip / medium interface, the fluorescence emission is limited to a very thin space in the vicinity of the glass surface. The resulting fluorescence images exhibits extremely high contrast and resolution with the possibility of real-time imaging of cell membranes, actin filament behavior or single molecule tracking.

ORBITAL Ring-TIRF Technology

ORBITAL 100 Ring-TIRF Technology at the Price of Point-TIRF



ORBITAL Ring-TIRF Technology

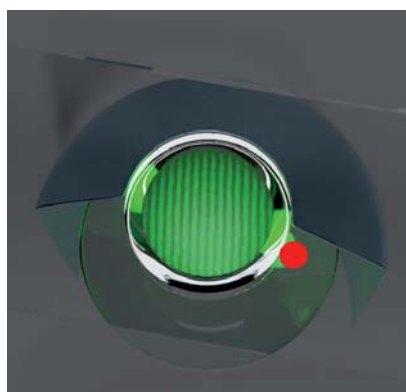
ORBITAL Ring-TIRF Technology

The VisiTIRF-ORBITAL is a compact and powerful high speed 2D galvo driven spinning Ring-TIRF laser illumination system. It offers a large and evenly illuminated field of view to enable applications such as single molecule tracking or SMLM - Single Molecule Localisation Microscopy for super-resolution imaging. Full 360 degree positioning by free circular diameter or elliptical trajectory at the back focal plane of the high aperture TIRF objective offers illumination with minimal fringes or shading gradients.

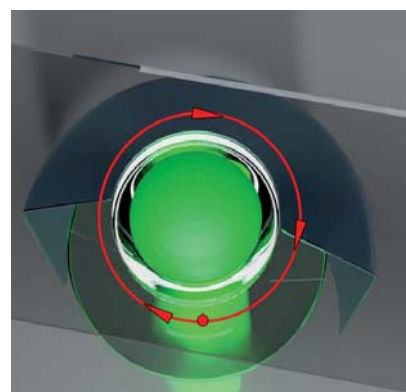
Spinning illumination for even TIRF imaging:

The 360 degree spinning of the laser excitation light at the back focal plane of the objective allows for an uniform imaging of samples without shadowing or artifacts. With the traditional single point illumination an interference pattern is often disturbing the quality of the image.

focal plane illumination



left image with point laser illumination and interference pattern

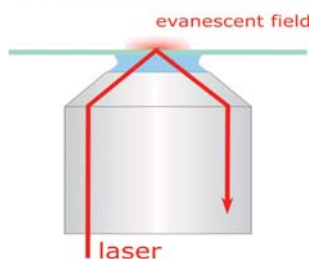


right image with ring laser illumination without interference pattern

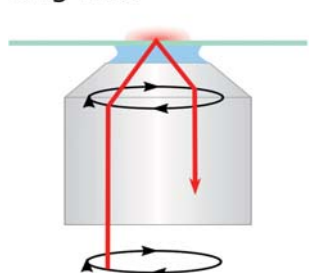
Modes:

- » free Single Point TIRF Mode
- » free RingTIRF Mode
- » HILO Mode
- » oblique illumination

Point-TIRF



Ring-TIRF



Features and Benefits:

- » based on 2D galvo scanner
- » laser light focused in the back focal plane of the objective
- » uniform illumination without interference fringes
- » fast switching of TIRF illumination angle
- » Epi widefield coupling by Liquid Light Guide
- » fully 360-degree positioning by free circular diameter or elliptical trajectory
- » TIRF angle calibration with 4 or 5 points
- » calibration routines for penetration depth control and equalization
- » TimeSharing Mode for multiple camera or SplitView operation

ORBITAL-100 Affordable Ring-TIRF System

At the price of a simple point-TIRF system we now offer the new ORBITAL-100 Ring-TIRF technology.

The compact unit is based on a high speed 2D galvo which drives the Ring-TIRF illumination. It offers a large, elliptically illuminated field of view to enable applications such as single molecule tracking or STORM based super-resolution microscopy. Full 360 degree rotation by free circular diameter or elliptical trajectory at the back focal plane of the high aperture TIRF objective, offers illumination with minimal interference fringes and shadowing effects.

ORBITAL-100

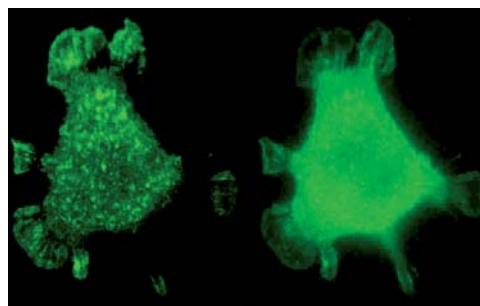
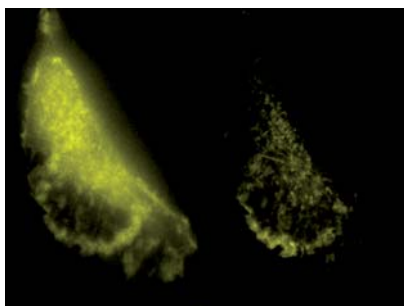
Ring-TIRF Laser Illumination



ORBITAL-100; here shown with collimator for Zeiss Axio-Observer

Applications:

- » single molecule localisation & tracking
- » kinetic studies of single molecule interactions
- » kinetic studies of protein
- » super-resolution techniques e.g. PALM or STORM
- » high contrast imaging of cell surface

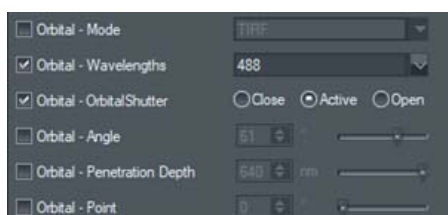
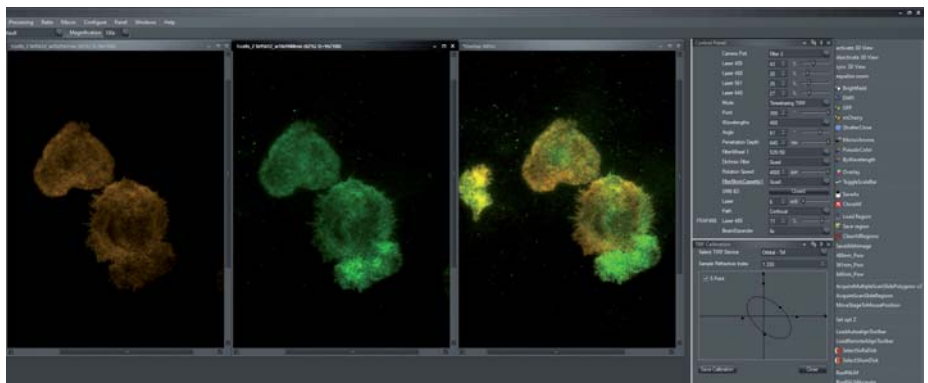


ORBITAL Technology

VisiView® Software Support

VisiView ORBITAL Support and Features

VisiView® is a high performance imaging software for Bio-Medical applications. The software is designed as an integrated imaging software which includes comprehensive microscope control, control of a vast number of peripheral devices, image acquisition and analysis. Its multitasking ability supports realtime image handling and up to 6D multidimensional acquisition. The ORBITAL setup, calibration and control is seamlessly integrated into the VisiView capture mode. In the TIRF illumination configuration, the user can setup five different TIRF modes. Which are Center Beam, Widefield/HILO, RingTIRF, Timesharing TIRF and Point TIRF.



ORBITAL Setup Modes

The Center Beam Mode moves the laser to the center of the calibrated ellipse. This is a good control for your TIRF alignment and proper beam focusing. It can be used for basic widefield laser illumination.

In Widefield/HILO mode the laser spins on a calibrated ellipse but at low incident angle. This offers a more homogenous laser WF illumination than the center beam Mode, which is strongly affected by interference.

The Point Mode simulates a classical TIRF system but the angle and the direction of the laser can be freely adjusted using the angle slider and the point slider component of the ORBITAL device.

In TIRF mode the laser spins on a calibrated ellipse beyond the critical angle which is needed for total reflection. The TIRF mode removes the out-of focus blur and increases signal to noise drastically. In TIRF mode you can directly and precisely control the penetration depth of the evanescent field with a separate slider.

ORBITAL Synchronisation

If using an ORBITAL, not only the elliptical laser deflection is externally controlled by the ORBITAL controller, but also the laser shuttering, which allows precise synchronisation of laser and angle. Further the stable image quality is assured by synchronizing the laser rotation speed with camera exposure. If exposure times are too low, the system switches to arc scanning instead of scanning full ellipses.