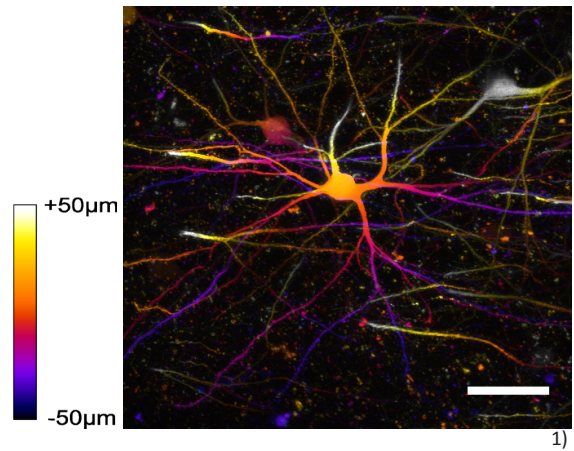


## Microscopes



1)

## Intravital<sup>2P</sup> –

### Two-Photon Microscope Dedicated to Intravital Imaging

#### The Two-Photon Advantage

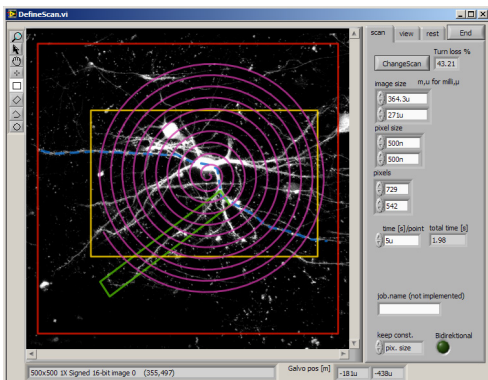
Imaging deeper under the surface of living tissue, time-lapse-recordings over days, obtaining better signal-to-noise ratio and true optical sectioning—these are the selling points for two-photon microscopes. Still there is a large spectrum of desirable imaging experiments that are out of reach for common two-photon microscope concepts. The most frequent problem is the large amount of laser power needed to obtain satisfactory images, which leads to unwanted

heating of the sample, dye bleaching, or even tissue ablation.

These artifacts need to be avoided, because they intermingle with the biological processes that are to be observed, leading to false interpretations.

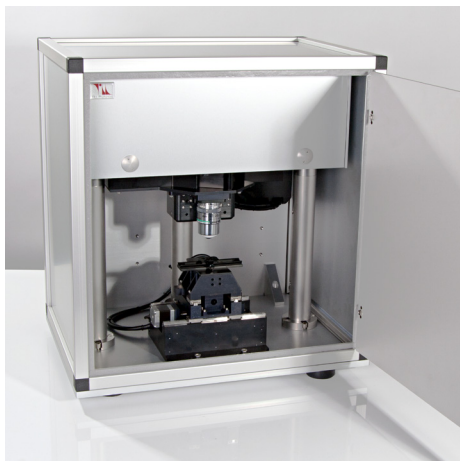
#### Boosting light collection efficiency is the only way out!

Intravital<sup>2P</sup> is a two-photon laser scanning microscope specifically created for imaging of living tissues and animals at low laser power. To achieve this, we designed the microscope frame around a very short, large diameter, dual-emission detection beam path. Collecting lenses further increase the share of light that falls onto the GaAsP detectors, which are hand selected for >40% quantum efficiency and very low noise and dark current. The resulting signal detection performance facilitates imaging at low light levels and greatly improves signal-to-noise ratio, allowing fast measurements deep within highly scattering tissue.



Flexible scan modes: Square, rectangle, rotated rectangle, line, polygon, spiral, point.

1) Mouse neurons expressing YFP, recorded *in vivo*, colour-coded depth, bar 50µm, courtesy Sabine Scheibe.

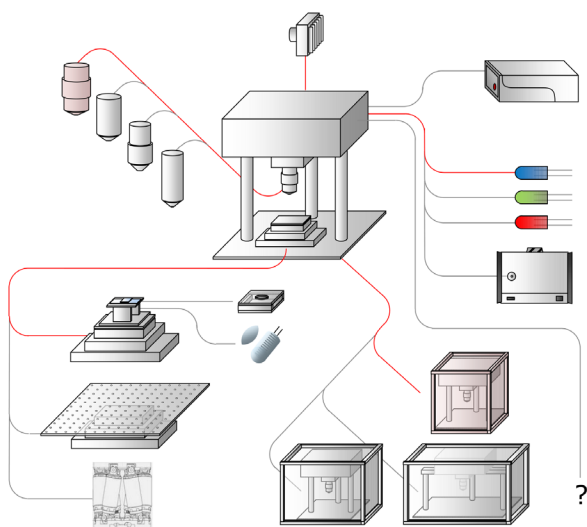


## Benefits

- High light-collection efficiency permits imaging with low laser power
- Simultaneous dual-colour non-descanned detection
- Compact and easy-to-use multiphoton imaging platform based on rock solid mineral casting
- Daylight operation through light-sealed enclosure
- LabView-based open-source software Colibri
- Fit for any sample: modular XY stage design with adapters for everything from slides to rats

## Performance in rectangular scan fields, examples. 25x objective, 1 $\mu$ s pixel dwell time

Scan field	800 $\mu$ m x 800 $\mu$ m	800 $\mu$ m x 800 $\mu$ m	100 $\mu$ m x 100 $\mu$ m	100 $\mu$ m x 50 $\mu$ m	200 $\mu$ m x 200 $\mu$ m
Scan resolution (pixel)	1000 x 1000	500 x 500	125 x 125	125 x 63	512 x 32
Scan speed (FPS)	1.11	4.16	39.5	79.0	63.6 at 0.5 $\mu$ s



*Flexible System diagramme showing Intravital<sup>2P</sup> and its equipment options. Please call us if you need a customized solution or if you have questions.*

## Components and specifications

- Upright imaging platform with light-sealed enclosure
- Nikon 25x objective with N/A 1.1 and 2.0mm W.D.
- Yanus digital scan head: free scan modes in a fields of up to 880 $\mu$ m diameter at 25x magnification
- Pixel dwell time adjustable in 250ns steps (4MHz sampling with variable averaging)
- VoiceCoil z-drive excursion of 7.5mm with 20nm resolution, response time <10ms for 500nm step
- Two GaAsP PMT detector modules (hand selected for TILL), 40% QE, lower dark current
- Up to 6 filter sets for EPI-fluorescence imaging
- Fully motorized dichro sliders and XY stage
- LED and camera for wide-field EPI-fluorescence
- MCU power and real-time control unit
- Optional: integrated fiber laser (780nm, >50mW, ~200fs, 100MHz)
- Optional: customized stage insets, integration of existing lasers, climate control, experiment control

Product specifications and descriptions in this document are subject to change without notice. © TILL Photonics GmbH 2012