

# TauMap®: A system for fluorescence lifetime imaging with submicron spatial resolution

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## ABSTRACT

TauMap® is a powerful tool for multiphoton tomography of cells, tissues and materials with submicron spatial resolution even in tissue depths up to 200 µm [1]. It can be used in drug. The procedure is often called fluorescence lifetime imaging (FLIM) or described as 4D-microscopy. TauMap® technology is based on time correlated single photon counting (TCSPC). The system had been developed for application of near infrared femtosecond lasers. The application of NIR laser radiation to living cells and tissues had been tested intensively and shown very slight damage versus application of UV/VIS lasers. Different fluorescent endogenous biomolecules like NAD(P)H, flavins, collagen, elastin, melanin, porphyrins, etc. are excitable by multiphoton processes. The autofluorescence and second harmonic generation (SHG) of these biomolecules is detected by ultrahigh sensitive and time correlated photon counting.

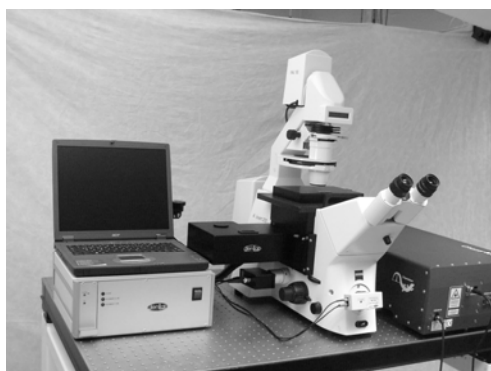


Figure 1: TauMap®

The system is based on a microscope supplemented with a scanning unit. The scanning unit is optimized for usage of near infrared femtosecond pulsed laser beam. The scanning unit consist of a galvoscaner, a beam expander, a power meter and power adjustment by filter turret or continuously with a Glan-Calcit polarizer as well as a control unit.

The system is equipped with a very fast photomultiplier (< 250 ps temporal resolution) as well as a SPC 830 and allows therefore time correlated single photon counting (TCSPC).

[1] V. Ulrich, P. Fischer, I. Riemann, K. König, " Compact multiphoton/single photon laser scanning microscope for spectral imaging and fluorexcence lifetime imaging", Scanning, **26**, 217-225 (2004).