Ultrashort and Spectrally Resolved Multiphoton Fluorescence Lifetime Measurements of human skin and hair in vivo

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Multiphoton tomography is a non-invasive, painless method to produce three dimensional optical biopsies of human skin in vivo with submicron resolution. Focused near-infrared laser beams with pulses in the femtosecond time range and wavelengths between 720 and 900 nm are able to excite the autofluorescence of endogenous fluorophores. By simultaneously recording the multiphoton excited fluorescence lifetime it is possible to further characterize the cellular fluorophores and extracellular matrix components. Fluorescent lifetime imaging (FLIM) is a useful tool to study the fluorescence lifetime and their distribution over whole areas.

In this work, new different techniques and detector systems will be applied to study human skin and skin appendages in vivo

- a detector with ultrashort time spread of <30ps
- spectrally resolved FLIM with a resolution of <15nm

The results of the measurements and the possible applications will be discussed.