

## **Multiphoton tomography of skin with gradient index-lenses**

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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 such as NAD(P)H, flavines, elastin, porphyrines and melanin, as well as the second harmonic of collagen. By simultaneously recording the fluorescence lifetime it is possible to further characterize the cellular fluorophores and extracellular matrix components. The imaging depth is limited by the working distance of the objective, typically 200  $\mu\text{m}$ .

An approach is made to extend the imaging depth by integrating gradient index-lenses into the imaging system. These micro-lenses with lengths in the centimetre range and diameters of 0.5 to 2 mm are capable of transferring the laser, fluorescence and SHG radiation.

First results of endogenous fluorophores imaged by gradient index-lenses are shown.