

Femtosecond laser-induced breakdown microscopy for biological applications

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KEY WORDS: Laser-induced breakdown, LIBS, femtosecond laser, trace elements, in-situ analysis

By combining femtosecond laserpulse technologies with laser induced breakdown spectroscopy (LIBS) we developed a new element-specific microscopy technique for in-vivo, in-situ biomedical applications. High spatial resolution in the femto- to attoliter range in combination with high element-specific sensitivity was realized. We demonstrated the spectrochemical analysis of bound calcium in the epidermal cell walls of young sunflower seedlings [1].

Currently, we scan the surface morphology of the biological specimen using confocal techniques. This information will be used in our combined micro- and nano material processing platform for 3-D depth profiling of trace elements.

This new microscopy technique will be discussed, first experimental results will be presented and the current status of the instrument will be reported.

[1] A. Assion, M. Wollenhaupt, L.Haag, F. Mayorov, C. Sarpe-Tudoran, M. Winter, U. Kutschera, and T. Baumert, „Femtosecond laser-induced breakdown spectrometry for Ca²⁺ analysis of biological samples with high spatial resolution“, *Appl. Phys. B*, **77**, 391-397 (2003).