Opto-acoustical method of light absorption in biological tissues in vivo.

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Diploma thesis abstract

This work is dedicated to absorption coefficient measurements in highly dispersive mediums including biological tissues by means of opto-acoustical reflection method. Laser pulse absorption leads to nonstational medium heating which results in pressure pulse (OA signal) excitation. Excited ultrasonic field is divided between waves running to and from front surface. OA signal registration in reflection mode allows for one-way medium diagnosis, in-vivo for biological tissues. Front side OA signal amplitude dependency on medium absorption coefficient was studied both experimentally and numerically in value range that is peculiar for human biological tissues in so called therapeutical laser wave lengths window. It is showed that for certain laser pulse diameter OA signal amplitude is proportional to medium absorption coefficient, independent of dispersion coefficient. Experiments were carried out for model suspensions obtained from milk, water and ink mixing; pork liver and human skin. In conclusion light absorption in layered dispersive media measurement possibility is discussed.

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