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Biothermophotonic evaluation of multilayered tissue structures. ANNA MATVIENKO, ANDREAS MANDELIS, University of Toronto, Canada, STEPHEN ABRAMS, Quantum Dental Technologies Inc, Toronro, Canada — Biothermophotonics is a novel non-invasive method for safe in vivo evaluation of thermal and optical properties of tissues. The method involves analysis of photothermal field induced in a sample by frequency-modulated laser excitation and following optical-to-thermal energy conversion. The theoretical model for fitting the properties of the sample features coupled diffuse-photon-density-wave and thermal-wave mathematical description. The sample is considered to be a multilayered one-dimensional structure. The best fits to the model are obtained with Simplex Downhill algorithm for multi-parameter minimization. The results demonstrated robustness of the algorithm and the capabilities of the method to simultaneously evaluate optical and thermal properties of multilayered tissue structures in vivo.

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