Diploma thesis abstract

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Polarized light propagation in strongly scattering media applied to the problem of biomedical diagnostics

In this diploma thesis, opportunities to apply polarization-sensitive technique of light scattering signals detected from different models to problems of non-invasive biomedical diagnostics of strongly scattering media are investigated. The technique is based on properties of scattering objects (individual particles or media consisted of them) to change polarization characteristics of optical radiation while it interacts with these objects depending on physical or optical parameters. The theoretical background of this technique is supposed to be Stokes-Mueller formalism which is realized by numerical Monte Carlo schemes using different system geometries and different optical properties of investigated models. Results of the research include calculations of scattered light parameters, such as Stokes vectors components and Mueller matrices, and also the analysis of their sensitivity to changes of different physical and optical parameters in investigated systems. In conclusion, the scientific importance of obtained results and potentialities of their use in experiments oriented to different biomedical applications is discussed.