Thermooptic excitation of ultrasonic waves in absorbing magnetoactive medium

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As is known the spectral transfer functions allow to determine dissipation and thermophysics constant of medium if on a spectrum intensity of laser radiation and experimentally measured amplitude of a photoacoustic signal are given.

In this paper the transfer functions are obtained for absorbing magnetoactive medium in registration multibeam interference of optical waves and thermal fluxes for cases of free and fixed boundaries.

The analysis of dependences of modules of transfer functions on frequency of a ultrasonic wave for the right- and lefthanded circularly polarized stimulating radiation is carried out. If $\omega < \alpha_{\pm} \cdot c_0$ ($\alpha_{\pm}$ - factor of absorption , c_0-adiabatic speed of a ultrasonic in medium), the excitation of a ultrasonic occurs more effectively at the fixed boundary surface. In field $\omega > \alpha_{\pm} \cdot c_0$ the generation of ultrasonic waves is more effective at a free surface. An effectively raised rangefrequencies in case of free boundary of absorbing medium is more than two times wider, than at the fixed boundary.

The dependences of modules of transfer functions on thickness of a sample are also obtained in the paper. It is shown, that on small depth the excitation of a ultrasonic is more effective at free boundary of absorbing medium, and with an increase of depth the signal grows for the fixed boundary. Thus for the fixed boundary surface there is field of absorbing due to fact that length of optical absorption becomes more than length of thermal diffusion in a sample.