

## INFLUENCE OF PULSE LASER IRRADIATION ON CHARACTER OF MAGNETO-ELECTRIC PROPERTIES IN FERRITE-GARNETS

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Magneto-electric (ME) properties of yttrium iron garnets (YIG) have been investigated by using optical polarimetry method – electro-magneto-optical effect (EMOE) [1]. The heart of the method is the registration of the electric-field-induced changes of the Faraday rotation in crystals –  $\alpha_{EMO}$  (EMOE) [1, 2]. As it was shown by us earlier, EMOE is a high sensitivity experimental method for investigation of changes in structural characteristics of ferrimagnetics [3]. Taking into account this fact, investigations of influence of laser irradiation on character of the magnetic-field dependences of EMOE has been carried out in YIG film. For irradiation we used

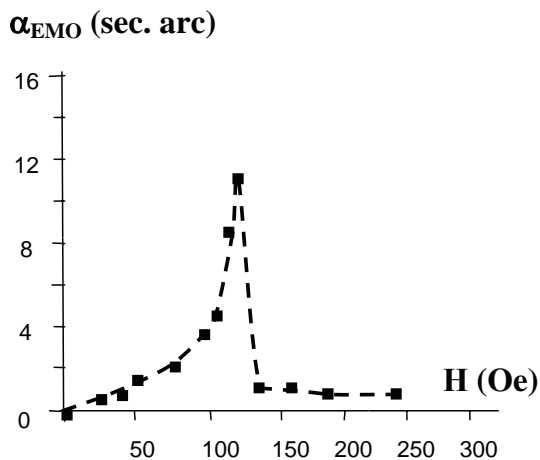


Fig. 1. The magnetic-field dependences of the EMOE measured in the irradiated by laser impulse YIG film.

pulse neodymium laser ( $\lambda = 1.06 \mu\text{m}$ ), i.e., we used irradiation in the range of a transparency for YIG. When the investigated film was irradiated by laser impulse with density of energy not exceeding  $30 \text{ J/cm}^2$ , we did not observe essential changes in the field dependencies of EMOE in comparison to the dependencies measured before irradiation. However, changes of EMOE value were observed when the value of impulse was  $45 \text{ J/cm}^2$  (Fig. 1) and the  $\alpha_{EMO}$  maximum has exceeded almost twice the value of EMOE registered before irradiation. In our opinion, the increase of EMOE can testify changing in centrosymmetric structure of the YIG. In the YIG film

volume, there can be local sites or thin layers where centrosymmetric structure is broken. The irradiation of YIG film by powerful laser pulse removes in them the nonuniform micro- and macropressure, local mechanical strain in the YIG film volume that leads to essential increase of EMOE value.

### References

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