

LSC Six-Month Progress Report

LIGO-M010125-00-M

Organization Institute of Applied Physics (IAP) Russian Academy of Sciences at Nizhny Novgorod

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Attachment C - Lasers/Optics

Participation Alexandr Sergeev - 100%
Kulagin Oleg - 100%
Khazanov Efim - 100%
Poteomkin Anatoly - 100%
Mal'shakov Anatoly - 100%
Palashov Oleg - 100%
Andreev Nikolay - 100%
KozhevatoV Il'ya - 100%
Kulikova Elena - 100%
Cheragin Nikolay - 100%
Katin Eugeny - 100%
Davidov Vladimir - 100%
Syndianova Maria - 100%

8-a

Design of advanced phase-modulated white light interferometer for preliminary characterization of surfaces of the LIGO core optics (clear aperture up to 25cm, absolute accuracy better than $\lambda/1000$, measurements of curvature radius from 3000m or more) was finished. Experimental modeling and optimization of in situ surface quality measurements were carried out. The first surface maps of removed (3m distance) objects were obtained by means of this technique.

8-b

It is shown that a quartz crystal which is placed inside a telescope may compensate for thermally induced birefringence in Faraday isolators. Depolarization of a commercial TGG-based Faraday rotator was reduced in experiment by a factor 8. This technique with uniaxial crystal was applied to compensation of birefringence in laser rods. Depolarization was reduced by a factor 15. Novel design of Faraday rotator for high power lasers was suggested and investigated theoretically.

8-c

Prototype of the beam scanning technique for high precision in situ probing of LIGO components was tested experimentally. In linear regime (no self-focussing) the accuracy of $\lambda/500$ was implemented.