

LSC Six-Month Progress Report

Organization Japan NAOJ-TAMA Group

LIGO-M000044-00-M

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Attachment D - Advanced Detector Configurations

Participation Masa-Katsu Fujimoto - 100%
Seiji Kawamura - 100%
Osamu Miyakawa - 100%

Item - Task 8 - a Work with P. Willems and J. Mason on the RSE experiment at Caltech for two weeks.

In July 1999, S. Kawamura and O. Miyakawa visited Caltech and worked with P. Willems and J. Mason on the RSE experiment for two weeks. We succeeded in locking the dual recycled interferometer using one modulation technique. The gain change of each degree of freedom from one state to another was simulated and intuitively understood, and it was verified to be correct by experiment.

In February 2000, S. Kawamura visited Caltech and worked with J. Mason and P. Willems on the RSE experiment for one week. This time we started with the Recycled Fabry-Perot Michelson. After successfully locking it, we proceeded to try the broad-band RSE. We discussed possible methods of the lock acquisition of the broad-band RSE.

Item - Task 8 - b RSE experiment in NAOJ to complement the Caltech RSE experiment.

O. Miyakawa and S. Kawamura have been working on the 4m RSE experiment in the vacuum. A

Small Suspension System (SSS) has been developed for this experiment. The SSS has a satisfactory control capability for the mirror position and orientation, and a simple eddy-current damping function. The SSS is small enough to handle several laser beams in the beam tube. A Fabry-Perot cavity consisting of two mirrors with the SSSs was successfully locked and held in lock very stably. Encouraged by this result, we will proceed to a coupled cavity investigation with the SSS.

Item - Task 8 - c Investigation of a signal extraction scheme for the RSE.

O. Miyakawa, S. Kawamura, M. Fujimoto have been studying a new signal extraction scheme for the RSE. So far we found that it is possible to extract all the signals using only one phase modulation. We are now investigating the possibility of obtaining more high-quality signals with the various modulation-demodulation methods.