

LSC Six-Month Progress Report

LIGO-M020240-00-M

Organization Australian Consortium for Interferometric Gravitational Astronomy (ACIGA)

Report Date February 15, 2002

Attachment A - LIGO I

Participation Susan Scott 80%
Antony Searle 100%
Benedict Cusack 30%
David McClelland 20%

LIGO I Data Analysis

commenced set up of environmental monitoring system;
ilwdread LIGOtool package

LDAS Data Conditioning API

contributed large amounts of software on - action wrappers, basic functions, system identification (auto-regressive and output error models), line removal implementation and initial testing, data conditioning API test scripts for the joint burst-stochastic MDC

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Attachment B - Isolation/Suspension/Thermal Noise

Participation Peter Veitch 50%
Chris Hollitt 100%
Bram Slagmolen 100%
Ju Li 80%
John Winterflood 50%
Ben Lee 100%
David McClelland 20%

Frequency Distribution of thermal noise (FDTN) 1

fabricated monolithic test cavity;
assembled bench top suspension system

FDTN2

parametrised flexure - measured Q and resonant frequency using a novel wide dynamic range technique with a simple Michelson;
processed vacuum system; demonstrated 'squashing' for reducing intensity noise.

FDTN3

completed isolator for delivery to ANU.

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Attachment C - Lasers/Optics
Participation Peter Veitch 80%
Jesper Munch 100%
Murray Hamilton 100%
David Blair 50%
David McClelland 20%
Ju Li 50%
Damien Mudge 100%
Aidan Brooks
David Hosken 100% 100%

Development of HPL2

The saturation of the output power of HPL2 at about 70W with 250W of pump power has been determined to be due to a negative horizontal thermal lens which caused loss of horizontal mode control. We have installed a waveguide to homogenize the pump power in the horizontal direction, which removes this wavefront distortion, and the probe HeNe beam is now transmitted through the pumped slab with no significant wavefront distortion.

Development of 10W Slave Laser

1. Pump diodes have been mounted and temperature controlled.
2. Thermal lensing of the pumped slab at pump powers of up to 40W has been measured.
3. Efficiency of laser head when using short flat/flat resonator has been checked, and confirmed to be OK.
4. Single mode laser resonator has been designed.

Assessment of SiO₂ coating for Slab Sides

No progress. Deferred to next period.

Refurbishment and Redevelopment of NPRO

Fabrication of new mount for gain medium completed.

Fabrication of 10W ARI laser

This development has been superceded by the development of the 10W slave laser, which will be used at Gingin.

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Attachment D - Advanced Detector Configurations

Participation David McClelland 40%
Hans Bachor 100%
John Sandeman 100%
Ben Cusack 50%
Glenn De Vine 100%
Kirk McKenzie 100%

Bench top investigation of VRMs

analysed FP cavity and Michelson interferometers as VRMs and found that the Michelson offers good diagonality in the control system;
set up bench top demonstration of signal recycling using a VRM.

Output Modecleaners

commenced analysis of output modecleaner with RSE.