

LSC Six-Month Progress Report

LIGO-M010346-00-M

Organization Syracuse University Experimental Relativity Group (SUERG)

Report Date August 15, 2001

Attachment A - LIGO I

Participation

Saulson visits LLO for commissioning

Saulson visited LLO at the rate of about one week per month through the spring and into the summer. While assisting in general commissioning activities, the main focus of his work was on understanding PEM signals. This work was carried out in collaboration with Joe Kovalik, Szabi Marka, and Doug Lormand. During E4, a comparison of triggers from different DMT monitors led to the discovery and correction of several bugs.

Penn works on Data Monitoring Tool

Penn completed work on a DMT monitor that constructs the bi-spectrum and bi-coherence of combinations of signals. This holds substantial promise as a diagnostic tool for understanding the coupling between signals

Saulson co-chairs Burst Upper Limit Group

The Burst Group continued to refine its plans for searching for unmodeled transient signals in the Upper Limit Run. During this period, development moved forward on several kinds of search filters, including the Excess Power Statistic, Time-Frequency Clusters, and the Slope Detector, in preparation for a Mock Data Challenge in early September. A plan was also developed for a simulation study to prepare for scientific interpretation of data from the search.

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Attachment B - Isolation/Suspension/Thermal Noise

Participation

Participate in SWG activities

Syracuse experiments on coating losses summarized in a paper. Syracuse consults on the companion paper on Glasgow/Stanford experiments, and Gretarsson designated as an author on that paper. Studies for these papers led Gretarsson to discover a factor of 2 error in the BENCH noise modeling program.

Loss mechanisms in fused silica

Studies of rods made from a new shipment of Suprasil 2 showed dissapointingly low Q, about 18 million, in diameters from 3 mm to 9 mm. We should have seen 55 to 65 million, or even higher if the trend of Q improvement with diameter had continued. After many trials to check suspension loss and surface damage, we conclude that the stock we were sent by Heraeus is intrinsically different in some way from what they had been sent previously. It will be interesting to learn what is different.

Loss mechanisms in sapphire

This task has been on hold while work continues on the anelastic effect experiment.

Improvement of anelastic effect measurement system

The most recent improvement has been to install alignment mechanisms to allow us to make measurements on fused silica samples suspended by fine fibers. We hope this will remove systematics associated with our previous rigid mount system.

Explore anelastic study of coating loss

We hosted a visit by Phil Willems of Caltech to discuss time-domain measurement of coating losses. He and we agreed that Willems's lab will pursue this technique to learn about coating loss.

Develop violin mode sensor

Gretarsson measured the noise statistics in a fine tungsten fiber. It showed some excess noise above that expected from thermal noise, in rough agreement with the results from the Moscow group. He has installed a servo system to allow the sensor to track pendulum mode motion, and designed a calibration system.