

## LSC Six-Month Progress Report

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(EPRG-CSUDH)

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Attachment A / LIGO I

Progress Report for the CSUDH LIGO subgroup for the February 15, 2003 - August 15, 2003 MOU Period

Task-1: Computation and documentation of computational results for imperfect optics simulations for Advanced LIGO and the upgraded 40m using the FFT program (Ganezer, Jennings, and Wiley).

We set up the full version of FFT so that a few input variables could be changed and one could switch from signal recycling to RSE tunings.

We reviewed the literature on RSE, and subsequently made refinements and corrections to the 2-d FFT program for RSE and SR tunings. We also checked FFT results with the finesse program from the Max Planck Institute. We concluded that SR tunings and analogous RSE tunings were out of phase in the SRC by an additive factor of  $\pi$  and that there was little or no difference in the full or 2-d FFT results between RSE and SR tunings.

Task-2: Efforts in the upgrade of the Caltech 40m (Ganezer)

Ganezer visited Caltech on about a monthly basis to keep track of the upgrade and to make suggestions.

Task 3: Work with the burst source data analysis and on correlations of gravity wave measurements with SNEWS and with neutrino experiments. (Ganezer and Keig)

In May 2003 Ganezer presented a proposal to the burst source analysis group on planned S2 data analysis activities entitled "S2 Burst Analysis Contributions from CSUDH Group: A Synthesis of Simulations, External Triggers, and Data Quality". Ganezer wrote a simple program to read official lock-segment files and to determine which interferometer caused lock breaks and what AS\_Q segments were to be examined for end-of-lock anomalies. Some AS\_Q time series were examined using GNUPLOT software from the LINUX operating system. MATLAB software including the MATLAB analysis package was setup to run on the CSUDH LINUX cluster for use in AS\_Q studies of lock breaks. Our results on lock breaks were used to check an on-line script that ran during S2 at LHO and LLO to determine lock break times and which interferometer caused each lock break.

Ganezer participated in the S1 burst source analysis by taking part in weekly teleconferences and other burst group meetings. Ganezer also helped to edit and finalize

the S1 Burst Source PRD paper, though written as well as oral suggestions and comments.

During summer 2003 we obtained approval for funding of a 32 node Beowulf cluster from the NIH for research in the Physics and Chemistry departments. This cluster can be used for LIGO data analysis and simulations and plans have been made to run LDAS and LIGO optical simulations under the new cluster.

#### Task-4: Participation in the S2 Science Run

The LIGO S2 science run took place from February 14 through April 14, 2003. The CSUDH LIGO subgroup participated in S2 by undertaking a total of 5 expert shifts (as required for two FTEs) and 8 training shifts at LHO and LLO. Ganezer completed three training shifts at LHO and three expert (Scimon) shifts a LLO and Wiley undertook five training shifts and 2 expert shifts at LHO. At the moment the CSUDH group has two Scimons, Ganezer and Wiley.