LSC Six-Month Progress Report

Organization: Elementary Particles and Relativity Group at California State University Dominguez Hills (EPRG-CUSDH)
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Attachment A / LIGO I

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

This task was undertaken by Sam Wiley, Ken Ganezer, and George Jennings. We performed calculations of the amplitudes of gravitational wave sidebands (GW-sbs) for various signal recycling (SR) tunings of the signal recycling cavity (SRC). We obtained (from Brett Bochner) and corrected a two dimensional version of FFT that assumes cylindrical symmetry and relies on analytical calculations from the basic formalism for SR. Our SR results for the full FFT program in the perfect optics limit agreed almost perfectly with those of the one dimensional version of FFT. In addition we calculated GW sideband amplitudes for several cases of imperfect optics with random pixel-by-pixel deformations. Our results from full FFT agreed with those of the 2-d version of FFT for GW-sbs in SR for perfect optics and our calculations for imperfect optics agreed with those in Bochner's PhD thesis. We performed calculations with RSE tunings using 1-d FFT and investigated how to setup full FFT for RSE.

Our FFT based calculations were presented by K. Ganezer in a talk at the August 2002 LSC meeting.

Task-2: Efforts in installing the PEM sensors, active vibration isolation system, and optical components at the 40m

Ganezer visited Caltech on about a monthly basis to participate in the installation of these systems.

Task-3: Work with burst source group on environmental vetoes, SNEWS and neutrino based triggers, and establishing upper limits from LIGO Engineering Runs

Ganezer gave a talk on behalf of himself and Keig at the August 2002 LSC meeting to the ASIS group concerning the status of SNEWS in general and with regard to GW experiments and possibilities for further neutrino correlations with LIGO. Ganezer participated in Burst Group meetings and made suggestions for burst source analysis techniques and the burst source pipeline. Suggestions were also made by Ganezer on how to correlate LIGO with individual neutrino experiments. For neutrino correlations beyond SNEWS new inter-collaboration agreements will be necessary.

Task-4: Construction of a Beowulf prototype at CSUDH and testing of the cluster using FFT

A LINUX cluster with about 8 nodes, the FFT code, and a gateway server was formulated by Ganezer with a second LINUX cluster with about five nodes by Martinez and Wiger. We did not manage to set up MPI. A proposal to the NIH was formulated by Martinez and Wiger for a 64 node Beowulf cluster that was submitted in December 2002, and funded in June 2003. The new cluster should be constructed in the next few months. The grant for the new cluster includes a full time systems manager.