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Subject: Large Facilities Projects Monthly Report for November 2006
(LIGO)
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Subject: LIGO End of November 2006 Highlights

Reference: LIGO-M060328-00-P

General

We held a very successful Opening of the Science Education Center at the Livingston Observatory on Monday, November 13th.

LIGO Scientific Collaboration (LSC)

On November 4-5, we held a productive LSC meeting at MIT. Virgo guests at the analysis group face-to-face meetings (2-3 November), and then during the LSC meeting proper, got a sense of the pace of LSC data analysis work. Each analysis group showed good progress on S5 data analysis, and presented publication plans.

The LSC meeting was followed by a 1.5 day meeting between data analysts and numerical relativists. It was a very fruitful interchange between the two communities, who learned in real time to speak a common language. The prospects look excellent for good scientific interaction in the near future.

The LSC Executive Committee met on Thursday, November 16. A new version of the MOU with Virgo was discussed and approved for transmission to Virgo, for meetings of the Virgo Steering Committee on December 6 and of the EGO Council on December 8. We just learned that both the Virgo and EGO Councils approved the MOU with suggestions for slight changes of wording to better clarify the text in a few clauses. We are hopeful that we are converging on a final version, which would then be submitted to the LSC Council (on our side) for final approval in early January 2007.

Publications

The S4 Stochastic All-sky search paper was accepted by the Astrophysical Journal. In the letter informing us of its acceptance, the Editor commented, "I encourage you and the LSC to consider ApJ again for future LIGO papers!" (Exclamation mark his.)

S5 Science Run

The onset of winter weather brought winds and storms that degraded ranges and duty factors at both sites. The month-long averages (for the past 30 days) for ranges and duty factors are shown below:

Detector(s)	Hours	Percent of Time in Science Mode since November 05, 2006
H1	500.6	69.5
H2	487.4	67.7
L1	457.2	63.5
(H1 or H2) + L1	361.0	50.1

The averages since the beginning of the S5 run are:

Detector(s)	Hours	Percent of Time in Science Mode since November 04, 2005
H1	6955.5	73.1
H2	7276.7	76.5
L1	5648.3	61.0
(H1 or H2) + L1	5112.3	53.8

November was an intra-S5 (fifth science run) commissioning period where necessary maintenance and commissioning activities were carried out to insure continued quality operation of the interferometers. (There have been two previous commissioning breaks, in February 2006 and in April 2006.) The duty factors reflect the commissioning activities and the environmental conditions: Hanford had 50mph winds and Livingston saw large microseismic noise. This additional noise brought the inspiral range from its normal 15 megaparsecs (Mpc) down to ~12 Mpc for the 4 km-long interferometers. Extremely high winds at the beginning of the last week of November, plus commissioning activity (for example, optical table floating, thermal testing of test masses, and parking lot paving) accounted for reduced duty factors at the end of the month. An interesting note was the recovery of inspiral range at Hanford attributed to Northwest Energy's (the nuclear power station 5 km away from the Hanford site) opening and closing of a bypass vent which induced significant ground motion. We expect to return to our more representative ~70 percent duty factors and 15 Mpc/7 Mpc ranges in December.

Education and Outreach

We have completed the development of teachers support materials for Einstein's Messengers. Teachers will soon be able to receive copies of the DVD and support booklet from Video Placement Worldwide. A companion Web site is now in place at www.einsteinsmessengers.com.

Enhanced LIGO

We held a baseline budget and schedule review for initial LIGO enhancements on 20 November, and presented a

progress report to the LIGO PAC on November 28. We also expanded the core enhanced LIGO team to include site coordinators for both Hanford and Livingston. Designs are so far progressing either on schedule or somewhat ahead.

Advanced LIGO

We held an optics meeting at Caltech November 6-10 to address a number of issues in the design of the Advanced LIGO Optical System. Participants from the Lab and a variety of LSC member groups discussed optics figure, point scatter, optical absorption, and mechanical loss issues. Configuration issues such as the choice of a stable/unstable recycling cavity, and the potential for parametric instabilities, also received attention. The meeting was useful in bringing together key scientists working on these issues and developing a "to-do" list for continued development work.

The characterization of the prototype for the test mass chamber (BSC) seismic isolation continues. In particular, the first transfer function matrices (input drive to output motion) have been measured, and in general agree well with the models. We held a kick-off meeting with the selected designer of the baseline system horizontal access module (HAM) seismic isolation system and set dates for a series of reviews/milestones. Cleaning and clean assembly nearly complete for the alternative "soft" (SAS) isolation prototype. We installed control electronics and software at the MIT LIGO Advanced System Test Interferometer (LASTI) in preparation for characterization.