



**Attachment OPS to the
Memorandum of Understanding LIGO-M000125-00
between the Carleton College Relativity Group (CCRG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
For The Period
August 15, 2008 - August 14, 2009**

This Attachment OPS to the Memorandum of Understanding LIGO-M000125-00 defines the role of the Carleton College Relativity Group (CCRG) as a Member of the LIGO Scientific Collaboration (LSC) in the areas of detector commissioning, detector characterization, and operations support in the initial LIGO interferometers. The period of performance for the activities in this Attachment is from August 15, 2008 - August 14, 2009.

1. Collaboration

Together, the LIGO Laboratory and the LIGO Scientific Collaboration (LSC) are responsible for implementing and exploiting the initial LIGO detector through its science data runs. LSC groups are encouraged to contribute to the commissioning, characterization, and operation of the LIGO detectors, as members of working groups established by the LIGO Laboratory and the LSC.

2. Participation

During the period August 15, 2008 - August 14, 2009, the members of CCRG will participate in the initial LIGO detector research program in the following areas:

a. Detector Commissioning

Not Applicable

b. Detector Characterization

Nelson Christensen (faculty), Thomas Ballinger, Daniel Buckleitner, and Tomoki Isogai (undergraduates) will continue to be involved in detector characterization activities. We expect more undergraduate students to join our group and be involved in the 08-09 cycle.

The CCRG will continue to calculate the coherence between the LIGO interferometers' output, and PEMs. This work will be coordinated through the LSC Detector Characterization Group. The CCRG will attempt to identify and determine the cause of noise lines in the LIGO data. For S6 we will calculate and produce DARM_ERR - PEM coherence results, averaged over daily, weekly, and monthly

time scales. We will develop the means to calculate this DARM_ERR - PEM coherence in near real time for S6.

Glitch Working Group: The CCRG will conduct research on identifying and characterizing glitches that appear in the LIGO interferometer output data. Specific attention will be given to identifying the cause of events that appear as triggers in the the LSC binary inspiral search pipeline. Inspiral vetoes will be developed. This work will be coordinated with both the LSC Glitch Working Group, and the LSC Inspiral Group. CCRG members will conduct glitch shifts for the LSC Glitch Working Group.

We will develop software whereby candidate veto channels can be developed immediately as binary inspiral, burst, and KleineWelle (on PEM and interferometer control channels) triggers are produced.

We will specifically target magnetometers with the intention of quickly producing magnetometer based data quality flags. We will develop tools that will quickly search the KleineWelle magnetometer triggers, and report events that occur simultaneously in multiple magnetometers at a particular observatory site.

c. Detector Operations

CCRG group members will fill in science monitor shifts as needed.

d. Other Contributions

Not Applicable

3. Resource Sharing

The LIGO Laboratory will contribute resources including allocation of appropriate scientific and engineering personnel, research facilities, and funding in support of the effort in Item No. 2, as indicated below.

- a. Research accommodations for CCRG group members while on LIGO research assignment at any LIGO Laboratory site.

Not Applicable

- b. Access to LIGO data through established LSC channels in support of this work.

Not Applicable

4. Coordination and Reporting

CCRG will perform research within the structures established by the LIGO Laboratory and the LSC where appropriate.

In particular, with reference to activities described above:

2a will be carried out in coordination with the LIGO Laboratory Commissioning Leader.

2b will be carried out within the Detector Characterization Working Group of the LSC.

2c will be carried out in coordination with the LHO or LLO Site Head.

This includes keeping the Group leaders informed of activities and plans, reporting to the group at meetings and telecons, and through technical documents submitted to the LIGO Document Control Center.

In addition, an annual report will be submitted with the update to this Attachment, giving a summary status on research by topic as indicated in Item No. 2, including progress against the milestones if any, significant accomplishments such as new insights/discoveries or publications, issues of concern if any, and an indication of invested time.

This Attachment will be updated at least annually with a plan of activities for the succeeding one-year period. These documents will be due one month before the close of the period of performance under this Attachment.

5. Computer Code

All computer code delivered to the LSC under this Attachment must be developed in consultation with the LSC Data Analysis Software Working Group (DASWG) and archived, documented and reviewed as determined by that group.



Jay Marx
LIGO Laboratory Director



Nelson Christensen
**Principal Investigator(s)
CCRG**



David Reitze
LSC Spokesperson