



**Attachment SUS to the
Memorandum of Understanding LIGO-M050375-00
between the Caltech Experimental Gravitational-Physics Group
(CEGG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
For The Period
August 15, 2008 - August 14, 2009**

This Attachment SUS to the Memorandum of Understanding LIGO-M050375-00 defines the role of the Caltech Experimental Gravitational-Physics Group (CEGG) as a Member of the LIGO Scientific Collaboration (LSC), and a member of the Isolation/Suspension/Thermal Noise Development Group (ISTNDG). The period of performance for the activities in this Attachment is from August 15, 2008 - August 14, 2009.

1. Collaboration

The Isolation/Suspension/Thermal Noise Development Group (ISTNDG) is the scientific collaboration for defining and developing instruments in optics for use in advanced subsystems for the initial LIGO interferometers or in entirely new advanced interferometers. MOU Attachment SUS defines the roles and responsibilities of workgroups in this development group.

2. Participation

During the period August 15, 2008 - August 14, 2009, the members of CEGG will participate in in ISTNDG in the following areas:

a. Coating Losses

Not Applicable

b. Suspension Design for Advanced LIGO

Not Applicable

c. Other Contributions

Note on some recent and proposed work

As outlined in several Progress Reports, our overall research relates largely to improving the isolation from seismic and other disturbances of instruments for the

measurement of gravitational waves, and of gravitational fields in general. Our recent work in these areas has stimulated new ideas for the measurement of small forces. To develop and apply these concepts further we have been working on a new design of gravity gradiometer, aiming at higher sensitivity than available from current techniques. One application envisaged for instruments based on these ideas arises in improving the low-frequency performance of gravitational-wave detectors. Here, by monitoring changes in the gravitational fields at the test masses arising from seismic and atmospheric motions it should be possible to compensate for these fields. This may make it practicable to largely avoid effects of local gravity-gradient noise, which has generally been regarded as setting the low-frequency limit to operation of earth-based gravity wave detectors.

Our present experiments are aimed at achieving high sensitivity in such measurements. These use new variants of the optical cavity sensing techniques proposed by the PI many years ago and currently used in LIGO. Seismic noise is the main factor limiting our present experiments, and work to improve seismic isolation is in progress. We expect this work will facilitate useful improvements in the low-frequency performance of gravitational wave detectors, as well as having applications in several other areas.

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 CEGG 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

CEGG will perform research within the structures established by the LIGO Laboratory and the LSC where appropriate. In particular, activities described in Item 2 will be carried out within the Isolation/Suspension/Thermal Noise Development Group of the LSC.

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

Signature Pending Approval

Ronald W.P. Drever
Principal Investigator(s)
CEGG



David Reitze
LSC Spokesperson