

Attachment DAT to the
Memorandum of Understanding (LIGO-M 050381 -00-M)
between the
Loyola University Experimental Gravitation Group (LUEGG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
August 15, 2006

This Attachment DAT to the Memorandum of Understanding LIGO-M 050381 -00-M defines the role of the **Loyola University Experimental Gravitation Group** as a Member of the LIGO Scientific Collaboration (LSC), in particular, its activities in data analysis in support of the initial LIGO interferometers. The period of performance for the activities in this Attachment is from August 15, 2006 to August 15, 2007.

1. 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. The LSC has organized the data analysis effort into search groups which coordinate the analyses, perform detailed reviews, and prepare publications on behalf of the collaboration. LSC groups are encouraged to participate in one or more of these groups. MOU Attachments define the contributions of each participating group to the data analysis groups.
2. During the period August 15, 2006 to August 15, 2007, the members of **LUEGG** will participate in the analysis of initial LIGO data in the following areas:

c) Stochastic

Martin McHugh will continue to pursue data analysis as part of the Stochastic Sources Working Group. The review of the LLO-ALLEGRO stochastic analysis is underway and we will work to have this completed soon. We plan to submit a paper on the results of the S4 LLO-ALLEGRO stochastic analysis for publication with the LSC author list plus some additional ALLEGRO group authors. We also plan to write a technical paper on the calibration of the ALLEGRO data for this analysis. This will be submitted for publication with a smaller author list.

During the coming year we plan to contribute to the all-sky H1-H2 stochastic analysis. While potentially the most sensitive instrument pair available, with the ability to use the full LIGO bandwidth, it is complicated by the co-location of the instruments and the common noise environment. Others in the stochastic group are currently pursuing techniques which identify frequency bands with statistically significant coherence. Another approach also being investigated is to use a regression technique to remove correlated environmental noise from the gravitational wave data channels. We propose to join these efforts to exploit the H1-H2 interferometer pair in the search for stochastic gravitational waves.

e) 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 **LUEGG** group members while on LIGO research assignment at any LIGO Laboratory site,
- b) Access to LIGO data through established LSC channels in support of this work.
- c) Not Applicable

4. Coordination and Reporting -

LUEGG will perform this research within the structures established by the LIGO Laboratory and the LSC where appropriate. In particular activities described in Item 2a) will be carried out within the LSC Inspiral Search Group, Item 2b) will be carried out within the LSC Burst Search Group, Item 2c) will be carried out within the LSC Stochastic Search Group and Item 2d) will be carried out within the LSC Continuous Waves search Group. 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 on-year period. These documents will be due one month before the close of the period of performance under this Attachment.

5. 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.

Approved:

Jay Marx
LIGO Laboratory Director

Martin McHugh
Principal Investigator
Loyola University Experimental Gravitation Gi

Peter Saulson
LSC Spokesperson

Attachment OPS to the
Memorandum of Understanding (LIGO-M 050381 -00-M)
between the
Loyola University Experimental Gravitation Group (LUEGG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
August 15, 2006

This Attachment OPS to the Memorandum of Understanding LIGO-M 050381 -00-M defines the role of the **Loyola University Experimental Gravitation Group** 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, 2006 to August 15, 2007.

1. 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. During the period August 15, 2006 to August 15, 2007, the members of **LUEGG** will participate in the initial LIGO detector research program in the following areas:

b) Detector Characterization

H1-H2 coherence studies undertaken for the stochastic analysis can directly inform detector characterization. These studies will look at environmental couplings to the gravitational wave channel.

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 **LUEGG** group members while on LIGO research assignment at any LIGO Laboratory site,
 - b) Access to LIGO data through established LSC channels in support of this work.
 - c) Not Applicable

4. Coordination and Reporting -

LUEGG will perform this research within the structures established by the LIGO Laboratory and the LSC where appropriate. In particular activities described in Item 2a) will be carried out in coordination with the LIGO Laboratory Commissioning Leader, Item 2b) will be carried out within the Detector Characterization Working Group of the LSC, and Item 2c) will be carried out in coordination with the LHO {or LLO} Site Head. Coordination will include 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 on-year period. These documents will be due one month before the close of the period of performance under this Attachment.

5. 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.

Approved:

Jay Marx
LIGO Laboratory Director

Martin McHugh
Principal Investigator
Loyola University Experimental Gravitation Gi

Peter Saulson
LSC Spokesperson

**Attachment Number Z to the
Memorandum of Understanding (LIGO-M **050381** -00-M)
between the
Loyola University Experimental Gravitation Group (**LUEGG**)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory**

This Attachment to the Memorandum of Understanding LIGO-M **050381** -00-M lists the coordinates of members of the **Loyola University Experimental Gravitation Group** who will participate in the LIGO Scientific Collaboration (LSC) as members of LIGO Development Groups. The period of performance for the activities in this Attachment is from August 15, 2006 to August 15, 2007. This period may be modified by agreement to a revision of this Attachment. This list may be extended by agreement to a revision of this Attachment.

Principal InvestigatorFirst Name: **Martin**Last Name: **McHugh**Affiliation: **Loyola University New Orleans**Address: **6363 St. Charles Ave.**City: **New Orleans**State: **LA**Zip Code: **70118**Country: **United States**Primary Email: **mmchugh@loyno.edu**Job Title: **Associate Professor**

Secondary Email:

Phone Number: **504 865 2451**Fax Number: **504 865 2453**Begin Date: **Aug 15, 2006**End Date: **Aug 15, 2007**Research FTE: **75 %**LIGO FTE: **75 %**AdvLIGO FTE: **0 %**Author on LSC papers: LSC Council Delegate?

Member #10

Select this box if the contact information of this member is the same as that of the Principal Investigator.

First Name:

Last Name:

Affiliation:

Address:

City:

State:

Zip Code:

Country:

Primary Email:

Job Title:

Secondary Email:

Phone Number:

Fax Number:

Begin Date:

End Date:

Research FTE %

LIGO FTE %

AdvLIGO FTE %

Author on LSC papers: LSC Council Delegate? **Authorship:****McHugh****Scientific Collaboration Council Delegate(s):****McHugh**

Approved:

Jay Marx
LIGO Laboratory Director

Martin McHugh
Principal Investigator
Loyola University Experimental Gravitation Gi

Peter Saulson
LSC Spokesperson