

**Attachment Number B to the**  
**Memorandum of Understanding (LIGO-M950059-00-M)**  
**between the**  
**LSU Experimental Relativity Group (LSUERG) of the Louisiana State**  
**University**  
**and the**  
**Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory**  
**February 15, 2000**

This Attachment to the Memorandum of Understanding LIGO-M950059-00-M covers the role of the LSU Experimental Relativity Group (LSUERG) of the Louisiana State University as a Charter 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 February 15, 2000 to August 15, 2000. This period may be modified by agreement to a revision of this Attachment.

1. LIGO Scientific Collaboration - The LIGO Scientific Collaboration is organized as a separate organization from the LIGO Laboratory. It includes scientists from the LIGO Laboratory, and those from collaborating institutions, and has its own leadership and governance. The Collaboration will ensure equal scientific opportunity for individual participants and institutions. It will organize the research, publications, and all other scientific activities. The Collaboration will report to the Laboratory Directorate for final approval of its research program, technical work, observational physics publications, and talks announcing new observations and physics results. This will be done through regular reports to the Directorate and its PAC.
2. Charter Membership - An initial period for formation of the Charter group of institutions in the LIGO Scientific Collaboration commenced on March 1, 1997 and ended following the first full meeting of the Collaboration at which the Collaboration Council assumed its role.

Following the charter period proposals will be evaluated through the Collaboration Council. With Collaboration approval, an MOU with the LIGO Laboratory, including Attachments defining specific work, will be required for any participating institutions.

3. This document is an agreement between the LSU Experimental Relativity Group (LSUERG) of the Louisiana State University and the LIGO Laboratory concerning the activities of LSU-ERG as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the Isolation/Suspension/Thermal Noise Development Group (ISTNDG), and as indicated in Item No. 8 below.
4. Isolation/Suspension/Thermal Noise Development Group - The Isolation/Suspension/Thermal

Noise Development Group (ISTNDG) is the scientific collaboration for defining and developing future isolation and suspension improvements for use in advanced subsystems for the initial LIGO interferometers or in entirely new advanced interferometers. A specific Attachment will define the roles and responsibilities of groups in this development group. Members of this group will normally be authors on publications reporting the work of the group and will normally be eligible to participate in data runs and science beyond the LIGO I data run.

5. Report of Progress - LSUERG will provide a status report on its activities in support of LIGO every six months. The report will consist of: a) a summary status on research by topic as indicated Item No. 8 below 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, b) updated List of Collaborators, and c) a plan of activities for the succeeding six-monthly period. The report will be due one month before the close of the period of performance under the Attachment in question.
6. Term of Membership - The Membership will be renewed every six months upon evidence of satisfactory performance of agreed upon duties.

The coordinates of LSUERG members are included in the Attachment Z to the Memorandum of Understanding LIGO-M950059-00-M.

7. Intellectual Property Rights - The rights to intellectual property developed under this Attachment will be subject to the National Science Foundation Grant Policy as indicated in Section 730, Intellectual Property.
8. During the period February 15, 2000 to August 15, 2000, LSUERG members Philip Adams, Warren Johnson, Joe Giaime, Philip Adams, and Phay Ho will participate as follows:

a) LSC Suspension and Isolation Working Group

W. Johnson, P. Ho, and J. Giaime will participate in the design phase of the LIGO-II Suspension and Isolation system development. J. Giaime will share leadership (with J. How) of the stiff-spring design development for a LIGO-II active seismic isolation system. W. Johnson will work on two items, a higher-sensitivity displacement sensor, and calculations and plans for a vertical spring system, based on straight torsion springs, as an alternative to blade springs for advance suspensions.

b) Cryogenic Suspension

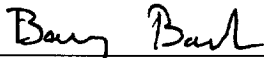
W. Johnson and P. Adams will construct a simple apparatus for measurement of the mechanical Q in metal wires at low temperature. The long term goal of this effort is to determine the scientific feasibility of drastically reducing the pendulum thermal noise by cooling just the suspension wires and not mirrors themselves. This effort is newly funded by the NSF.

c) Transient Noise Measurement

J. Giaime will (using LSU start-up funds) begin construction of a facility to measure transient noise in LIGO components.

9. During the period February 15, 2000 to August 15, 2000, the LIGO Laboratory will share, as requested and agreed, LIGO data of relevance to research topics in Item No. 8 above.
10. The research effort pursuant to this Attachment B will be coordinated by W. Johnson and Syd Meshkov on behalf of LSUERG and LIGO Laboratory, respectively.
11. 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. 8, as indicated below. These resources will be in addition to the coordination effort and data to be made available per Item No. 9 above.
  - a) Provide accommodations for LSUERG investigators while on LIGO research assignment at Caltech, and/or LIGO sites.

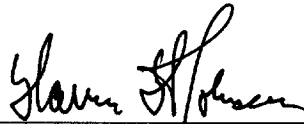
Approved:



Barry Barish  
LIGO Laboratory Director

4-3-00

Date



Warren Johnson  
LSUERG Principal Investigator

16 March 2000

Date