

**Attachment Number B to the**  
**Memorandum of Understanding (LIGO-M970058-00-M)**  
**between the**  
**Experimental Relativity Group (ERG) of the Pennsylvania State University**  
**and the**  
**Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory**  
**August 15, 1999**

This Attachment to the Memorandum of Understanding LIGO-M970058-00-M covers the role of ERG 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 August 15, 1999 to February 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, physics publications, and talks announcing new 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. 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 Experimental Relativity Group (ERG) of the Pennsylvania State University and the LIGO Laboratory concerning the activities of ERG as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the Isolation/Suspension/Thermal Noise Development Group (ISTNDG), and as noted 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 - ERG 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 ERG members are included in Attachment Z to the Memorandum of Understanding LIGO-M970058-00-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 August 15, 1999 to February 15, 2000, the following tasks will be done:
  1. Cross Coupling Issues: Gabriela Gonzalez, Mark Beilby, and Aran Glancy will continue work on experiment measuring cross coupling issues related to mechanical configuration of a double pendulum plus vertical blades.
  2. Local Damping Systems / Performance: G. Gonzalez, M. Beilby, Robert Huber, and Laura Markowitz will design and begin an experiment to compare performance of different local damping systems (point to pint vs.modal damping).
  3. LIGO II: G. Gonzalez will participate in LIGO II design exercise.
  4. CBI Benchmark Program: Lee Finn will maintain and continue development of the CBI benchmark program, used to provide insight into the relative science reach of different interferometer designs and configurations. A stochastic signal benchmark will be added.
9. During the period August 15, 1999 to February 15, 2000, the LIGO Laboratory will share, as requested and appropriate, the LIGO data of relevance to the research focus in Item No. 8 above.
10. The research effort pursuant to this Attachment B will be coordinated by Gabriela Gonzales and Syd Meshkov on behalf of ERG 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 investigators in Item No. 8 above while on research assignment on LIGO at Caltech and/or at LIGO sites.

Approved:

Barry Barish

Barry Barish  
LIGO Laboratory Director

Dec 7, 1999

Date

Gabriela Gonzalez

Gabriela Gonzalez  
ERG Principal Investigator

12/15/99

Date

Lee Samuel Finn

Lee Samuel Finn  
ERG Principal Investigator

12/16/99

Date