

**Attachment Number A 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  
February 15, 1998**

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 LIGO I Development Group (L1DG). The period of performance for the activities in this Attachment is from February 15, 1998 - August 15, 1998. This period may be modified by agreement to a revision of this Attachment.

1. LIGO Scientific Collaboration - The LIGO Scientific Collaboration will be organized as a separate organization from the LIGO Laboratory. It will include scientists from the LIGO Laboratory, and those from collaborating institutions, and will have 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 will commence on March 1, 1997 and will end following the first full meeting of the Collaboration at which the Collaboration Council will assume its role. We expect that this transition will occur within six months. Membership in the Collaboration during this charter period will be initiated by proposal to the LIGO Laboratory Directorate.

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 noted below, under provision 8, of ERG as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the LIGO I Development Group (L1DG).
4. LIGO I Development Group - The LIGO I Development Group will be the scientific collabo-

ration for implementing and exploiting the initial LIGO detector and physics through the initial science data run. Only groups who establish a specific Attachment approved by the LIGO Laboratory, which defines a sufficient contribution and participation in LIGO I development, implementation or data analysis will be part of this initial LIGO data run and science. Participation in future data runs and science that follow LIGO I will be possible for other groups, with guidelines to be determined by the LIGO Scientific Collaboration. It is anticipated that LIGO I data will only be made available, during the first two years following its collection, through formal collaboration within the LIGO I Development Group.

The general guideline for institutional membership in the LIGO I Development Group is that the contribution per collaborator of any new group to the design, construction, and implementation of the initial LIGO detector and to the first data run be comparable to that of the LIGO Laboratory scientists.

5. Report of Progress - ERG will provide a summary report of progress, monthly, by e-mail to the Collaboration Council and to the LIGO Laboratory Director. ERG will submit a complete report on its activities every six months, supply an updated List of Collaborators, and a plan of activities for the next six months. This report should be submitted one month before the updated attachment will take effect.
6. Term of Membership - Membership will be renewed every six months upon evidence of satisfactory performance of agreed upon duties.
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, 1998 - August 15, 1998, the ERG group will consist of Prof. Gabriela Gonzalez. Subsequently, a post-doc and 1-2 graduate students will be added to ERG.

Prof. Gonzalez proposes to collaborate in the installation and commissioning of the first LIGO Detector, and to undertake research on suspension designs aimed at improving the detector sensitivity. The ERG would be part of the LIGO Scientific Collaboration, participating in the LIGO I Development Group. The work for LIGO 1 will consist of:

- a. Collaboration with the Research and Development program related to the Phase Noise Interferometer prototype at MIT.
- b. Collaboration with the Detector design, providing documentation and updates on the modeling done of the control systems with inputs from environmental data at the sites.
- c. Collaboration with the actual installation and commissioning of the first detectors at the site. In the next 1-2 years, Prof. Gonzalez plans to collaborate with the University of Florida group and LIGO on the installation of the Input Output Optics system at the Hanford site. She will design and perform a diagnostic plan on the suspensions, first when installed in the Mode Cleaner cavity, then with the large optics suspensions under local control and in the detector.

The work plan from February 15, 1998 - August 15, 1998 is:

- a. Continue the participation of Gabriela Gonzalez in the Phase Noise experiment at MIT from February, 1998 until the experiment is successfully completed.
- b. Update and improve as necessary the work started on the design of detection servos for Length and Alignment Sensing and Control for the detectors, preparing a design for the Final Design Review of the Length Sensing and Control and Alignment Sensing and Control sub-systems.
- c. Collaborate with the installation and testing of suspended optics and seismic isolation first items at the Hanford site.

Approved:

Barry Barish  
Barry Barish  
LIGO Laboratory Director

Gabriela Gonzalez  
Gabriela Gonzalez  
ERG Principal Investigator

March 12, 1998  
Date

3/13/98  
Date