

**Attachment Number C to the
Memorandum of Understanding (LIGO-M960071-00-M)
between the
University of Florida Laser Interferometric Gravitational Wave Group
(UFLIGO)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory
August 15, 2003**

This Attachment to the Memorandum of Understanding LIGO-M960071-00-M covers the role of the University of Florida Laser Interferometric Gravitational Wave Group (UFLIGO) as a Charter Member of the LIGO Scientific Collaboration (LSC) and a member of the Lasers/Optics Development Group (LODG). The period of performance for the activities in this Attachment is from August 15, 2003 to February 15, 2004. 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 University of Florida Laser Interferometric Gravitational Wave Group (UFLIGO) and the LIGO Laboratory concerning the activities of UFLIGO as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the Lasers/Optics Development Group (LODG), and as indicated in item No. 8.


4. Lasers/Optics Development Group - The Lasers/Optics Development Group (LODG) is the scientific collaboration for defining and developing future high power lasers and required improvements in optics 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 - UFLIGO 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 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 UFLIGO members are included in the Attachment Z to the Memorandum of Understanding LIGO-M960071-00-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, 2003 to February 15, 2004, the UFLIGO will continue in the design of the Advanced LIGO Input Optics as follows:
 - a) Mode Cleaner design: UFLIGO will finalize the design of the LASTI and AdLIGO mode cleaner, including final specification of the mirrors, thermal modeling of the mode cleaner using Femlab and Melody, and preliminary optical layout.
 - b) UF-LIGO will establish a new High Power Laser Facility (HPLF) at the LIGO Livingston Observatory. The HPLF will consist of a 100 W laser and associated diagnostics for measuring the thermal loading effects in Advanced LIGO optical components. During the period covered by this MOU, UFLIGO will bring the laboratory to an operational state and begin testing on Faraday Isolators and modulators described below.
 - c) The refinement and testing of high power Faraday isolators will continue. Specifically, we will examine and characterize materials such as YLF for improving the compensation of thermal lensing in the Faraday isolator. A prototype 20 mm aperture Faraday isolator will be assembled and characterized.

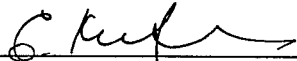
- d) Development and testing of high average power handing electro-optical modulator will continue. RFAM measurements will be performed at 50 and 100 W power levels. Long term exposure and damage testing will take place.
- e) Continued development of the adaptive optical telescope will continue. Finite element modeling will be used to determine the optical path difference achievable in OG515 Schott glass. A prototype adaptive optical telescope will be set-up in vacuum and its performance will be evaluated. A preliminary design for the AdLIGO mode-matching telescope will be undertaken.
- f) A prototype birefringence and thermal compensated Faraday isolator will be delivered to the ACIGA Facility in Gingin Australia for integration into the Gingin High Power interferometer.
9. During the period August 15, 2003 to February 15, 2004, the LIGO Laboratory will share, as requested and appropriate, LIGO data of relevance to the research focus in Item No. 8 above.
10. The research effort pursuant to this Attachment C will be coordinated by G. Mitselmakher and David Shoemaker on behalf of UFLIGO and the 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.
- a) Provide accommodations for UFLIGO collaborators while on LIGO research assignment at Caltech, and/or LIGO sites.
- b) LIGO research effort at the University of Florida is supported in part with the LIGO Laboratory funds under the Caltech Purchase Order for IO operations.
- c) LIGO Laboratory provides partial funding for IAP/Nizhny Novgorod collaboration under a Caltech Purchase Order for LIGO effort with the University of Florida.

Approved:



 Barry Barish
 LIGO Laboratory Director
 26 Nov 03

 Date



 Guenakh Mitselmakher
 UFLIGO Principal Investigator
 Dec 17, 2003

 Date