



**Attachment OUT to the
Memorandum of Understanding LIGO-M050292-00
between the Caltech Relativity Group (CaRT)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
For The Period
August 15, 2008 - August 14, 2009**

This Attachment OUT to the Memorandum of Understanding LIGO-M050292-00 defines the role of the Caltech Relativity Group (CaRT) as a Member of the LIGO Scientific Collaboration (LSC) in support of Education and Outreach to the broader community. The period of performance for the activities in this Attachment is from August 15, 2008 - August 14, 2009.

1. Education and Outreach

As a frontier physics effort, LIGO offers a unique opportunity to inspire interest in science among students and to educate the broader community. The LIGO Laboratory supports a broad program of education and outreach to take advantage of these opportunities.

Activities to attract and educate visitors take place at both Observatories, as well as the development of educational materials for use there and elsewhere.

The LIGO Laboratory is building a Science Education Center at the Livingston Observatory, and is participating with local partners to make it a vehicle for science education throughout the region. LSC groups are invited to participate in these activities, and to suggest others, with the goal of leveraging activities to make a greater impact.

This MOU Attachments defines the role and responsibilities of groups in this development group.

2. Participation

During the period August 15, 2008 - August 14, 2009, the members of CaRT will participate in in LDG in the following areas:

a. Educational Materials Developed

Not Applicable

b. Other Contributions

(a) Outreach lectures:

Thorne will give occasional lectures for nonscientists (the general public, undergraduates, minority students, ...) about gravitational-wave science and related issues.

- (b) “Interstellar” A science fiction movie based on gravitational physics in which Thorne is co-author of the story and Executive Producer
During the coming year, the screen writer (Jonah Nolan) is expected to complete the screen play. Thorne will work with Nolan on this to ensure that the science remains accurate and compelling, and will work with Nolan, the Producer (Lynda Obst) and Director (Steven Spielberg) on planning for computer-graphics renderings of gravitational waves, black holes, and other curved-spacetime phenomena.
- (c) DVD on the science underlying the movie “Interstellar” Thorne will work with Obst, Spielberg and Nolan on planning and organizing the production of a DVD about the science of Interstellar - to which Spielberg has tentatively agreed.
- (d) Visual Media Outreach Program
Thorne will continue to work with Vallisneri and Phinney to flesh out their proposed Visual Media Outreach Program (joint Caltech/ USC Film School student media projects; advice to the TV and Movie film makers), and find funding for it.
- (e) “Einstein’s Cosmic Messengers” multimedia show
Vallisneri will assist composer Andrea Centazzo in completing the multimedia show “Einstein’s Cosmic Messengers” (working title), and in organizing presentations of the show (together with public lectures by LSC scientists) at LSC institutions, and elsewhere. The premiere of the show will be in Oct 2008 at Caltech’s Beckman Auditorium, and is being organized by Vallisneri in collaboration with LIGO Lab CIT.

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 CaRT group members while on LIGO research assignment at any LIGO Laboratory site.

Not Applicable

- b. Access to LIGO data through established LSC channels in support of this work.

Not Applicable

4. Coordination and Reporting

CaRT will perform research within the structures established by the LIGO Laboratory and the LSC where appropriate. In particular, activities described in Item 2 will be carried out with the LIGO Observatories Educational and Outreach Leaders.

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 one-year period. These documents will be due one month before the close of the period of performance under this Attachment.

5. Computer Code

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.



Jay Marx
LIGO Laboratory Director



Yanbei Chen
**Principal Investigator(s)
CaRT**



David Reitze
LSC Spokesperson