

**Attachment DAT to the  
Memorandum of Understanding (LIGO-M050280-00-M)  
between the  
Australian Consortium for Interferometric Gravitational Astronomy  
(ACIGA) and the  
Laser Interferometer Gravitational Wave Observatory (LIGO)  
August 15, 2005**

This Attachment DAT to the Memorandum of Understanding LIGO-M050280-00-M defines the role of the Australian Consortium for Interferometric Gravitational Astronomy (ACIGA) as a Member of the LIGO Scientific Collaboration (LSC), in particular, its activities in data analysis in support of the initial LIGO interferometers. The period of performance for the activities in this Attachment is from August 15, 2005 to August 15, 2006.

1. Together, the LIGO Laboratory and the LIGO Scientific Collaboration are responsible for implementing and exploiting the initial LIGO detector through its science data runs. The LSC has organized the data analysis effort into search groups which coordinate the analyses, perform detailed reviews, and prepare publications on behalf of the collaboration. LSC groups are encouraged to participate in one or more of these groups. MOU Attachments define the contributions of each participating group to the data analysis groups.
2. During the period August 15, 2005 to August 15, 2006, the members of ACIGA Group will participate in the analysis of initial LIGO data in the following areas:
  - a) *Bursts* –
    - Coherent burst search: The Australian National University with Chatterji *et al* at Caltech/JPL
      - i) Publication of new method
      - ii) Large-scale monte-carlo/mock data testing
      - iii) Implement as production search
      - iv) Test analysis on S4 data
      - v) Run as S5 search
      - vi) Impact of AIGO on this search
  - b) *Stochastic* –
    - Probability event horizon (University of Western Australia):
      - i) Join the LSC stochastic background group.
      - ii) Further develop the Probability Event Horizon algorithm for cosmological stochastic background searches.
      - iii) Develop a simulation code to create interferometer data with non-Gaussian noise.
      - iv) Port simulation and cross correlation software to Cray XD3 supercomputer.
      - v) Test the PEH algorithm for simulated events buried in non-gaussian noise.
      - vi) Submit PEH results to LSC for comment and evaluate case for testing using

playground data from LIGO.

- c) *CW* – Gravitational lensing (ANU)
    - i) Investigate the possible effects on detection for gravitational waves that have been gravitationally lensed, in cases where the lensing cannot be treated in the geometrical optics approximation.
    - ii) Using the diffraction integral formalism of Nakamura and Deguchi, determine conditions for applicability of simple mass distributions (point mass, SIS) as models for distributed lensing objects (star clusters, galaxies).
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 ACIGA group members while on LIGO research assignment at any LIGO Laboratory site,
    - b) Access to LIGO data through established LSC channels in support of this work.
  4. Coordination and Reporting – ACIGA Group will perform this research within the structures established by the LIGO Laboratory and the LSC where appropriate. In particular activities described in Item 2a) will be carried out within the LSC Burst Search Group, Item 2b) will be carried out within the LSC Stochastic Search Group, and Item 2c) will be done within the LSC Pulsar Search Group. Coordination will include 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 on-year period. These documents will be due one month before the close of the period of performance under this Attachment.
  5. 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.

Approved:

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Barry Barish  
LIGO Laboratory Director

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David McClelland  
ACIGA Principal Investigator

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LSC Spokesperson

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LSC Stochastic Search Group Leader

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