

Attachment DAT to the
Memorandum of Understanding (LIGO-M050233-00-M)
between the
Balearic Islands University Relativity and Gravitation Group (UIBRG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
August 15, 2005

This Attachment DAT to the Memorandum of Understanding LIGO-M050233-00-M defines the role of the Balearic Islands University Relativity and Gravitation Group (UIBRG) 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 UIBGR group will participate in the analysis of initial LIGO data in the area of periodic GW.

Our next steps will focus on two broad areas: First, using still SFT data as input, and second combine the Hough and F statistic searches as another step forward to a multi-stage hierarchical search. This will continue being done in collaboration with GEO-AEI. In particular:

- We plan to investigate in detail the implications of using the adaptive peak selection criteria that would take into account possible non-stationarities of the detector noise and the amplitude modulation induced by the antenna pattern due to the motion of the detector. We plan to modify the search codes that were used for the S2 analysis and we hope to gain a factor ~15% in sensitivity while keeping a similar computational performance. The new codes would then be used to analyze S4 data.
- Data conditioning or line removal will be considered to be included in the pipeline in order to reduce the number of false candidates. We have codes able to do such conditioning, but so far they have only been used to clean the data that is searched using E@H.
- We will start working on a search code able to combine the Hough and F-statistic searches. Assuming the master equation is sufficiently accurate, the core routines for

performing this modified Hough search are already in place. These routines have to thus be interfaced with the other existing routines for calculating the F statistic, paying attention to the peak selection criteria. The possibility of doing this in the framework of Einstein@Home will also be seriously considered. If no major roadblocks appear, we would like to use Hough on F-statistic to analyze S5 data.

- Another issue that requires our attention is the possibility of developing a coincidence veto and optimize the candidate selection.
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 UIBGR 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 – UIBGR Group will perform this 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 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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Peter Saulson
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