



**Attachment DAT to the
Memorandum of Understanding LIGO-M050233-00
between the Balearic Islands Relativity and Gravitation Group
(UIBRG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
For The Period
August 15, 2008 - August 14, 2009**

This Attachment DAT to the Memorandum of Understanding LIGO-M050233-00 defines the role of the Balearic Islands Relativity and Gravitation Group (UIBRG) as a Member of the LIGO Scientific Collaboration (LSC). In particular, it addresses data analysis activities in support of the initial LIGO interferometers. The period of performance for the activities in this Attachment is from August 15, 2008 - August 14, 2009.

1. Collaboration

Together, the LIGO Laboratory and the LIGO Scientific Collaboration (LSC) 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 analysis, review, and publication on behalf of the collaboration. LSC groups are encouraged to participate in one or more of these groups. MOU Attachment DAT defines the contributions of each participating group to the data analysis development groups.

2. Participation

During the period August 15, 2008 - August 14, 2009, the members of UIBRG will participate in the analysis of initial LIGO data in the following areas:

a. Binary Inspirals

In collaboration with other groups, we will continue working on the problem of incorporating black hole merger waveforms from numerical relativity. We plan to investigate the problem of parameter estimation for these full merger waveforms for future detectors

b. Bursts

Not Applicable

c. Stochastic

Not Applicable

d. Continuous

In this period we plan to use the Multi-IFO Hough search on the full S5 data and perform an all sky search. The goal is to publish a paper together with the results obtained by Power-Flux and the new cross-correlation search. This search will start as soon as all the SFT from the S5 run are available.

The code needs to be reviewed since several new features have been incorporated:

- dynamical selection of data depending on SFT noise floors and sky-positions,
- splitting of sky patches with frequency dependent size,
- creation of a top list of candidates,
- internal follow-up using the full data,
- and a chi-square test.

Also the veto strategy and the way to set upper limits with a reduce number of monte-carlo injection.

Depending of the total volume of data we might decide to perform the multi-IFO search using L1, H1 and H2 data or only using L1 and H1. Results will have to be carefully analyzed, identifying clusters of events and performing coherent follow-ups on the most promising candidates (not excluded by instrumental artifacts). Our plan is to perform the Hough search up to 1kHz using 500 CPU of the morgane cluster at AEI for one month, plus an equivalent time doing follow up studies using F-statistics. The coherent integration time will need to be limited between 7 to 10 days given the large number of templates to be followed up. For the Hough search we want to start the search as soon as possible. Therefore we request the generation of SFTs using version 03 of the calibration. Final upper-limits would then be corrected using the final calibration when this becomes available.

We will keep collaborating with the Einstein@Home team, supporting the Hierarchical Hough search that is currently being used, and participate in their regular telecons

The two students Miquel and Lluçia will participate in the Astrowatch program. This will contribute to gain a better understanding to the noise sources that affect continuous wave searches.

e. Other Contributions

Not Applicable

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 UIBRG 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

UIBRG will perform research within the structures established by the LIGO Laboratory and the LSC where appropriate.

In particular, with reference to activities described above:

2a will be carried out within the LSC Inspiral Search Group.

2b will be carried out within the LSC Burst Search Group.

2c will be carried out within the LSC Stochastic Search Group.

2d will be carried out within the LSC Continuous Waves search Group.

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.



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