



GEO-LIGO data analysis

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GEO 600 Project

- Albert Einstein Institute (Golm and Hannover)  
- University of the Balearic Islands 
- University of Birmingham 
- University of Cardiff 
- University of Glasgow  

 **data analysis**

 **experiment**

GEO's data analysis activities have been part of the LSC for a long time

- LSC data analysis is organized in four working groups. Each has two co-chairs:
 - **Binary inspirals** - *Cardiff*
Patrick Brady [UWM], Gabriela Gonzalez [LSU]
 - **Continuous waves** - *AEI, Balearic Is, Birmingham, Glasgow*
M.Alessandra Papa [**AEI**], Mike Landry [LHO]
 - **Stochastic background** - *Cardiff, Birmingham*
Joe Romano [**Cardiff**], Peter Fritschel [MIT]
 - **Burst signals** - *AEI, Cardiff, Glasgow*
Erik Katsavounidis [MIT], Peter Shawhan [CIT]
- GEO also provides computing power (3 large clusters)

LSC papers

- Detector Description and Performance for the First Coincidence Observations Between LIGO and GEO, B. Abbott et al. (LSC), Nucl. Instrum. Meth., A517 (2004) 154-179
- First Upper Limits from LIGO on GW Bursts, B. Abbott et al. (LSC), Phys. Rev. D 69 (2004) 102001
- Setting Upper Limits on the Strength of Periodic GW from PSR J1939 + 2134 Using the First Science Data from the GEO600 and LIGO Detectors, B. Abbott et al. (LSC), Phys. Rev. D 69 (2004) 082004
- Analysis of LIGO Data for GW from Binary Neutron Stars, B. Abbott et al. (LSC), Phys. Rev. D 69 (2004) 122001
- Analysis of LIGO Data for Stochastic GW, B. Abbott et al. (LSC), Phys. Rev. D 69 (2004) 122004
- Limits on gravitational wave emission from selected pulsars using LIGO data, Kramer, Lyne and the LSC, submitted to PRL (2004)

What is the LSC ?

- *a real working collaboration:*
 - The purpose of the LSC's restriction on data access is to ensure that thorough vetting. Internally there is complete transparency and full access to all data.
 - The LSC does incredibly painstaking internal testing of results. Important scientific decisions are made collectively.
 - Contribution of members is monitored. New members normally work for a year before getting on the author list.
 - People put in a lot of "service" time for the collaboration.
 - Moderated internal competition.

GEO 600 – LIGO MOU

Extracts from the new revised MOU

K. Danzmann, J. Hough, B. Schutz

B. Barish, P. Saulson

This [...] describes the operation of the LIGO-GEO data exchange agreement. It applies to data acquired by either Project from the effective date of the agreement.

The agreement shall remain in force until one or the other party withdraws from it or a revised agreement is adopted.

GEO 600 – LIGO MOU

All provisions of this addendum are *reciprocal*.

Any provision for the treatment of GEO data by LIGO applies equally to the treatment of LIGO data by GEO.

Responsibility for operation of the exchange lies with the LIGO Director on the one hand and the GEO Principal Investigator for Data Analysis on the other.

In general, both Projects agree that they will endeavor to distribute, analyze, and ensure the security of data received from the other Project in the same way as their own.

GEO 600 – LIGO MOU

The word “*data*” refers to any experimental data recorded from any detector and its associated monitoring system. The term “reduced data set” refers to a data product that includes a calibrated data stream suitable for analysis for gravitational wave signals. The exact format of the reduced data set will be agreed upon from time to time by LIGO and GEO.

GEO 600 – LIGO MOU

The fundamental principle is that GEO and LIGO should be considered to ***constitute a single network of three sites and four interferometers***; data from all interferometers should be used on an equivalent basis, subject to the scientific needs of the particular search in question.

Progress will be monitored through the structures of the LSC. All publications of results from these data are subject to the provisions of paragraph 6 below.

GEO 600 – LIGO MOU

LIGO and GEO will cooperate to the best of their abilities on ***scheduling observations***, with the aim to ensure that at any time at least two independent detectors are operating with good sensitivity in full-bandwidth mode. Planned periods of data recording will be discussed and coordinated by representatives appointed by the Director of LIGO and the GEO Principal Investigator for Data Analysis.

GEO 600 – LIGO MOU

Any form of ***dissemination of the results*** of the analysis of the data covered by this agreement to persons outside the Projects may be made only with permission of both the Director of LIGO and the GEO Principal Investigator for Data Analysis. Scientific publications describing such results will be jointly authored by individuals identified by each Project. Any press releases based on the analysis of data under this agreement will be issued jointly and simultaneously by LIGO and GEO.

GEO 600 – LIGO MOU

The LIGO Lab and the LSC have begun to establish data analysis agreements with other gravitational wave detection and astrophysics projects. ***All such agreements to share data with external projects will be made jointly by LIGO/LSC and GEO leadership, with the goal that, wherever it makes scientific sense, provisions for sharing data will treat data from LIGO and GEO equivalently.***

GEO 600 'Xmas wish

Data exchange between VIRGO and GEO will come automatically in the context of a VIRGO agreement with the LSC, which we very strongly encourage.

We hope that the collaboration between GEO and VIRGO scientists will continue and will grow. We hope that VESF can broaden the GW European community and foster collaboration.

We would like to understand better what the relationship is between VIRGO and VESF.