

Request for letters of interest in EM identification and follow up of GW candidate events

INTRODUCTION

This call is open to professional astronomers or physicists engaged in astronomical research to submit letters of interest in working jointly with the LIGO and Virgo Collaborations (LVC) on the identification and follow up of electromagnetic counterparts of gravitational wave (GW) candidate events, thus increasing the scientific payoff of the network of gravitational wave detectors.

The Laser Interferometer Gravitational-Wave Observatory (LIGO) consists of two widely separated detectors within the United States, one in Hanford, Washington and the other in Livingston, Louisiana, operated by the LIGO Scientific Collaboration (LSC, <http://www.ligo.org>) in unison as a single observatory. The Virgo Collaboration (<https://www.cascina.virgo.infn.it/>) operates a detector in Cascina, Italy. The LSC and the Virgo Collaboration (LVC) constitute a large group of scientists seeking to make the first direct detection of gravitational waves, use them to explore the fundamental physics of gravity, and develop the emerging field of gravitational wave astrophysics. The LVC works toward this goal through the development, commissioning and exploitation of gravitational wave detectors.

Together LIGO and Virgo are the world's leading facilities for gravitational-wave physics and astrophysics. The main science drivers for the LVC are the search for transient gravitational waves from short duration astrophysical events, such as merging of neutron stars and black holes and supernova explosions, as well as periodic signals, such as those generated by rotating neutron stars, and a stochastic background from cosmological origin or from unresolved sources.

DESCRIPTION

The LVC currently plans to start taking data in 2015, and we expect the sensitivity of the network to improve over time. Gravitational-wave (GW) transient candidates will be identified promptly upon acquisition of the data; we aim for distributing information with an initial latency of a few tens of minutes, possibly improving later. The LVC is now working towards a program of accompanying electromagnetic observations. Early positional accuracies of the GW candidates will evolve in time, as described in arXiv.1304.0670. During early science runs before publications of the first four GW events, alerts will be available only through partnerships to be developed under this program (ref. LIGO-M1200055 in dcc.ligo.org). Partners will be asked to sign a Memorandum of Understanding (MOU) involving an agreement on deliverables, publication policies, confidentiality, and reporting. After the publication of the first four gravitational wave events, the current LVC plan is to release alerts on all highly significant detection candidates promptly to the entire scientific community.

Most GW transients will have limited accuracy of localization, and may require coordination for the identification and follow ups of electromagnetic counterparts. We anticipate two possible

modes of participation in such program: 1) contributed and 2) coordinated, reflecting a lesser and higher degree of coordination between the astronomers and the LVC scientists, respectively.

We foresee the following procedure to develop a collaboration of LVC and partners for defining an observing program:

1. Reception of responses to this open call for Letters of Interest (LOI) to establish a partnership with the LVC in such a joint EM-GW observational program, by July 26, 2013. Professional astronomers or physicists engaged in astronomical research are identified as qualified LOI submitters for the purpose of this step.

2. Representatives of qualified submitted LOIs are expected to attend either of two meetings to be held in Amsterdam, Netherlands, in August 29/30 and at University of Chicago, US, on September 10/11. The purpose of these meetings will be to discuss definitions of the modes of participation, and discussion on how to develop and enhance the scientific return and electromagnetic identification and follow up program. The possible content of a standard MOU template as well as criteria for signing this agreement will also be discussed.

3. Following the Amsterdam and Chicago meetings, an MOU template will be finalized to cover each mode of participation. A call for proposals to contribute to an EM identification and follow-up program of GW triggers will be released in the Fall of 2013. Proposers will be expected to meet a set of criteria regarding expected scientific return. The collaborative agreement will be governed by a standard MOU.

4. After an evaluation by internal and external LVC Astronomy committees, MoUs with qualifying partners will be signed by early Summer 2014.

Updates about the meetings to be held in Amsterdam and Chicago and on this process will be posted in <http://www.ligo.org/science/GWEMalerts.php>

LETTERS OF INTEREST:

Letters of Interest not longer than two pages should be submitted in PDF format to emf@ligo.org by 23:59 UTC on July 26, 2013.

The LOI should:

1. Provide a preliminary list of key people, their home institution, the expertise they bring to this effort, and their particular scientific interest.

2. Describe the facilities, including a brief description of instrument capabilities, that proposers anticipate using for their identification and follow up program, explain the relevance for this program, and the mode of operation (shared, dedicated, owned, other....).

3. Describe the scientific deliverables as well as the data products that they would provide and expected delivery dates after the trigger.