

# GRAVITATIONAL-WAVE INTERNATIONAL COMMITTEE

## GWIC

May 26, 2010

Dr. Edward Seidel  
Acting Assistant Director for Mathematics and Physical Sciences  
National Science Foundation  
Arlington  
Virginia 22230.

Dear Ed,

### **GWIC Endorsement of the LIGO-Australia concept**

On behalf of GWIC, the Gravitational Wave International Committee, I am writing to express our strongest support for LIGO-Australia, the collaborative effort to place an Advanced LIGO detector in a site to be provided by the Australian gravitational wave community and operated as a component in the LIGO network.

As you may remember GWIC was formed in 1997 to facilitate international collaboration and cooperation in the construction, operation and use of the major gravitational-wave detection facilities world-wide. It is affiliated with the International Union of Pure and Applied Physics as a sub-committee of IUPAP's Particle and Nuclear Astrophysics and Gravitation International Committee. A key GWIC goal is to promote the development of gravitational-wave detection as an astronomical tool, exploiting especially the potential for coincident detection of gravitational waves and events from other fields (photons, cosmic-rays, neutrinos).

Recently, a 30-year Strategic Roadmap for the field of gravitational-wave science was completed by a subgroup of GWIC. The Roadmap calls out the highest priority for ground-based gravitational-wave science as extending the global network anchored by Advanced LIGO and Advanced Virgo with an instrument in the southern hemisphere

The detection of gravitational waves from violent astrophysical systems in our Universe is one of the most challenging problems in experimental astrophysics and is of the highest potential return. It promises the opening up of a new field of astronomy; for example, looking at the interactions of black holes and neutron stars in a way not possible with conventional optical, radio or other electromagnetic observations.

NSF's support for the development of gravitational-wave detectors has been exemplary for the past forty years, and today that support is on the threshold of bearing fruit as a new generation of long-baseline laser interferometers come into operation. Advanced LIGO, in its partnership with Advanced Virgo and GEO-HF, will have a high probability of detecting the first signals and thus bringing about the opening of gravitational wave astronomy.

However, even though the LIGO-Virgo-GEO network will break entirely new ground, their coverage of the sky will leave large gaps. To cover the sky with reasonable completeness -- to the point where gravitational-wave signals can be fully characterized in terms of polarisation, direction and source distance -- requires at least

one more well-separated detector of comparably sensitivity, ideally in the southern hemisphere.

GWIC strongly supports the LIGO-Australia effort as the most effective way to have an advanced interferometer operating in the southern hemisphere relatively early in the operating lifetime of Advanced LIGO and Advanced Virgo. There is a well established and experienced gravitational wave community in Australia and so we have no doubts that a strong scientific and technical team can be established to carry out the installation, commissioning and operation of an Advanced gravitational-wave interferometer there. The scientific gain from a network with one Advanced LIGO interferometer at each of the two LIGO sites in the US, Advanced Virgo in Europe, and an Advanced LIGO interferometer in Australia is so large as to make this the optimum thing to do from the scientific perspective. By utilizing technical components from Advanced LIGO and operating LIGO-Australia as, in effect, a third LIGO site, the effective operation of the array for gravitational-wave astronomy will be assured.

In summary, the membership of GWIC urges the NSF to support LIGO's efforts toward LIGO-Australia and to work with its counterparts in Australia to bring this important scientific opportunity to reality.

Yours sincerely



Prof. James Hough FRS, FRSE, FAPS, FInstP  
Chair, Gravitational Wave International Committee,  
Kelvin Professor of Natural Philosophy  
Associate Director of the Institute for Gravitational Research, University of Glasgow,  
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Current member projects and their representatives on GWIC include:

**ACIGA**

- Jesper Munch, University of Adelaide

**ALLEGRO**

- William O. Hamilton, Louisiana State University

**AURIGA**

- Massimo Cerdonio, University of Padua and INFN

**EINSTEIN TELESCOPE**

- Michele Punturo, INFN-Perugia and EGO

**EXPLORER/NAUTILUS**

- Eugenio Coccia, University of Rome "Tor Vergata"

**EUROPEAN PULSAR  
TIMING ARRAY (EPTA)**

- Michael Kramer, Jodrell Bank Centre for Astrophysics (University of Manchester)

**GEO 600**

- Karsten Danzmann, Albert-Einstein-Institut für Gravitationsphysik and University of Hannover
- Sheila Rowan, University of Glasgow

**LIGO, including the LSC**

- Jay Marx, California Institute of Technology
- David Reitze, University of Florida

**LISA**

- Thomas Prince, California Institute of Technology
- Bernard Schutz, Albert-Einstein-Institut für Gravitationsphysik
- Robin Stebbins, Goddard Space Flight Center
- Stefano Vitale, University of Trento

**MiniGRAIL and other  
Spherical Acoustic Detectors**

- Giorgio Frossati, Leiden University

**NANOGrav**

- Andrea Lommen, Franklin and Marshall College

**PARKES PULSAR TIMING  
ARRAY (PPTA)**

- Dick Manchester, Australia Telescope National Facility (ATNF)

**TAMA/CLIO/LCGT**

- Seiji Kawamura, National Astronomical Observatory (Japan)
- Kazuaki Kuroda, Institute for Cosmic Ray Research, University of Tokyo

**Virgo**

- Francesco Fidecaro, University of Pisa
- Benoit Mours, LAPP-Annecy

**THEORY COMMUNITY**

- Clifford Will, Washington University, St. Louis

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