

GWIC Statement on the Importance of the LCGT Interferometer Detector

3 April 2008

Gravitational wave observations hold the potential to revolutionize our understanding of the universe. What we know of the cosmos today arises almost exclusively from observations made in the electromagnetic spectrum. However, some of the most important phenomena of fundamental physics -- e.g., the catastrophic transformation of spacetime when two black holes coalesce -- have no electromagnetic signature and can only be observed in gravitational waves. Additionally, some of the most energetic cosmic phenomena -- e.g., the violent formation of a black hole which may drive a gamma-ray burst, or the collapse and bounce of a stellar core leading to a supernova explosion -- are difficult or impossible to observe electromagnetically, but leave clearly visible gravitational wave signatures. Gravitational wave observations will permit us to pierce the veil that shrouds these phenomena from our understanding.

Advanced interferometric gravitational wave detectors are being developed in the USA (Advanced LIGO) and in Europe (Advanced Virgo and GEO HF) which will have the sensitivity required to observe a variety of gravitational wave signals. However, there is an urgent scientific need for another detector of comparable sensitivity located in the other longitudinal hemisphere to come into operation simultaneously or soon after the US and European detectors (approximately 2015). Full exploitation of the information contained in the gravitational waves requires a network of detectors operating in coincidence with the intercontinental baselines to localize the sources. The addition of another detector to the network will also greatly increase the reliability of gravitational wave observations, since the false alarm rate drops dramatically as the number of detectors in the network increases.

The Gravitational-Wave International Committee (GWIC) fully endorses the development of the Large-scale Cryogenic Gravitational wave Telescope in the Kamioka mine in Japan. This would significantly enhance the directional sensitivity of the array of detectors and provide a truly global observatory. The Japanese gravitational wave group has made fundamental and fruitful contributions to global interferometer research with the development and operation of the TAMA detector and with the studies of an underground cryogenic interferometer prototype. Thus this Committee strongly supports the funding of LCGT to be operational by 2015 or shortly thereafter.

GWIC

GWIC was formed in 1997 by the directors of the large gravitational wave detector facilities to facilitate international collaboration and cooperation in the development of experimental gravitational wave science. It is affiliated with the International Union of Pure and Applied Physics as a sub-committee of IUPAP's Particle and Nuclear Astrophysics and Gravitational International Committee (PaNAGIC).

Member projects and representatives on GWIC at the date of this Statement include:

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