Gravitational Wave International Committee (WG.11) report to IUPAP

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prepared by David Shoemaker [*MIT*, Executive Secretary],
Dave Reitze [*Caltech*, Chair]

The Gravitational Wave International Committee (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. From 1999 until 2011, GWIC was recognized as a subpanel of PaNAGIC (IUPAP WG.4). In 2011, GWIC was accepted by IUPAP as a separate Working Group (WG.11).

GWIC meets annually adjacent to an appropriate conference. In July 2019, GWIC met in Valencia, Spain, in conjunction with GR22 and Amaldi13. Other recent meetings have been held in Chicago (2018), Pasadena (2017), New York City (2016), Gwangju (2015), Banff (2014), Warsaw (2013), Rome (2012), Cardiff (2011), and Hannover (2010). Other business during the year is conducted via email or other electronic communication. The next meeting is scheduled for July 2020, in conjunction with the 13th LISA Symposium in Glasgow, Scotland.

GWIC maintains a website at https://gwic.ligo.org/ which contains an up-to-date listing of members, its by-laws, announcements of its activities, and links to other items of interest to the gravitational wave community.

GWIC Membership

The membership of GWIC represents all of the world's active gravitational wave projects, as well as other relevant communities, covering gravitational wave frequencies from nanohertz to kilohertz. Each project has either one or two members on GWIC depending on size. GWIC also includes representatives from ISGRG (IUPAP AC2), International Astronomical Union (IAU) Commission on Gravitational Wave Astrophysics, and from the astrophysics/theoretical relativity community, to help facilitate communication with those bodies. One current member of GWIC in (Sheila Rowan) was also a member of ApPIC (WG.10), ensuring close communications.

The GWIC Chair is elected by its membership at its annual meeting in odd years. At our 2019 meeting, GWIC chose Dave Reitze (Caltech) as its Chair, serving until 2021 (the previous Chair, Sheila Rowan, chose not to present herself for a 3rd term). This year David Shoemaker (MIT) serves as the Executive Secretary.

Each member project in GWIC determines its representatives on GWIC. New members as of July 2018 are Patrick Brady (as the new Spokesperson of the LIGO Scientific Collaboration), and Matt Evans as the representative of a newly-admitted member, the

US Cosmic Explorer 3rd Generation ground-based gravitational-wave detector Project. The full membership is given at the end of this report.

GWIC Activities in October 2018-August 2019

GWIC convened the biennial Edoardo Amaldi Conference on Gravitational Waves, sponsored by IUPAP as a "class B" Conference. The Amaldi meeting is considered by many in the gravitational wave community to be their most important international gathering. The members of GWIC serve as the Scientific Organizing Committee for the Amaldi meetings. The meeting was held with the ISGRG-sponsored International Conference on General Relativity in Valencia. Roughly 1000 persons, 20% women, from 50 countries attended this very successful meeting. The next Amaldi Conference is planned for 2021, and GWIC selected Melbourne, Australia, as the location for that meeting.

GWIC's activities in this last half-year have continued to be focused on third-generation ground-based observatories ('3G'), via a subcommittee formed in late 2016. The charge for this subcommittee is to engage the community broadly to help formulate the best possible science case and to lay out the best path toward a robust international project. This committee has created subcommittees in several crucial areas: The Science Case, Governance, R&D, and Coordination.

The Science Case subcommittee formed an informal consortium of some 200 scientists interested in exploring and documenting the science that can be done uniquely with 3G detectors and in conjunction with electromagnetic observations. The group has produced a full report, and has also written a number of more specialized documents for use in roadmaps in Europe and the US, and for proposals for continuing efforts.

The Governance subcommittee has explored existing models for large instruments and observatories in a range of fields of science, and looked at the suitability and difficulties of these models for a globally-unified network of 3G observatories. The 'ab initio' discussions of governance are being melded with the present state of the Einstein Telescope and Cosmic Explorer 3G projects. The R&D coordination subcommittee has organized sessions at R&D meetings in the field, and gathered the status and plans in various domains. The Coordination Subcommittee has been in touch with and made presentations to funding agencies and roadmapping organizations in both Europe and the US.

The materials have informed funding agencies and panels considering the future of the gravitational-wave field and more generally astrophysics and astronomy, and to help the community envision, evaluate, and plan for its future. Specifically, the European ESFRI Roadmap and the US Astrophysics 'Astro2020' Decadal Survey were informed by appropriate submissions and white papers. APPEC in Europe and the NSF-founded Gravitational-Wave Agencies Correspondents (GWAC) have also had briefings and are reviewing near-final versions of the documents.

GWIC is also working on an update to its Roadmap for the field, as informed by the 3G studies described above. It is planned to bring this to the public awareness through an initial article in a Nature journal, and followed by a more complete in-depth Roadmap to be published by GWIC.

The next steps for the 3G effort are now in discussion and will continue to be a focus for GWAC in the coming year, as the 3G detectors move toward engagement with funding agencies, and the need for a strong advocacy program ramps up.

Membership of GWIC (as of August 2019)

Chair: Dave Reitze, California Institute of Technology and University of Florida, (GWIC, 2007–, Chair 2019–)

Cosmic Explorer: Matt Evans, MIT, 2019–

Einstein Telescope|: Michele Punturo, INFN-Perugia, 2009–

European Pulsar Timing Array (EPTA): Michael Kramer, Max-Planck-Institut für Radioastronomie and Jodrell Bank Centre for Astrophysics (University of Manchester), 2009–

GEO 600: Karsten Danzmann, Albert-Einstein-Institut fur Gravitationsphysik and University of Hannover, 1997–; Sheila Rowan, University of Glasgow, 2009–

IndIGO: Bala Iyer, International Centre for Theoretical Sciences (ICTS) of the Tata Institute of Fundamental Research (TIFR), 2011–; Somak Raychaudhury, Inter-University Centre for Astronomy and Astrophysics, 2017–

KAGRA: Yoshio Saito, KEK, 2013–; Takaaki Kajita, Institute for Cosmic Ray Research, University of Tokyo, 2011–

LIGO: Dave Reitze, California Institute of Technology and University of Florida, 2007–; Patrick Brady, University of Wisconsin Milwaukee, 2019–

LISA Community: Kelly Holly-Bockelmann, Vanderbilt University, 2018–; Bernard Schutz, Albert-Einstein-Institut für Gravitationsphysik, 2001–; Ira Thorpe, Goddard Space Flight Center, 2016–; Stefano Vitale, University of Trento, 2001–

NANOGrav: Scott Ransom, NRAO, 2019–

OzGrav: PPTA: Matthew Bailes, Swinburne University, 2017–; Audioband: David McClelland, Australian National University, 2000–

Virgo: Jo van den Brand, Dutch National Institute for Subatomic Physics (Nikhef) and VU University in Amsterdam, 2017–: Fulvio Ricci, University of Rome, "La Sapienza", 2014–

Theory Community: Luis Lehner, Perimeter Institute, 2018–

IUPAP Affiliate Commission AC2 (International Commission on General Relativity and Gravitation): Beverly Berger, 2013–

IAU Commission D1 Representative: Marica Branchesi, Gran Sasso Science Institute, 2017–

Executive Secretary: David Shoemaker, Massachusetts Institute of Technology, 2016–