

Particle And Nuclear Physics and Gravity International Committee
PaNAGIC

Report to IUPAP 2011

David Sinclair
Chair

The Particle and Nuclear Astrophysics and Gravitational International Committee (PaNAGIC) was established by IUPAP in 1998 as an inter-Commission committee to support the world-wide exchange of ideas and help in the convergence of the international scientific community in the large scale activity in the emerging field of particle and nuclear astrophysics and cosmology and of gravitational waves. Its purposes are:

- To promote and provide a forum for international coordination of large-scale projects in these areas of research.
- To develop a common culture in these emerging and rapidly evolving fields.
- To promote and help to organize regular world-wide meetings, workshops and schools in these areas.

These interdisciplinary sectors include:

- The study of basic constituents of matter and their interactions by non-accelerator means.
- The study of the sources, acceleration mechanism and propagation of high energy particles in the Universe.
- The study of nuclear and particle properties and processes of astrophysical and cosmological interest in the Universe.
- The study of gravity, including the detection and the astrophysical sources of gravitational waves.

PaNAGIC has the status of an IUPAP Working Group. Its mandate was extended at the 25th IUPAP General Assembly in October 2005 in Cape Town, South Africa, until the time of the next General Assembly. It was extended for a further 3 years at the General Assembly in 2008. It is expected that the Working Group will wind up at the 2011 General Assembly to be replaced by a new body with a more representative structure able to respond to the request from the Global Science Forum for an scientific input to their planning process. The recommendations for a new structure were put to the members of PaNAGIC and all responses were positive. We welcome the change.

The science that PaNAGIC represents continues to grow in numbers of participants, numbers of experiments, numbers of facilities and in scientific excitement. The major

conference in our field is TAUP (Topics in Astroparticle and Underground Physics) and this year's conference was a great success. This conference is held every 2 years and alternates with the Neutrino conference. This year the conference was held in Munich. Attendance at these meetings has averaged 260 participants but this year registration was closed when it reached capacity at 330. The topics for the meeting covered Dark Matter, Cosmology, Double beta decay and neutrino mass, Neutrino oscillations, Low-energy neutrinos (Geo, solar, supernova), Gravity waves, Astrophysical Messengers (Neutrinos, gamma-rays, cosmic rays). The format of the meeting was 5 days of plenary talks in the morning and 4 days of parallel sessions in each of the above topics. An extra poster session was added to accommodate the many contributions. The science was particularly compelling with clear hints of new fundamental physics in the areas of dark matter detection and new neutrinos, new and robust measurements of the low energy solar neutrino spectrum, major new facilities for underground experiments in China and India, and very promising technical developments in high energy neutrino and gravity wave detection. These developments come from the full spectrum of experiments underground, at accelerators, and out to the precision cosmological studies. It was very refreshing to see this broad expanse of science coming together in a coherent and inter-related picture. In this past, this conference was co-sponsored by PaNAGIC and there have been close links between the conference steering committee and PaNAGIC. This year's conference was sponsored by C4. This support is most welcome but it might be valuable to strengthen the linkage between the commission and the conference.

The gravity wave community has been a vital part of our group and have organized themselves as the Gravity Wave International Committee. As in the past they report to IUPAP through PaNAGIC and their report is attached.

The PaNAGIC committee developed from a study of how efforts to measure very high energy neutrinos in an underwater detector could be coordinated. It is very gratifying to see this initiative nearing fruition with the development of the KM3NET proposal.

The people who have served on PaNAGIC are as follows:

Current members

Charles Baltay	Stavros Katsanevas
Leonid Berrukov	Paolo Lipari
Hesheng Chen	Hitoshi Murayama
Eugenio Coccia	Angela Olinto
Victoria Fonseca	Bernard Sadoulet
Masa-Katzu Fujiimoto	David Sinclair
Rohini Godbole	Christian Spiering
James Hough	

Past Members

Barry C. Barish
Johannes Blümer
Enrique Fernandez
Thomas Gaisser
Wick Haxton
Eckart Lorenz
Victor Matveev
John Peoples
Steve Ritz
Yojj Totsuka
Michael Wiescher

Alessandro Bettini
Massimo Cerdonio
Joshua Frieman
Isabelle Grenier
Takaaki Kajita
Karl Mannheim
Arthur McDonald
Martin Rees
Michel Spiro
Alan Watson

Gravitational Wave International Committee

report to PaNAGIC

19 September 2011

(prepared by Stan Whitcomb, Caltech [Secretary] and Eugenio Coccia, University of Rome "Tor Vergata" [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. The membership of GWIC represents all of the world's active gravitational wave projects. In 2008, GWIC invited the three pulsar timing collaborations which are searching for very low frequency gravitational waves to join, so now it represents projects covering gravitational wave frequencies from nanohertz to kilo hertz. Each project has either one or two members on GWIC depending on size. Because the GWIC representatives are generally the leaders of each project, GWIC has access to broad expertise from throughout the community. GWIC also includes representation from the International Society on General Relativity and Gravitation and from the astrophysics/theoretical relativity community. GWIC meets annually, with recent meetings in Cardiff (2011), Hannover (2010), Pasadena (2009), New York City (2009), Pisa (2008), and Sydney (2007).

GWIC Activities in 2010-2011

GWIC convenes the biennial Edoardo Amaldi Conferences 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. Amaldi 9 was held on 10-15 July 2011 in Cardiff University, with an attendance of nearly 300 scientists and students.

In 2006, GWIC established an international prize, to be awarded annually to an outstanding Ph. D. thesis based on research in gravitational waves. The 2011 GWIC thesis prize was awarded to Haxing Miao, University of Western Australia, and presented at the Amaldi Conference in Cardiff. The number of theses nominated has grown every year since the prize was established, demonstrating the growing interest in gravitational waves. The awarding of the GWIC Thesis Prize to Haxing marks the fourth continent (in five years) to be so recognized since its inception, making it truly an international award. Finally, GWIC entered into an agreement with Springer, under which the winner of the GWIC Thesis Prize will be nominated (with the presumption of acceptance) to be published in the Springer Thesis Series. This will provide added recognition and an additional monetary award to the Thesis Prize winner.

In 2007, GWIC appointed a subcommittee to prepare a global road-map for the field of gravitational wave science, with the perspective to optimize the global science in the field. The charge to the committee is to cover both ground- and space-based detectors

with a 30-year horizon. The committee obtained broad input from the communities involved to identify relevant science opportunities and the facilities needed to address them. During 2011, GWIC completed and published this Roadmap (http://gwic.ligo.org/roadmap/Roadmap_100814.pdf). GWIC has used this document to provide inputs to both the OECD Global Science Forum and the ASPERA astroparticle roadmaps.

At its 2011 meeting, GWIC accepted the application of the Indian Initiative in Gravitational-wave Observation (IndIGO) as its newest member. IndIGO is a rapidly growing national collaboration. We were pleased to learn that IndIGO had received funding to set up an Indo-US Centre to facilitate exchanges of scientists and students as a way to build capability in India, one of the activities that we had written a letter of support for in 2010.

Also at its 2011 meeting, Eugenio Coccia was elected as the chair of GWIC for a two-year term. GWIC thanks Jim Hough for his leadership over the past four years. A number of other GWIC membership changes have occurred as leadership positions in the different projects have changed

Membership of GWIC

Chair: Eugenio Coccia

ACIGA: Jesper Munch

AURIGA: Massimo Cerdonio

Einstein Telescope: Michele Punturo

EXPLORER/NAUTILUS: Eugenio Coccia

European Pulsar Timing Array (EPTA): Michael Kramer

GEO 600: Karsten Danzmann, Sheila Rowan

LIGO, including the LSC: Gabriela Gonzalez, David Reitze

LISA: Thomas Prince, Bernard Schutz, Robin Stebbins, Stefano Vitale

NANOGrav: Maura McLaughlin

Parkes Pulsar Timing Array (PPTA): Dick Manchester

Spherical Acoustic Detectors: Odylio D. Aguiar

TAMA/CLIO/LCGT: Takaaki Kajita, Seiji Kawamura

VIRGO: Francesco Fidecaro, Jean-Yves Vinet

Theory Community and ISGRG: Clifford Will

Executive Secretary: Stan Whitcomb