This month

Next meetings

German National Day
22 June - Hamburg

United Kingdom National Day
23 July - London

Preparatory Roadmap Phase II Workshop
19-20 July 2007 - Paris

Roadmap Phase II Workshop
20-21 September 2007 - Amsterdam

PICTURE OF THE MONTH

VIRGO listens to the sky and talks to LIGO

On 18 May 2007, the gravitational-wave interferometer VIRGO, located near Pisa in Italy, started its first science run, joining the already operating US LIGO detectors.

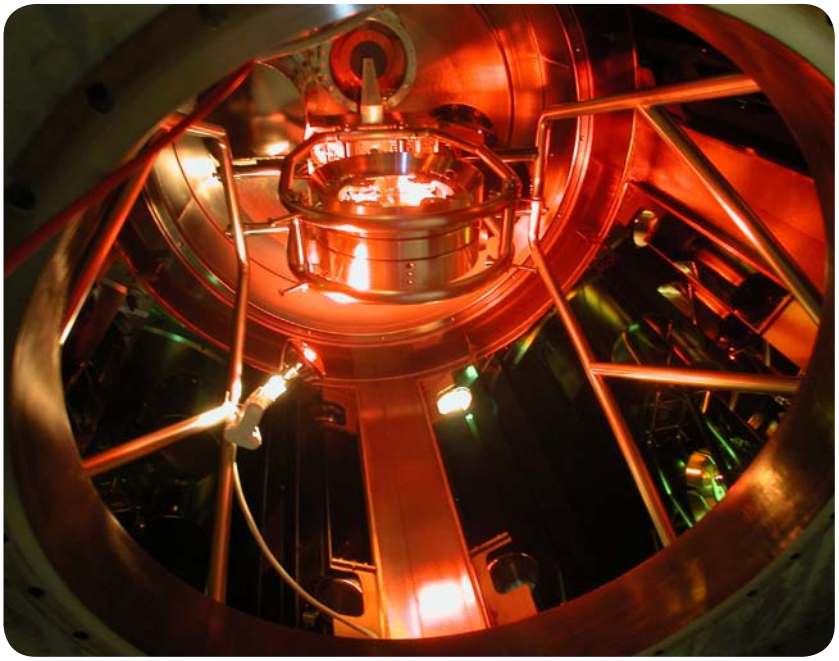
On May 18th, the VIRGO interferometer started its first science run. This is a twofold milestone in the hunt for gravitational waves (GW), heralding the start of scientific operation of a frontier European instrument and full data sharing with similar instruments in US and Germany. VIRGO, the largest European GW detector, joins the already operating LIGO detectors in the US and the German-British interferometer GEO600. This network of instruments will have the capability to observe, with unprecedented statistical confidence, the coalescence of binary black holes and other violent astrophysical events. The arrival times of GWs to the detectors will indicate the source position in the sky.

GWs, a direct consequence of General Relativity, are perturbations of the gravitational field produced when large masses undergo strong acceleration, such as in star collisions. General Relativity says that gravitational fields distort space-time; similarly the passage of GWs produces ripples in the space-time fabric, as waves on the surface of a pond. The practical effect is that distances among free masses vary by minuscule amounts.

Laser interferometers, like VIRGO, are ideal instruments to detect such phenomena. In fact, an interferometer, by means of

two perpendicular light beams, compares with enormous accuracy the distances of two far mirrors with respect to a central beam splitter mirror. Microscopic changes of those distances, caused by GWs, materialize as tiny changes in the interference fringes.

The largest predictable distance changes due to GWs, even for interferometers with kilometre-long arms, are much smaller than the radius of an atomic nucleus. That is why, in order to isolate VIRGO from external disturbances, cutting-edge technologies have been developed in precision mechanics and metallurgy, vacuum technique, extreme-quality optics and lasers, analogue and digital electronics, and analysis methods. All the instruments are close to their design sensitivities and the scientists could have the chance to detect GWs in the next four months of common data taking. But the probability of such an event is estimated to be about 1% for binary neutron stars, one of the better known sources. To increase this probability, the American-European collaboration has set up a coordinated two-step improvement campaign. It will bring the overall GW detection probability in the range of one event per year around 2009-10 and in the range of a few tens of events per year around 2013-14.



The VIRGO beam splitter mirror seen from below, suspended inside its vacuum tower. It is surrounded by the recoil mass (the aluminium hollow cylinder) and protected by the tubular safety frame. Credit: © VIRGO collaboration

VIRGO is located at the European Gravitational Observatory (EGO, near Pisa, Italy), funded on an equal basis by the Centre National de la Recherche Scientifique (France) and by the Istituto Nazionale di Fisica Nucleare (Italia). The beginning of the first VIRGO science run has been announced in a successful press conference at the EGO site, on May 22.

The institutions were represented by Arnold Migus, Director General of CNRS, Sergio Bertolucci, Vice President of INFN, and Tony Chan, Head of Mathematical and Physical Sciences at NSF. VIRGO and the LIGO Scientific Collaboration have been presented by the respective spokespersons: Benoit Mours and Dave Reitze, and by other distinguished scientists.

Submitted by Carlo Bradaschia (INFN)

VIRGO : http://www.virgo.infn.it

EGO : http://www.ego-gw.it

LIGO : http://www.ligo.org

The first steps to the Roadmap

Interview with Gerard van der Steenhoven (National Institute for Nuclear Physics and High Energy Physics Amsterdam), who is responsible for overseeing the assessment of the status in astroparticle physics research funding - ASPERA Work Package 1-

What is ASPERA work package 1?

This work package is to inventory how the various funding agencies operate with respect to funding and organising Astroparticle Physics. There are a lot of differences from country to country. Before we try to plan how to improve things in Europe, especially with an eye to funding large pan-European infrastructures, we need to find out how things are organised in various countries, including the legal and financial conditions and differences in reviewing new plans.

What tools do you use to make the inventory?

First, we distributed a questionnaire to the funding agencies, in which we asked them many questions about how they are organised, how they assess plans, and how they provide funding and evaluate results. Second, we organise national days. At a national day the host country invites all national stakeholders in Astroparticle Physics to a workshop to present their national funding system to the other ASPERA partners. The hope is that the discussions will direct us to the best way to improve European cooperation between funding agencies. On the basis of the national days and the questionnaire, we will prepare a report in which the most important differences between the various countries are identified, especially with respect to funding and organising large European infrastructures for astroparticle physics research.

There have been national days in France in January and in the Netherlands in April. How do you think they went?

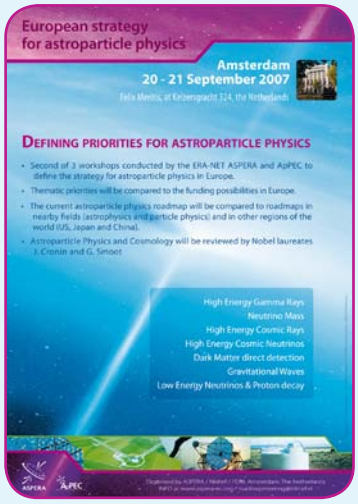
They were very interesting for two reasons. First, it was indeed possible to convey all the necessary information about the funding systems in these two countries to the ASPERA partners. There was another dimension to it, however, which was somewhat unexpected. The national days brought together all stakeholders in a given country on one day in one room. Astroparticle Physics is an interdisciplinary field with stakeholders from Particle Physics, Astronomy, Cosmology, Space Science, etc. It rarely happens that all these people get together at one event. So a national day is not only beneficial for ASPERA, furthermore, it can also be beneficial for the profile and success of Astroparticle Physics in individual countries.

What can we expect from the Roadmap workshop in Amsterdam in September?

This workshop is an important milestone for ASPERA. Important steps have been taken following the Valencia workshop last year, where the Roadmap for astroparticle physics was discussed for the first time. In each of the subfields of Astroparticle Physics, groups of experts were convened to discuss priorities and timelines for the large-scale European facilities that are needed. For all subfields (high energy gamma rays, neutrino mass, high energy cosmic rays, high energy neutrinos, dark matter direct detection, gravitational waves, low energy neutrinos and proton decay) a well-balanced presentation of priorities and timelines is expected in Amsterdam. On the basis of these 7 presentations, the final step, the realization of the next generation of Astroparticle Physics projects, shall be discussed.

Will there be strong discussions or even "fights"?

I do expect serious discussions. Of course, each subfield will present its case in a very strong way. But I don't expect fights in the sense that people won't listen to scientific arguments and won't accept that the discussion should be driven by the quality, maturity, feasibility, and scientific excellence of the projects. Anyway, the discussion might be more difficult at our third Roadmap workshop in 2008, when an overall ranking of the various infrastructure projects shall be discussed. Such a ranking is not only governed by scientific but also by funding-related arguments, which makes it even more challenging, since the ideal science world is then approaching the real funding world.



I hope that many scientists will come to the Amsterdam workshop in September, because it will demonstrate the importance of the next generation of experiments in Astroparticle Physics and will send a clear signal to decision makers all over Europe. When all scientists are able to unite behind one single plan, the chances of success increase.

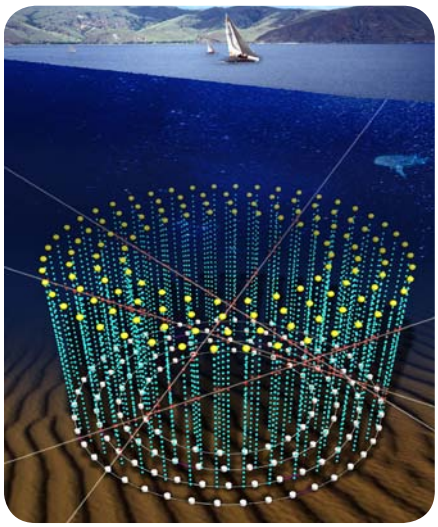
Amsterdam workshop : http://indico.cern.ch/conferenceDisplay.py?confId=9710

Submitted by Dirk Lorenzen

Towards a European deep sea neutrino telescope
1st annual KM3NeT meeting

The KM3NeT Design Study proceeds on its way towards the realisation of a future cubic-kilometre neutrino telescope in the Mediterranean Sea.

April 16-18, the KM3NeT collaboration held its first yearly Design Study meeting in Pylos, Greece. Hosted by the NESTOR institute, the 3-day meeting took place at the shore of the picturesque Navarino bay in the south western part of the Peloponnesus. More than 100 participants reviewed the progress achieved in the first year of the KM3NeT Design Study and discussed the next steps.



artist's view of KM3NeT
Credit: © Marco J. Kraan / NIKHEF

KM3NeT is a future deep sea research infrastructure to be constructed in the Mediterranean Sea that will host a neutrino telescope with a volume of at least one cubic kilometre. The Design Study for the infrastructure, funded by the EU FP6 framework, began in February 2006.

The KM3NeT research infrastructure has been singled out by ESFRI (the European Strategy Forum on Research Infrastructures) to be included in the European Roadmap for Research Infrastructures. The design, construction and operation of the KM3NeT neutrino telescope will be pursued by a consortium formed around the institutes currently involved in the ANTARES, NEMO and NESTOR pilot projects. Based on the expertise of these research groups, the development of the KM3NeT telescope is envisaged to be achieved within a period of three years for preparatory R&D work plus five years for construction and deployment.

«Even though some delays were caused by the fact that not all Design Study positions could be filled immediately at the start of the project, we are making good progress», says Uli Katz, the Design Study coordinator from the University of Erlangen, Germany. «In the first year, we have concentrated on exploring different design options and assessing the sensitivity of various detector layouts. Now is the time to focus these efforts and to concentrate on working out the conceptual design specifications.»

In fact, the schedule for producing the Conceptual Design Report (CDR) - the first major milestone of the project - was one of the dominant subjects of the meeting. It was decided to hold a one-week workshop to finalise the CDR at NIKHEF, Amsterdam, November 12-16, 2007.

Another major topic was the proposal for the KM3NeT «Preparatory Phase» (PP) project - a new funding instrument in the 7th EU Framework Programme, restricted to the research infrastructures on the ESFRI Roadmap and aiming at the political, financial, legal, and technical aspects that need to be addressed in order to allow for a timely start of construction. The ESFRI process and the preparation of the PP proposal has already revealed a substantial level of political support for KM3NeT in different countries – for instance, the Greek Secretary General for Research and Technology, Prof. Tsoukalas, announced a strong financial support for KM3NeT at his opening address.

First yearly Design Study meeting took place in Pylos, Greece.
Credit: © KM3NeT collaboration

After three days of a perfectly organised meeting, culminating in a splendid banquet, the participants left Pylos knowing that the Design Study is on track to tackle the challenges ahead.

KM3NeT website : www.km3net.org

Submitted by Uli Katz, KM3NeT Design Study coordinator

New electronic communication tools for ASPERA

On the way to improving the ASPERA internal and external communication, two important milestones are about to be passed. The www.aspera-eu.org portal will be launched on the 1st of July, and a virtual conferencing system is being tested that will be widely used in the future.

When working on a European scale, electronic tools can help a lot to improve collaboration between members of a community. Therefore, ASPERA is developing new tools to increase its internal and external communication abilities.

The new website portal of ASPERA, www.aspera-eu.org, will be launched July 1.
It aims to present the ASPERA European Astroparticle Physics network and its activities to coordinate Astroparticle Physics on a European scale. Implemented by FECYT in Spain, the web portal will increase the image of ASPERA and shall serve as a hub for the whole Astroparticle Physics community, linking with experiments that have European participation in this field of science, classified by topics.

Astroparticle Physics is also described through six main questions that the field is trying to answer, while a map presents a collection of European infrastructures. In addition, the ASPERA website will offer interesting tools for the whole community, such as an internal collaborative space and a webpage for jobs ads in Astroparticle Physics.

A Virtual Conferencing System for Astroparticle Physics

Only a computer, a microphone and a webcam are needed to participate in a "virtual conference". When connected to the Internet, you are able to attend such a meeting from everywhere in the world! « It is just like you are discussing in the same room » said Didier Rouable, who is implementing and testing the virtual conferencing system at CNRS. He explains that the tool is very easy to use and offers many functions. For instance, it is possible to share file documents between all the participants of a meeting, to chat with one or several persons, or to use a virtual white board to draw diagrams that can be seen by other participants.

This system, called EVO, already in use by many international collaborations, was developed by and for the scientific community. ASPERA management has begun to successfully use EVO and it should be widely used for all kinds of meetings in the very near future.

This advanced collaboration system also allows international lectures to be broadcast for students from different universities all over the world. Such lecture experiments will be offered in Astroparticle Physics through VCA – the "Virtual Conferencing for Astroparticle Physics". It will be reachable from the new ASPERA portal.

View of the Virtual Conferencing Astroparticle Physics interface
Credit: © ASPERA

To become a user of the virtual conferencing system, registration is needed. It takes only a few minutes. It is then possible to attend a meeting or to book a conference room. All the technical aspects and directions for use are available on the temporary

VCA interface: http://www.inestinteractive.com/site/

For further information on VCA: drouable@admin.in2p3.fr