THE GRAVITATIONAL VOICE

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JULY 2011

# Virgo listening to the sky...

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"h - The Gravitational Voice" is an internal publication of the European Gravitational Observatory (EGO) and the Virgo Collaboration.

The content of this newsletter does not necessarily represent the opinion of the management.

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# EDITORIAL

We take the opportunity afforded by this editorial to welcome the new elected Spokesperson of the Virgo Collaboration: good luck, Jean Yves! Even if he has been with Virgo since the beginning - and before many of us - we will ask him to write an article about himself and his views for the future, to be published in *h*20. We also thank very much the previous Spokesperson, with the same sentence: good luck, Francesco! He needs best wishes for his new role as the Director of the Physics department at the University of Pisa.

The past few months have been a time of evident intense activity, discussing the technical choices for Advanced Virgo to be submitted to the STAC and to the EGO Council. After the double approval, we are now in an apparently quiet moment, taking science data in the VSR4 run. In reality, intense activity goes on in parallel, since we have to prepare for some more commissioning at the end of the run and, immediately afterwards, for the challenging transition to Advanced Virgo. Advanced LIGO is already progressing ahead of us.

In autumn 2011, outreach activity will also restart with momentum. On 23-24 September we will have our third European Researchers' Night and from November 21 to December 3 we will participate in an astronomy exhibition at La Limonaia, in Pisa.

C. BRADASCHIA

**Cover Picture by Jérôme Degallaix**

A long-term exposure photo of the Virgo site taken from the roof of the new technical building.

The photo is composed of 800 single exposures taken during the darkest period of the night between the 21st and 22nd of June (23:30 - 04:00). The very bright strip of light at the right edge of the picture is the rising moon. Another quite bright line above the Central Building is the rising Jupiter. In the centre of the rotating stars' circles you can see a little arc: this is the almost immobile polar star.

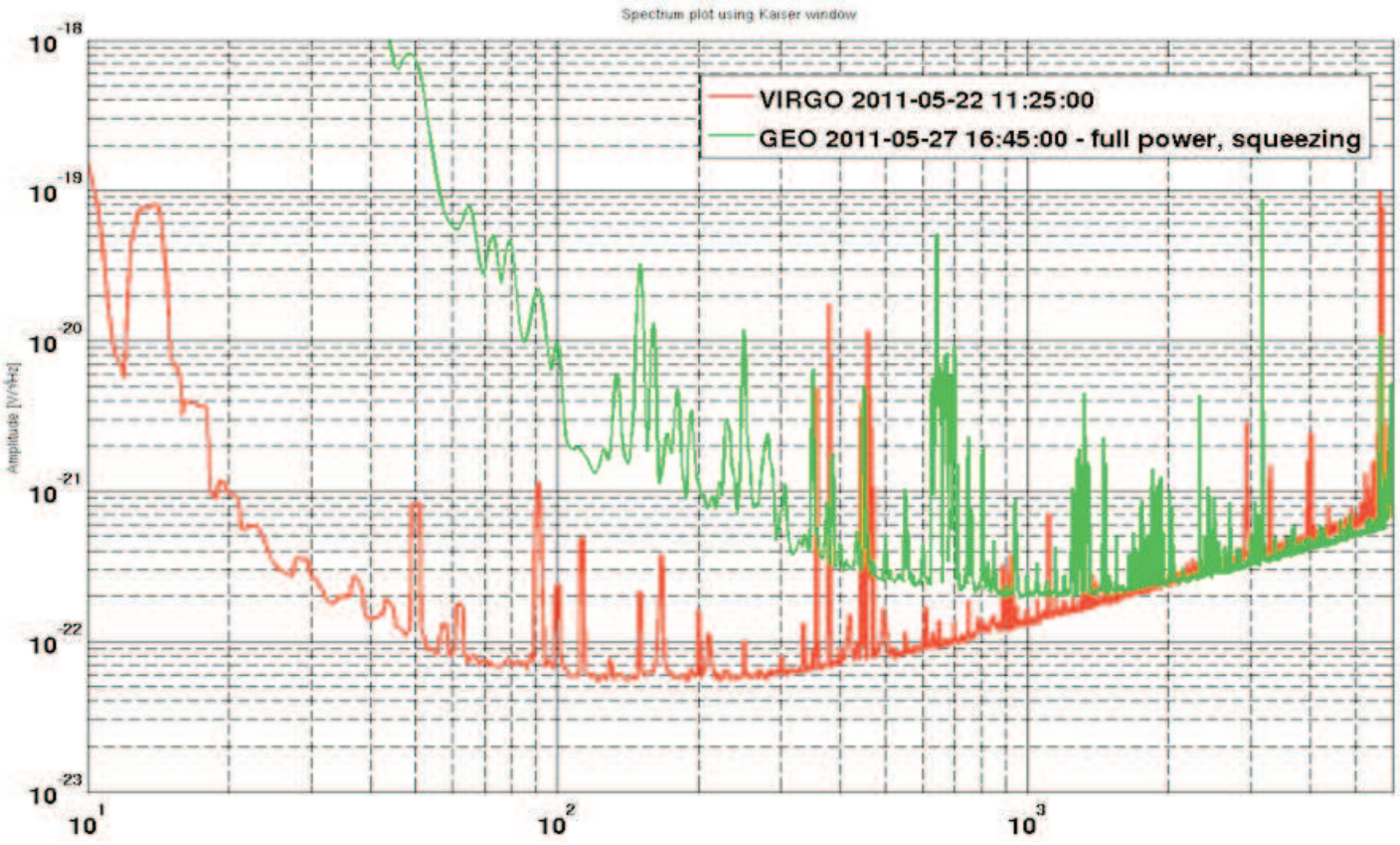
***h*** would like to thank all the people who provided us with free pictures to embellish our newsletter!

# VSR4 is taking data!


**Virgo started its fourth Science** run on the 3rd of June 2011 together with the GEO 600m interferometer. The previous months have seen an important commissioning activity in order to cope with most of the problems observed during the previous runs, mainly with the important difference of the end mirrors radius of curvature. Thanks to the installation of the CHRoCC (see previous h) on both end mirrors and a long tuning time to find the point which allows a stable lock and a good sensitivity, the interferometer has for the first time reached a NS-NS horizon of 11 Mpc. The last week before the run was devoted to the final tunings and the commissioning team was glad to start the run three hours in advance and have a drink for the occasion (see picture 1). A couple of hours later, GEO also switched to science mode.

Due to the difference in sensitivity between the two detectors (see figure 2), the main scientific goals are the search for pulsars using the gain in sensitivity in the low frequency part which may beat the limit already published on a few objects (Crab, Vela, ...). We will also follow the external triggers, mainly with gamma-ray bursts, where both GEO and Virgo data could be combined. Since the start of the run we have a very good stability (as usual for the Virgo runs) with 88 % of time spent obtaining science data. The organization of the run is a bit different and I would like to thank all the operators for their dedication as they spend the week-ends and nights alone in the control room.

The data quality is also quite stable with the NSNS horizon close to 10 Mpc, the GRB horizon is around 8 Mpc and the supernova(e) horizon is 3 kpc. The glitch rate is



surprisingly good with a rate around 0.8 Hz and very few loud events in the data. The noise in the high frequencies regime is even better with only few moderate events, mainly due to a strange 3kHz noise currently under investigation. Our GEO colleagues have also a good duty cycle so far, 86 %, and this promises long stretches of data to analyse.
The run is planned to end on the 3rd of September and will be followed by some time devoted for tests before the shutdown and the installation of Advanced Virgo.

N.LEROY from LAL
Run Coordinator


## ET design study official presentation

**On the 20th of May, here at the** EGO site, the pre-release version of the Einstein gravitational wave Telescope (ET) conceptual design document was presented. In fact, the ET conceptual design phase, supported by the European Commission within the Seventh Framework Programme (FP7), concluded on the 4th of July, after more than 3 years of intense activity, and it is time to present the conclusions.

The interest in the ET science and technology has grown in the last few years, pushing participation in the ET science team to up to more than 220 scientists, mainly European, but also from the US and Japan. The presentation of the pre-release version was the occasion to both submit the complete design study document (prepared by the restricted team, TWT, over the last year) to the ET science team and to announce the readiness of the study to the research institutes involved in ET.

The design study document is a ~450 page volume, containing the science motivations, the basic schemes, the crucial technologies and the expected timing of the ET project. At the presentation event (http://www.et-gw.eu/events/dspresentation) representatives of the beneficiaries of ET, of national agencies and ESFRI participated. It was an occasion, thanks to few introductory talks, to show the worldwide status of the gravitational wave search, to describe the impressive science potential of ET and to depict a roadmap for the next steps.

The event had a great resonance in the press (see the list of online articles here: http://www.et-gw.eu/press-releases, links 11-38), both with important international journals (Nature, Science, etc.) and in local newspapers. Also, ET was cited in Israel, but it is hard for us to read the content of the article! The efficiency (many thanks to Marta and Veronica!) of the local organisation and the sunny day transformed this important milestone for the ET project into a pleasant event.

M. PUNTURO
ET Scientific Coordinator

## Will cold fusion heat up our future?

**Recently we heard the news of the** completion of a successful experiment on cold fusion performed in Bologna by Prof. Focardi and inventor Rossi. Before commenting on this further affirmation of the success of a dream that has lasted for more than 20 years a quick reminder is necessary on what we mean by cold fusion. It is known that the sum of the masses of the individual components forming a stable compound is larger than the mass of the compound itself. The mass difference, called mass defect, multiplied by the square of the speed of light is the binding energy and is also the energy released during the formation of the system composed of its constituents. Therefore the mass of atomic nuclei of the stable elements is less than the sum of the masses of its components (protons and neutrons). More significant in our case is the ratio between binding energy and the number of nucleons.

If we plot the value of this parameter

as a function of the atomic weight (or mass number) of the stable elements, we get a curve that is growing rapidly, reaches a maximum around mass number 60 (corresponding to the chemical elements Fe, Co, Ni) and then decreases. The maximum value is about 8.5 MeV per nucleon (compared with the energy of some eV typical of chemical reactions like the burning of oil). Therefore, from the point of view of energy, the fusion of elements lighter than iron or the fission of heavier elements are favoured.

In the stars, during the various phases of stellar evolution, the fusion of light elements, starting from hydrogen produces heavier elements until iron is reached. At this point further fusion absorbs energy. This interrupts the production of radiation which, with its pressure, opposes the gravitational force, which is pulling the matter of the star towards its centre. The star collapses and turns into a white dwarf, a neutron star or a black hole depending on its mass. In order to fuse two light elements it is necessary to bring the nuclei very close together so that the nuclear forces (which have a very small range) take over from the enormous force of electrostatic repulsion due to the positive charge of the nuclei. Temperatures of the order of millions of degrees and very high pressures are necessary for this. These conditions are found in the cores of stars or during thermonuclear explosions.

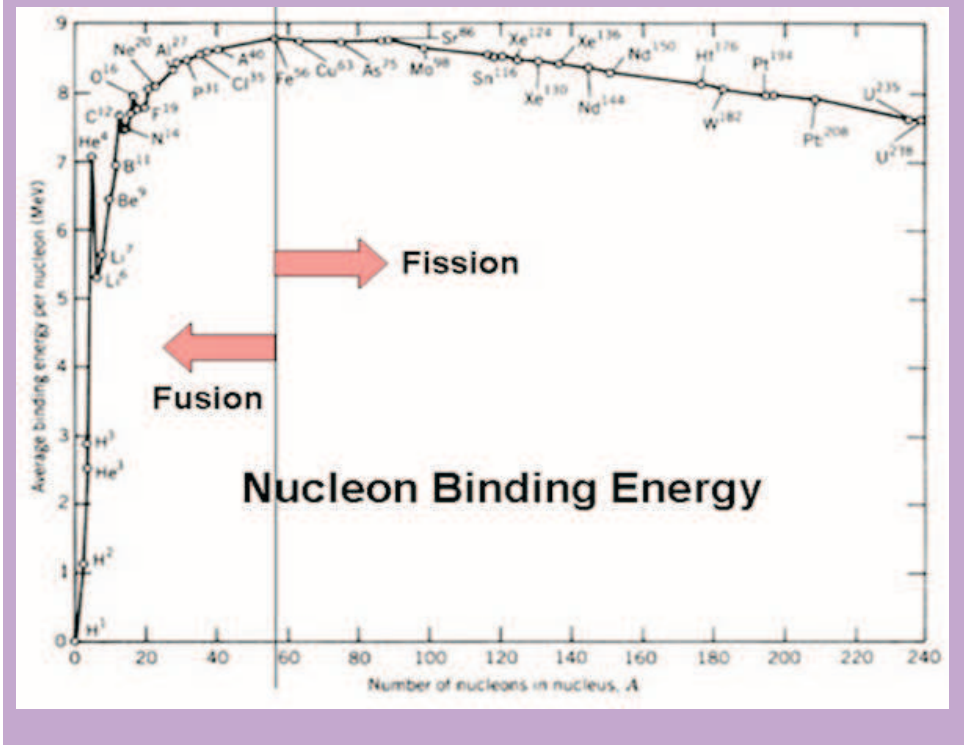
For more than 50 years people have tried to achieve in the laboratory the conditions necessary for controlled nuclear fusion for the production of energy at a low cost with low environmental impact. In this field considerable progress has been made (inertial confinement using power laser beams, magnetic confinement of plasma at a high temperature, etc.) but the time foreseen for an effective implementation of a prototype that provides more energy than it consumes for the operation is very long in spite of considerable funds used for research.

From very early on, people have tried to look for alternatives to high temperatures and high pressures to reduce the distance between the atomic nuclei: for example, a possibility already proposed by Sakharov before 1950 was to use exotic atoms of hydrogen isotopes in which the single electron is replaced by a negative muon. In this way, given the greater mass of the muon compared to the electron, the atomic radius is reduced by more than a factor 200 thus allowing the nuclei to get closer without being affected by the electrostatic repulsion. Unfortunately the muon has a very short mean life (about 2 microseconds) and before decaying is able to "catalyze" only a very small number of reactions, not enough to compensate for energy needed for its production (at least for now).

Another way to bring the nuclei very close is to use the adsorption of hydrogen by some metals such as palladium that can absorb up to 900 times its volume in hydrogen. In 1989, Martin Fleischmann and Stanley Pons announced that they could obtain the so-called cold fusion using an electrochemical cell with electrodes of palladium and platinum. Unfortunately subsequent experiments have produced contradictory results and there are still many doubts about the correctness of the experiments that, according to their performers, gave a positive result.

In the case of the new experiment by Focardi and Rossi, as far as we understand it, they use nickel for the adsorption of hydrogen. Thus it seems that feeding what Focardi and co. call "Energy Catalyst" with an input power of only 500 W this device has an output power of about 12 kW. The demonstration of the experiment was performed in the presence of some journalists, and even some scientists who, however, have not been allowed to examine the contents of their "black box". Nevertheless, according to the scientists present, who were granted

*Figure from the site: http://www.mpoweruk.com/nuclear_theory.htm*



the opportunity to perform a number of measurements such as the input and output powers and any radiation produced, there was an obvious source of energy hidden within the "Energy Catalyst". Focardi and co., by their own admission, cannot explain the origin of such a high-energy production, but suppose that in their cell there is some form of nuclear reaction and in support of this hypothesis they provide some detail. First of all in their cell there is no fusion of hydrogen into helium as in all other controversial cold fusion experiments, but the nuclear reaction would involve the nickel itself: more exactly the following reaction would occur:

$$Ni^{58} + p^{1} \rightarrow Cu^{59} + 3.41MeV$$

$$Cu^{59} \rightarrow Ni^{59} + e^{+} + \bar{\nu} + 4.8MeV$$

Or other similar involving other natural isotopes of nickel. There would thus be the fusion of atoms of nickel and hydrogen to produce copper and then still nickel but with a higher mass number and with the production of about 8 MeV of energy for each fusion event. Therefore, the "burning" of 4 atoms of hydrogen with this method provides energy of approximately 35.6 MeV, which is greater than that given by the synthesis of an atom of helium (approximately 28 MeV). Therefore also from the point of view of energy a cold fusion of this type would be more convenient than a 'conventional' one. From January to June of this year several demonstrations were made, all with very controversial results, both with regard to the calculation of the actual energy balance, and on the measures of the isotopic composition of the copper present in the exhausted "fuel".

Although there is still no theoretical explanation of what happens inside the cell, however, we hope to be in front of a real demonstration of cold fusion. This would have a tremendous impact in the production of cheap energy (one gram of nickel is equivalent to about 200000 liters of oil ...) with obvious consequences also from the environmental point of view.

For further information see the web site:http://www.esowatch.com/it/index.php?title=Catalizzatore_di_energia_secondo_Rossi_e_Focardi

**D. PASSUELLO**

# Mars on Earth

## A report from the Mars Desert Research Station (MDRS)

**I returned a few weeks ago from** a research trip to Mars - Mars as replicated in the Utah desert. My 15-day adventure was through the Mars Society, a group interested in

exploring and settling the Red Planet. The group established the Mars Desert Research Station to help identify and solve problems associated with a mission to Mars - a trip that could take nearly two years to complete.

The MDRS is a small two-story cylindrical habitat in a remote area of Utah, about four hours from Denver (Fig 1 previous page). Crew members share a space that measures 10 metres in diameter. Beds are up steep stairs at the top floor while the lab, toilet and shower are on the main floor.

Once I knew my application for the MDRS 2011 season had been accepted, I was looking forward to being part of an international crew, along with 5 others, getting a taste of what it would be like living on the Red Planet. Indeed my crew was truly international with people coming from Italy, Greece, Canada and the U.S. (Fig. 2 previous page)

Together we formed a very diverse team with expertise in different fields. The demographics and skills of the crew were also diverse. We got to know each other in advance via mission planning conference calls and the setting up of a dedicated mission web page (https://sites.google.com/site/mdrs102/home). Being perfect strangers we got along with each other pretty well and we were able to build a very collaborative environment. In this sense the psychological side of the simulation was very successful.

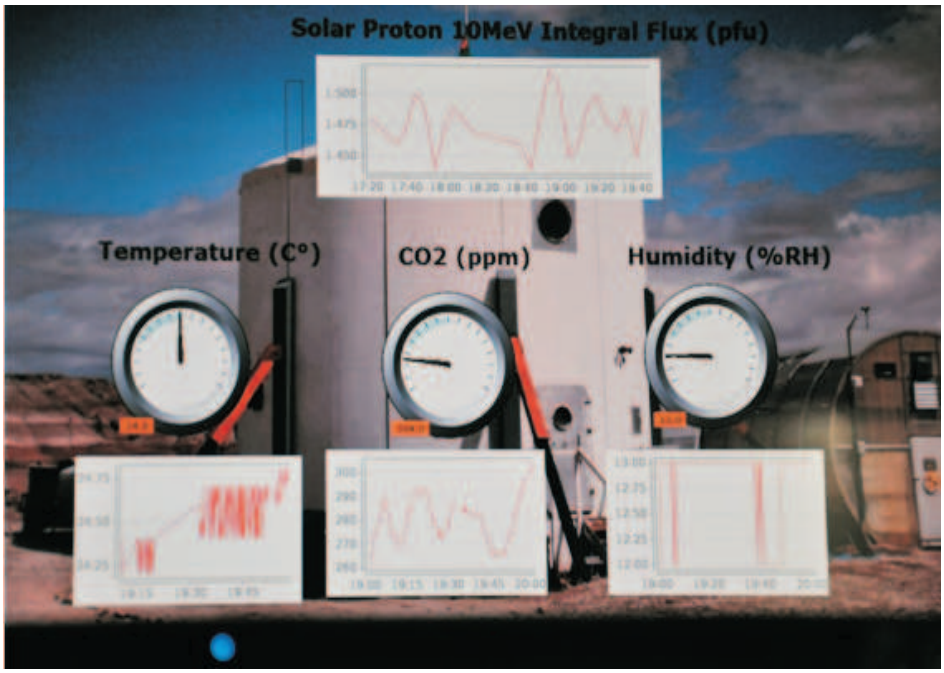
Along with the participation in the ongoing MDRS simulation, our crew proposed many studies. One of the most significant among them was an experiment that looked at growing an edible bacteria called spirulina. The experiment was devised by Lara Vimercati, the crew biologist. When people finally do travel to Mars, one of the major obstacles will be creating food. Bringing enough food for a trip that could take two years would be difficult. Spirulina contains the

proteins and nutrients necessary for human life. NASA found it to be an exceptionally compact food source (1 kg of Spirulina is equivalent to 1000 kg of assorted vegetables).

Being a photosynthetic organism, Spirulina might also eventually address the problem of air recycling by providing oxygen and removing CO2 produced by astronauts. An enclosed fully functional ecosystem could then be proposed. Such a self sustaining ecosystem would improve long-term space missions and this option could be fundamental for a successful trip to Mars.

Since availability of water will also be an issue, treated urine could be a source of water for growing the bacteria. My fellow crew members and I had to provide urine for the experiment. (Fig.3 above)

The specific project I had proposed dealt with an environmental monitoring and alarming system. Such a system would be an essential part of the design of any Martian base habitat and, through integration into the overall habitat control and remote communication system, would be the key element for crew safety. Using the electronic



components I brought with me it was possible to arrange a series of web pages displaying some relevant environmental parameters and providing corresponding audible alarms (Fig. 4 previous page)

In order to further assess the extensibility of the system, real time Proton Flux data from the GOES Satellite were integrated in order to simulate a Solar Flares alarming system. The effectiveness of receiving these kinds of alarms via smart-phones was also tested (Fig. 5 below)

Apart from scientific research and experiments during the simulation, my crew also dedicated part of its time to outreach activities. Experiments were conducted in support of Space Florida's annual contest submitted by middle and high schools from Florida. The crew also co-operated with the TV channel 'ARTE' in the filming of a documentary promoting the Mars Society and MDRS.

Like the other crew members, I ventured out of the station, donning a space suit, to gather soil samples and explore the nearby terrain, similar to outings astronauts will take on Mars (Fig. 6). Before exiting the station in our space suits we had to step into an air lock, which simulated depressurization. We had to observe policies that are likely to be put in place on Mars - traveling in pairs, and having two people at the station at all times.

Conservation was important, as it would be on Mars. Water left over from washing dishes was used to flush the toilet (toilet rules: "If it's yellow let it mellow; if it's brown flush it down"). Showers were only permitted every 4 days and consisted of about a 1.5 minute "Navy shower" (water on, water off, soap on, water on, soap off, etc.).

Besides a faulty toilet, we had to repair several things, including the station's roof and back-up power generator. The repairs taught us what it will be like for Mars astronauts. They'll have to learn to fix equipment that they may not have much experience with, using limited tools.

So what did I learn, you say? Would I go to Mars? Yes, I definitely would and I am still hoping all of this can happen in my lifetime. Very promising developments are on-going at the moment. Keep an eye on what SpaceX is doing:

http://news.discovery.com/space/spacex-elon-musk-mars-astronauts-20-years-110423.html

But this is for the next story…..

F. CARBOGNANI

*More online*
*Find out more on the Mars Society and the MDRS project at:*
www.marssociety.org

## PEOPLE

These last three months have been quiet .. We have to go all the way back to h11 to find an issue in which there were no births or weddings to report!

Concerning personnel movements, we are glad to see Elena Catalano (of the Administration department) and Virginie Bornes (of the ET project) both back at work following maternity leave. Welcome back to both of them!

The *h* team wishes a nice summer to all our readers!

# News from the last GWADW workshop on the Island of Elba

**The GWADW workshop has been** closed for a few weeks, but we are already thinking towards next year's edition, scheduled for the Hawaiian Islands. This year the Gravitational Waves physics appointment was organised at "La Biodola", on the Island of Elba (Italy), at the Hotel Hermitage in a marvellous atmosphere and a beautiful landscape, typical of this corner of Tuscany, where land, sky and water are in a perfect and harmonic fusion. The workshop programme was focused on the performance of the up-graded first generation interferometers (enhanced LIGO and VIRGO+), the on-going activities for the advanced detectors and the first studies towards the next generation of gravitational wave detectors. The scientific appointment was important, particularly as, at the beginning of the year, the underground cryogenic detector LCGT, to be built in Japan in the Kamioka mine, was approved. Despite the problems resulting from the recent earthquake, the tsunami and the energy restrictions directly connected to the nuclear accidents that occurred in Fukushima, site preparation has started and the program will undergo minor delays, as reported by our Japanese colleagues: good luck from all the gravitational physics community. While the VIRGO and LIGO collaborations are preparing their advanced detectors, the GEO interferometer is testing the use of squeezing the light injected into the interferometer arms to avoid thermal problems connected to the use of a high power laser source.

A working session was devoted to the presentation of the Einstein Telescope Project, for which a detailed design study of the third generation detector has been developed. The project, based on the construction of an underground laboratory, inside which a multiple detector can be installed with the goal of covering a wide frequency detection band, was presented. The detector conceptual design is based on two interferometers: the first one, aiming to explore the low frequency region (below 3 Hz), having a cryogenic payload and the second one to be used for high frequency investigation. The proposal was accepted with great enthusiasm and represents the most challenging mission for the future of gravitational wave physics.

*Pict. 1 The swimming pools and the beach at the Hermitage Hotel.*

The week passed very quickly, alternating work with leisure. The workshop was very interesting and the 111 official participants had the opportunity to attend about sixty-five presentations, covering all the most important topics of the field.

The long lunch breaks, together with the after-dinner moments, represented an important workshop complement for informal discussions and comparison of experience acquired in different experimental contexts. The discussion on problems encountered in operating these complex machines, as well as in all the activities devoted to their future implementations, has found important guidelines to bring back home, within our daily activity.

Special thanks are due to the organizers, Francesco Fidecaro and Syd Meshkov, together with the perfect logistical arrangements, performed by Lucia Lilli and Séverine Perus. All of us are indebted to these people for a pleasant and fruitful week spent on this marvellous beach. Looking at the pictures I took during the week, I am already dreaming of the next GWADW workshop. See you at the Hawaiian Islands.

F. FRASCONI

*Pict. 2 After the visit of the Mines of Ginevro, the participants tasting local food and wine of the "Le Ripalte" farm, located on the "Seagulls cost", another beautiful corner of the island.*

*Pict. 3 Sunset at "La Biodola" beach during the social dinner.*

# Cooking in the Middle Ages

**Continuing backward the series** "Cooking in the Centuries", after the lamb recipe by Alexandre Dumas' Père, we propose a recipe from the Middle Ages.
It has been taken from a house keeping manual written in the 14th century by an older man (*Le Ménagier de Paris*, i.e. the Master of Paris) for his young spouse. This time, we propose a fish dish, taken from the chapter "Other Thickened Soups Without Meat". We give here the English translation, followed by the original version in ancient French. In this language the recipe is "Chaudumée d'un Brochet" i.e. "Chaudrée de Brochet"and is taken from the chapter "Autres potages lyans sans char" i.e."Autres potages épaissis sans viande".

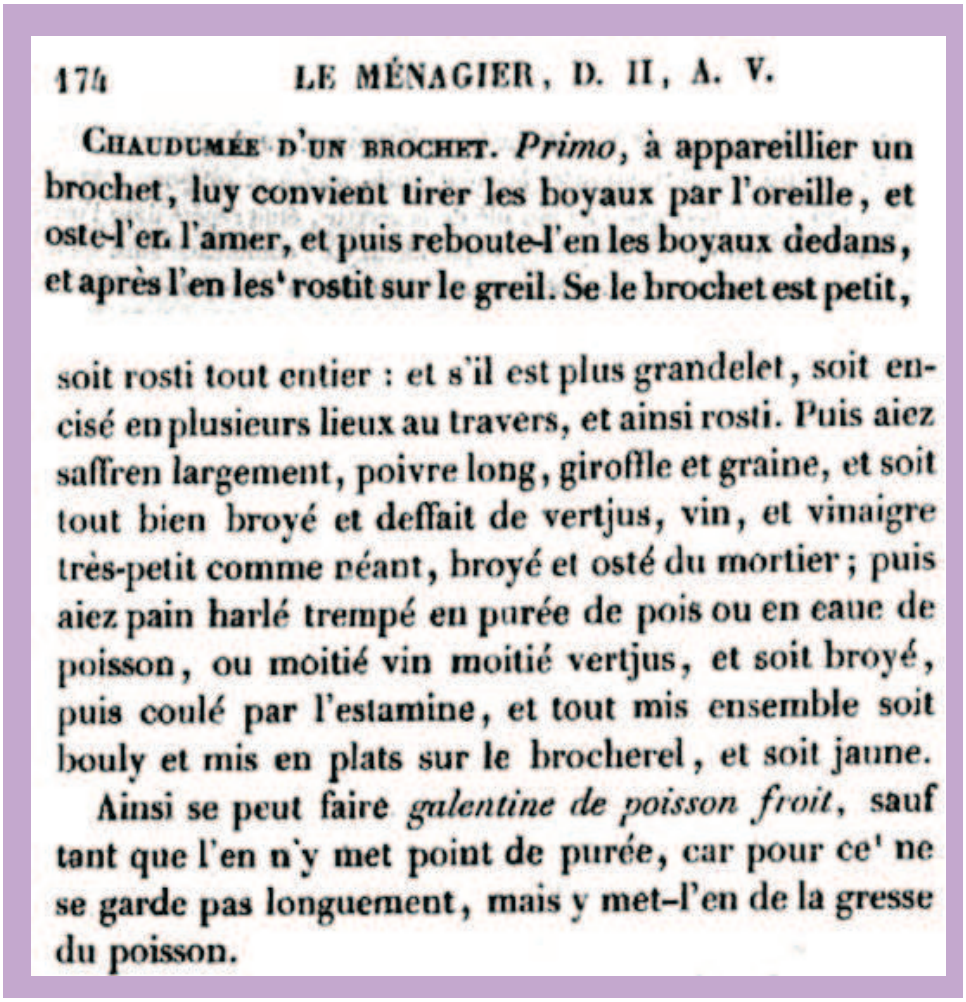
At the end you will find a few notes on spices used in the ancient times (please see Wikipedia for further details) and the addresses of sites where you can find the whole text in either ancient French or English.

## Pike Chowder

To prepare the pike you must first draw its guts out through its ear and remove the bitter parts. Then put the guts back inside and roast it on the grill. If the pike is small, it may be roasted whole: and if larger it can be sliced in several places and thus roasted. Grind up well a lot of saffron, long pepper, clove and grain. Mix these with verjuice, wine, and a very small amount of vinegar, almost none. Then remove this from the mortar. Then grind toasted bread moistened with pea soup or fish stock, or half wine half verjuice and put this through a sieve. Mix these ingredients together and boil them.Then spread this mixture which should be yellow over the pike on the dish.
In the same way you can make Cold Fish Galantine, except that you do not add pea soup, because this does not keep long, but you do add fish grease.

*NOTES*
*Poivre long (long pepper): fruits of a plant of the same family of pepper*
*Graine de paradise (grains of paradise): seeds of a spicy plant from Africa*
*Vertjus (verjuice): seasoning made with jus of unripe grapes*

*http://www.daviddfriedman.com/Medieval/Cookbooks/Menagier/Menagier.html#Thickened_Soups_Without_Meat*
*http://gallica.bnf.fr/Search?ArianeWireIndex=index&p=1&lang=EN&q=le+mesnagier+de+paris*



174 LE MÉNAGIER, D. II, A. V.

CHAUDUMÉE D'UN BROCHET. *Primo*, à appareillier un brochet, luy convient tirer les boyaux par l'oreille, et oste-l'en l'amer, et puis reboute-l'en les boyaux dedans, et après l'en les rostit sur le greil. Se le brochet est petit, soit rosti tout entier : et s'il est plus grandelet, soit encisé en plusieurs lieux au travers, et ainsi rosti. Puis aiez saffren largement, poivre long, girofle et graine, et soit tout bien broyé et deffait de vertjus, vin, et vinaigre très-petit comme néant, broyé et osté du mortier; puis aiez pain harlé trempé en purée de pois ou en eaue de poisson, ou moitié vin moitié vertjus, et soit broyé, puis coulé par l'estamine, et tout mis ensemble soit bouly et mis en plats sur le brocherel, et soit jaune.

Ainsi se peut faire *galentine de poisson froit*, sauf tant que l'en n'y met point de purée, car pour ce' ne se garde pas longuement, mais y met-l'en de la gresse du poisson.

# Open doors at EGO

**May 7th was a beautiful sunny** day. From the afternoon onwards, the EGO site, which is normally so quiet on Saturdays, began to be crowded with dozens of people of every age, all eager to visit our laboratories and to learn about what we are doing here. Three guided tours of the EGO site started with short seminars, which taught the visitors what gravitational waves are and how we are trying to detect them. They then continued by visiting the central building, the exhibits in the main building hall and the tube at 1500m west.

The main event of the day, however, took place after sunset. About 160 visitors gathered to have the opportunity to spend a few hours with us. In the open space in front of the control building five telescopes and two binoculars were mounted, to show young and old what the night sky had for us. Everybody was impressed by the moon which was close to its first quarter. This is one of the best moments to observe its canyons, mountains and craters, which are very visible at the terminator, the imaginary line which separates the light and dark parts of the moon. One of the telescopes was connected to a small camera to project an on-line image of the moon on a large screen: many people could gather around it to listen to short lessons on the main features of our natural satellite.

Another awesome sight was Saturn: its rings are not quite open and it was possible to appreciate their shape and even the shadow they cast on the planet surface. All the astronomical observations went ahead very well, thanks to the precious help of the local amateur astronomer association (Associazione Astrofili Pisani Galileo Galilei).

In the mean time, inside the atrium of the main building, people could take a look at some interesting exhibits: the suspended payload and the small model interferometer. These were accompanied by explanations from EGO and Virgo

researchers, who were also at public disposal to answer whatever question may arise.

All in all, it was another success!

G. VAJENTE

# Feathers and stones

**I would like to tell you about the** tall shiny instrument that appeared a month ago in the entrance hall of the Main Building.

It is one of the largest existing apparatuses to demonstrate experimentally the universality of free fall in a vacuum. We can see that, even if in air a falling stone reaches the ground much earlier than a feather, in a vacuum they arrive together. For the sake of reproducibility, in our system we have approximated the stone and the feather with a sphere of iron and a disk of light sponge.
The apparatus was built by the Pisa section of the INFN to be shown in the big exposition organized in 2005 at CERN, on the occasion of its 50th anniversary. It is there that the EGO director saw and fell in love with it. At that time he was Scientific Attaché to the Permanent Mission of Italy to the United Nations Office and other International Organisations in Geneva.

In the last years the apparatus was installed in the Vecchi Macelli, in Pisa, to be shown to visitors of the Ludoteca Scientifica and in the museum of computing instruments. Recently it had to be removed to allow restoration of the buildings and with the help of the director, we took the occasion to have it here, hopefully for ever: EGO is the "European Gravitational Observatory"!
The experiment shows that in vacuum, under the gravitational attraction of the earth, the fall of all bodies is identical, independently of their nature (weight, density, shape): it is a "universal" law.
To be more exact it demonstrates uniformly accelerated motion, with acceleration g = 9.8 m/s2. The 3 m fall is covered in about 0.8 seconds. The increasing velocity can be felt observing that in the first 0.4 seconds the objects fall by only 0.8 m, while in the following 0.4 seconds they fall by 2.2 m. In an equation

$$s = \tfrac{1}{2} g t^2$$

the covered space is proportional to the square of the elapsed time t.
In air the objects fall under the gravity attraction and the friction of air. The heavy iron ball feels a large gravity force and a tiny friction force (it is relatively aerodynamic); it will reach ground almost as fast as in a vacuum. The light sponge disk feels a moderate gravity force and a large air friction (it is large and poorly shaped). It will soon reach a velocity where gravitational force is balanced by frictional force. From that moment on the disk will move at constant (low) velocity, being subject to null force.

C. BRADASCHIA


It is impressive to read as Galileo understood all this, while not having the means to perform the experiment in a vacuum. In "Discorsi e dimostrazioni matematiche intorno a due nuove scienze" he describes the expected behaviour, including the friction of different means and the reaching of an asymptotic speed.

***DISCORSI E DIMOSTRAZIONI MATEMATICHE INTORNO A DUE NUOVE SCIENZE***
***GALILEO GALILEI***
***1638***

SALVIATI: ..... solo uno spazio del tutto voto d'aria e di ogni altro corpo, ancor che tenue e cedente, sarebbe atto a sensatamente mostrarci quello che ricerchiamo, già che manchiamo di cotale spazio, andremo osservando ciò che accaggia ne i mezzi più sottili e meno resistenti, in comparazione di quello che si vede accadere ne gli altri manco sottili e più resistenti: che se noi troveremo, in fatto, i mobili differenti di gravità meno e meno differir di velocità secondo che in mezzi più e più cedenti si troveranno ..... parmi che ben potremo con molto probabile coniettura credere che nel vacuo sarebbero le velocità loro del tutto uguali ..... il mobile cadente ..... il quale, perché, come ho detto, si va per sua natura continuamente accelerando, vien per consequenza ad incontrar continuamente resistenza maggiore nel mezzo, e però ritardamento e diminuzione nell'acquisto di nuovi gradi di velocità, sì che finalmente la velocità perviene a tal segno, e la resistenza del mezzo a tal grandezza, che, bilanciandosi fra loro, levano il più accelerarsi, e riducono il mobile in un moto equabile ed uniforme, nel quale egli continua poi di mantenersi sempre .....

***DIALOGUES AND MATHEMATICAL DEMONSTRATIONS ABOUT TWO NEW SCIENCES***
***GALILEO GALILEI***
***1638***

***SALVIATI: ..... no medium except one entirely free from air and other bodies, be it ever so tenuous and yielding, can furnish our senses with the evidence we are looking for, and since such a medium is not available, we shall observe what happens in the rarest and least resistant media as compared width what happens in denser and more resistant media. Because if we find as a fact that the variation of speed among bodies of different specific gravities is less and less, according to the medium becomes more and more yielding, ..... then we are justified in believing it highly probable that in a vacuum all bodies would fall with the same speed ..... which body, as I have said, is by nature continuously accelerated so that it meets with more and more resistance in the medium and hence a diminution in its rate of gain of speed until finally the speed reaches such a point and the resistance of the medium becomes so great that, balancing each other, they prevent any further acceleration and reduce the motion of the body to one which is uniform and which will thereafter maintain a constant value .....***

# The Virgo Spring Excursion

**The traditional EGO-Virgo spring** excursion led us this year to Populonia, a site famous for its beautiful beach and its important remains of Etruscan settlements. As usual, Carlo had organized a program suitable for a large variety of tastes, including a hike through the woods, a stay on the beach (with picnic), and the possibility to visit the cultural monuments.

Initially a group of about 15 persons was foreseen, including many children, but last minute problems prevented several people from coming, so that in the end only a few people gathered at the Esselunga parking in Pisa. Another colleague joined at the departure point in Piombino. The excursion team was small, but nice. Taking a last coffee gave us the force to face two long hours without a single bar; then we started the hike which led us North through the wood on a large track, requiring a modest amount of climbing. Lots of cork oak trees on the left and right provided shade but only for the first part of the trail. Further on towards Populonia hungry caterpillars had stripped the trees of all leaves so that hats and sunscreen had to prove their efficiency. Fortunately the temperature was not too high and there was also some wind. After crossing the wood we arrived at the Golfo di Baratti, whose softly curved coast line is distinguished by a very popular sandy beach. After walking along the coast for a short time we reached our picnic point and relaxed in the sand. On our way back we just missed another colleague with his family who had come to the beach and would have joined the group of excursionists had they been able to come earlier. This would have increased the group size significantly.

H. HEITMANN

# "Soccorsiadi 2011": The first-aid Olympiad

**One of our colleagues (Samuele** Puccinelli, Computing Dept.) participated in the 'Soccorsiadi' championship last may, an event proposed by ANPAS (http://www.anpasnazionale.org/) Organization (National Public Assistance Association). The Editorial staff wanted to know more about his participation in this event.

**Who is Samuele outside the EGO site?**

As you may know, Samuele has been a volunteer with ANPAS since 1998. On Sunday and in the evening he supports people in need of help who have called the public emergency number (118). He provides support in his role as ambulance man along with other volunteers. On average, Samuele dedicates 12 hours a week to rescuing people and another 8 hours a week training himself or others on first-aid techniques.

**Why such a choice?**

Simply to have an experience in that field, with the wish to help other people in difficulty.

**What is your most significant experience in ANPAS?**

Apart from the tragic ones that are inescapably present in this kind of activity, I have good memories of people rescued due to our intervention. I said our and not my, because it is important to note that in the ambulance all the figures are of paramount importance, from the doctor to the driver.

**So, Samuele, explain us what are the Soccorsiadi 2011?**

It is the 11th edition of an annual event which was organized by ANPAS last May in San Miniato (http://www.pubblicaassistenzapisa.it/joomla/sanitario-iphone/6-news/151-soccorsiadi-2011).

24 teams from the 12 areas that make up the whole Tuscany region (Pisa, Grosseto, Livorno, Elba, Lucca, etc) competed in three distinct races:

1. A race for the ambulance driver
2. A competition on Basic Life Support
3. A competition on Basic Trauma Life Support

Note that an independent 4th competition was dedicated for the under 18's on Basic Life Support. The fact that the composition of the teams and the role of each member are made known only on the eve of the competition makes the competition more difficult!

**Who wins?**

We won 3 of the 4 prizes available, the best driver, the best 'Basic Trauma Life Support' and the last one, that is the sum of the points cumulated of the three competitions mentioned above.

**Do you intend to race again next year?**

I would like to specify that the main goal of such an event is to enhance the training level of first-aiders and gather people together that are normally far apart. Having said that, the preparation for such a race is time consuming. Two times a week from 21:00 to 24:00 for 4 months, and 3 times a week on the last month. I have already contributed to this championship these past years and I don't rule out participating again even if I am currently more inclined to give way for other volunteers.

**What' next?**

I will certainly stay in ANPAS and I am going to follow a dedicated training to become a first-aid instructor.

So, Samuele, we hope to never see you in your role of ambulance man, but consider us lucky to count you among the EGO first-aid team members !

F. RICHARD