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THE GRAVITATIONAL VOICE

number 9

OCTOBER 2008



NEWS FROM THE SITE

Many new Coordinators
The Broken Window - Part 2

NEWS FROM THE WORLD

ET, What is this?
GW and Science Fiction

SPORT IN CASCINA

Biathlon 2008
Virgo EGO League 2008

News from EGO and VIRGO



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EDITORIAL

“Waves of wonder” is the highlight of *h9*. In this extended article, Piero Rapagnani tells us about gravitational waves as they appear in science fiction stories from as far back as the seventies. If in our community there was someone entitled to write on this subject, it was Piero. This is testified by the fact that he was the owner of a science fiction library of more than 800 volumes. We say was because Piero donated his collection to the library of the village where his father was born.

In the news section we keep our readers informed about how fast we are recovering from the NE viewport accident. We deal also with the mini-black-hole saga, so much present in the press in these weeks, and reassure that the Earth will not be swallowed or disappear for ever.

The *h* sport section is growing as it is sport activity in Cascina: we had the Biathlon in July and the Virgo EGO League football matches are presently drawing all the attention of our reporters.

Finally we have much happy news to announce like weddings and new born babies. We are optimistic also for the future of our enterprise. The confidence in success to come may be grounded on some solid cornerstones that Daniel Enard strongly participated in establishing. Alain Brillet remembers Daniel as a kind friend and an enthusiastic colleague.

C. BRADASCHIA

A surprising visit!

Ni kore dankas vin pro via afabla kaj interesege scienca guidado tra Virgo.

Marion – Francio, Michael – Italio, Ionel – Rumanio, Matthias – Austrio, Marek – Slovakio, Quynh – Viet Nam, Murilo – Brazilo, Barbora – Slovakio, Vesna – Slovenio, Enrico – Italio, Claudio – Italio, Anca – Rumanio, Ioana – Rumanio, Melinde – Belgio, Tünde – Hungario, Livia – Rumanio, Angela – Austrio, Fabio – Italio, Oliviero – Italio, François – Francujo, Francesco – Italio



The flag of Esperanto

This is the thank-you message written to Franco Frasconi and myself by a group of students to whom we gave guided tour of the site on Friday, September 19. You may have understood that it means: We heartily thank you for your kind and interesting tour of Virgo.

It is written in Esperanto, the “universal” language created in 1887 by Ludwig Lazarus Zamenhof, a polish ophthalmologist, with the aim of easing communication and fostering peace and international understanding (<http://en.wikipedia.org/wiki/Esperanto>).

C. BRADASCHIA

Many New Coordinators

In spite of the obstacles on Virgo's path (read the Broken Window column) towards an even longer and with better sensitivity Science Run, we entered the Virgo+ phase and some of the planned upgrades have already been implemented. This new phase sees a new team of coordinators leading the effort. In some cases, their appointments were not about to expire, but new, more important duties in their near future demanded a change in their responsibilities.

That is the case for Virgo Commissioning Coordinator, Edwige Tournelier, who stepped down before her second mandate in this role was over. She is going to be a mom soon and therefore, after using the last few weeks in her capacity as Coordinator to teach the tricks of the trade to her heir, went back to Annecy.

Enrico Calloni (INFN Napoli) took over and will foster the task of bringing Virgo sensitivity to its design goal in time for next year's Science Run. Enrico's promotion left a vacancy in the Detector Group Coordinators as Optical Characterization Leader. This opening was filled by Julien Marque (EGO).

A different reason is behind the change of Virgo's Detector Coordinator: this role has been Michele Punturo's for two terms in a row. Michele now leads the E.T. Project (see this issue's *E.T., what is it?*) and the new Detector Coordinator is Piero Rapagnani (INFN Roma 1). Piero is also the author of a beautiful article in this *h* issue, showing an unknown side of his wisdom.

Giovanni Losurdo (INFN Firenze/Urbino) is the only first level Coordinator still in charge, while Data Analysis is now under Gianluca

Guidi's (INFN Firenze/Urbino) responsibility, as he takes the place held by Andrea Viceré (INFN Firenze/Urbino)

In addition, the role of Head of Technical Coordination was added to the EGO hierarchy, in order to bridge the gap between the Virgo Collaboration and EGO, and Henrich Heitmann (CNRS-ARTEMIS) was appointed to this position (see *h8*). He then left vacant the function within the Detector Group Coordinators as Alignment Leader and the responsibilities it entails to Maddalena Mantovani (EGO).

To all new appointed coordinators we wish all the best success and take this opportunity to thank their predecessors for the good work done.

F. NOCERA

More Site Visits

Call for Volunteers

Since the end of the site construction, the long blue tubes of the Virgo interferometer have kept arousing curiosity in the area and even far beyond Tuscany.

In the last years many local inhabitants and school groups from everywhere in Italy (and abroad) interested in learning more about the Virgo experiment have come to the EGO Virgo site to see this amazing apparatus close up.

Obviously those visitors are not permitted to wander about wherever they want (Virgo is not an amusement park!). Site visits are organized on particular days, usually on Saturday mornings from 10 to 12:00 (if you take it easy!) and guided by volunteers keen to share their enthusiasm for Virgo. Besides these regular site visits, an Open Day also gives the opportunity for the general public to visit Virgo. Indeed this initiative is a contribution

to the program of the yearly Settimana della Cultura Scientifica launched in 1991 by the Ministero dell'Università e della Ricerca. This year on March 8, Carlo Bradaschia and Franco Frasconi welcomed about forty five people for the now well-oiled guided tour of the site.

Unfortunately while requests for site visits have increased, the volunteer team has been reduced. Some of our volunteers like Carlo Bradaschia and Franco Frasconi have dedicated much time to guided visits and without their commitment, many visitors would still look at the long and blue tubes with perplexity!

That's why we hereby launch a call for volunteers!

Guiding a site visit means essentially to welcome the visitors, lead them to the seminar room where you will present some slides introducing the Virgo experiment and the interferometer (about 30-45 mn). Then you will guide visitors into the central building and the control room so that they can have a look on some of the interferometer components.

There is indeed no particular requirement to join our team: just a good knowledge of the experiment (some questions may be tough for non scientific volunteers...), being available sometimes for a couple of hours in the weekend and sharing your enthusiasm for Virgo with our guests while answering the questions that may arise during the visit.

Sometimes visits are also requested in languages other than Italian (mostly in English or French). Knowing one of these languages will be useful when needed.

Interested? Contact Carlo B. or Severine to give your availability and let us organize the volunteer rotation.

Do not wait, the season is already started!

S. PERUS

The Broken Window Part 2

Repeating the last sentence of “The Broken Window – Part 1”, published in *h8*, just after the NE tower accident, it is confirmed “that the goal remains a long term data taking, VSR2, in parallel with LIGO, in mid 2009”. Virgo and LIGO will both be in the respective improved sensitivity configurations: Virgo+ and Enhanced LIGO.

Contrary to our initial hope, the NE window did not implode due to a defect or to a shock, but due to an unsafe design, hence we have to change all Virgo viewports, about 100!

This has been demonstrated by thorough analysis consisting of comparing viewports by different manufacturers, studying the different designs, producing finite element models, testing the strength of existing viewports (we have broken by hydraulic pressure 16 of them - Figure below). All this has been done in collaboration with

colleagues from LIGO and CERN and with the help of external experts, in particular from SSV at Murano, near Venice.

It has been shown that, if the glass disk is brazed to metal not only on an annulus on its front face, but also on the rim, i.e. the lateral surface, this produces a traction stress on the glass, when it has vacuum on one side and atmospheric pressure on the other (see BradPlenary080717.ppt at <http://www.cascina.virgo.infn.it/collmeetings/presentations/2008/2008-07/Plenary/>).

Given these conclusions, the first due action had the goal of making the interferometer safe. It consisted of replacing the weak viewports with blank stainless steel flanges, wherever possible, as soon as possible.

While completing this preliminary action, the recovery had already started. A company producing safely designed viewports (Larson, CA) has been selected and new viewports have been ordered: 53 uncoated, 60 anti-reflection coated for HeNe laser light, 4 A-R coated for Nd-YAG laser light.

The superior safety of the new viewports is due to:

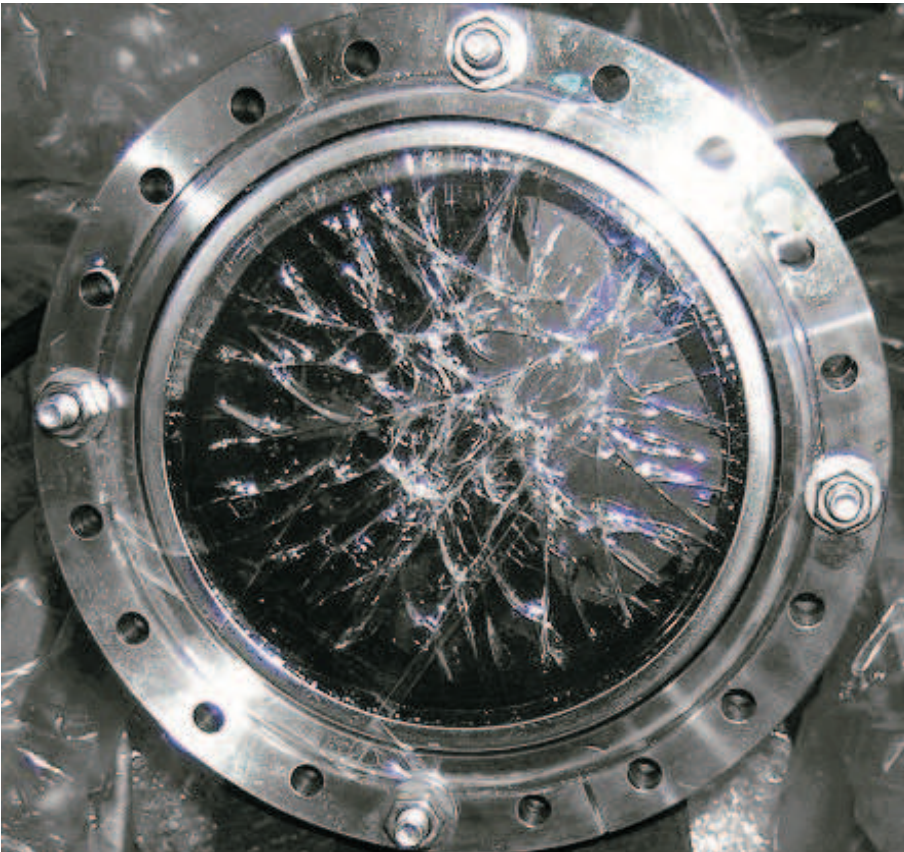
- absence of brazing on lateral surface
- higher thickness, 9.5 mm instead of 6.5 mm
- double soft transition ring between glass and CF flange.

None of the two tested Larson viewports failed; they withstood the highest reached pressure of 7.0 bar: that is a safety factor of at least 7. Similar results have been obtained at LIGO, where they “succeeded” in breaking one of these windows at 6.5 bar.

66 new viewports have been already delivered and 58 have been installed. It is planned to have mounted, in early October, as many windows as are barely sufficient to continue Virgo+ commissioning. The others, useful but not strictly necessary, will be mounted when possible, without slowing down the control room activity.

The recovery from the viewport accident will be completed with the replacement of the North End damaged mirror. The new mirror, the refurbished marionette and recoil mass are at EGO; the new payload is being assembled and it will be back in place within the end of October, ready to start Virgo+ commissioning.

C. BRADASCHIA



1.5 Years of Commissioning

I was asked by the h editors to write about my ‘service as commissioning coordinator’. There would be many things to tell, so I tried to make a selection and give you here some flavour of how it is to be commissioning coordinator and of what happened in the commissioning of Virgo during these 1.5 years.

Being commissioning coordinator is a very intense experience with quite hard times but also much satisfaction and interesting work.

The nicest times of a commissioning coordinator are without any doubt those spent in the control room. In addition to the fact, which has to be underlined, that this room is very nicely done, the atmosphere is usually very good and it is populated with enthusiastic workers. There are some figures that one cannot imagine the control room without: the operators (a very enthusiastic and professional team), some commissioners, who, one might sometimes think, have forgotten the way to or the key of their office/home, and there are also the invisible figures who, from outside/far away are providing precious support. After some hard days of meetings/organization it was good to take a 'break' in this nice place, the control room, far from e-mails and phone, enjoying analyzing the commissioning data or discussing the on-going work. And I should mention that regular intake of ice cream (especially in the centre of Pisa) also offers good after-work relaxation!

So, what happened during these 1.5 years? I started the coordination in March 2007, 2.5 months before the start of the first Virgo science run (VSR1, a big event in Virgo, see h6). The 2 months before the start of VSR1 were rather loaded with hardware changes on the interferometer: change of the electronics used for the laser frequency stabilization (the so-called 'SSFS board'), installation of acoustic enclosures around 3 optical benches including the displacement and reshuffling of one of them (the detection bench hosting the dark fringe beam), an electrical shutdown of 1 week (which brought us a new bump at 8kHz in the sensitivity... will it go away with the next electrical shutdown?) and the replacement of a vacuum component, the detection Brewster window, with a larger one (more details are given later on this 'Brewster saga'). With so many hardware changes some people were afraid the scientific run would not start on time. The run started as

planned and was a success (see h6)! Let's open a parenthesis here. There is an old belief that I tried hard (not very hard) to erase and I take this *h*-opportunity to try harder: some people believe that each time we modify something on the interferometer 'it will take *some time to recover*', especially after hardware changes needing long shutdowns. Well, if you take a stable machine and perform well prepared work in a controlled way (it is most important to control the 'satellite' works), this is not true. And that was quite impressive, in the first months of 2008, during which time several long shutdowns (up to 10 days) took place with significant changes (removal of the Brewster window, installation of a thermal compensation system, replacement of the magnets on the main interferometer mirrors: details on all that later) we saw the interferometer relocking almost at the first attempt with a good sensitivity (even I was breathless!).

But let's go back to VSR1. I thought the commissioning work would be more relaxing during the 4 months of the science run. That was without counting on the endless commissioners' imagination! We were allowed 25 hours of commissioning breaks per month and each week there was 4 hours of maintenance during which some commissioning investigations could also take place. And the commissioning team was ready to fill this time:

- some had decided that earthquakes would not unlock Virgo anymore and they put in place a kind of global control for the top stage of the mirror suspensions to let the interferometer surf like a man on the earthquake wave,
- others have been fighting against drifts of the interferometer alignment: after some 'quick' curing the final solution was implemented after the run, with the installation of auto-centering systems (the galvanometers),
- others had decided that the control noise would no longer limit

the sensitivity at low frequency (that was completely successful only after the run: see below),

- others had decided to track and remove the sources of environmental noise (magnetic, acoustic, seismic) in the experimental halls, a major undertaking,

- and there was the successful fight against the so-called fast unlocks from the injection system which were reducing the interferometer duty cycle

During all the run there was also a very puzzling noise that was showing up as ugly structures in the Virgo sensitivity from 200 to 800 Hz. We named it the mystery noise... This mystery was understood in September 2007, after a lot of brainstorming and experimental tests: we first understood that it originated from the injection system, then, that it was probably some jitter noise (something was shaking the input beam), then that the origin was on the suspended injection bench, inside vacuum, and finally that some piezo-actuators installed on this bench were shaking it due to the noise of their electronics. Once understood, the cure was incredibly fast: filter this electronic noise and the mystery is dead!

At the end of VSR1 the interferometer had therefore gained in robustness and the sensitivity was well improved. Then the commissioning work restarted at full speed. Here are some highlights of what happened between October 2007 and May 2008:

- Below 50 Hz the sensitivity was limited by some noise introduced by the signals used to control the position of the mirrors. This noise is known and can therefore be subtracted. The technique used for the subtraction has been improved and the cancellation improved from a factor 50 (before VSR1) up to almost 1000 now! Less noisy signals have also been used (the so-called 8MHz). These actions brought the control noises below the Virgo design sensitivity.
- The lowering of control noise

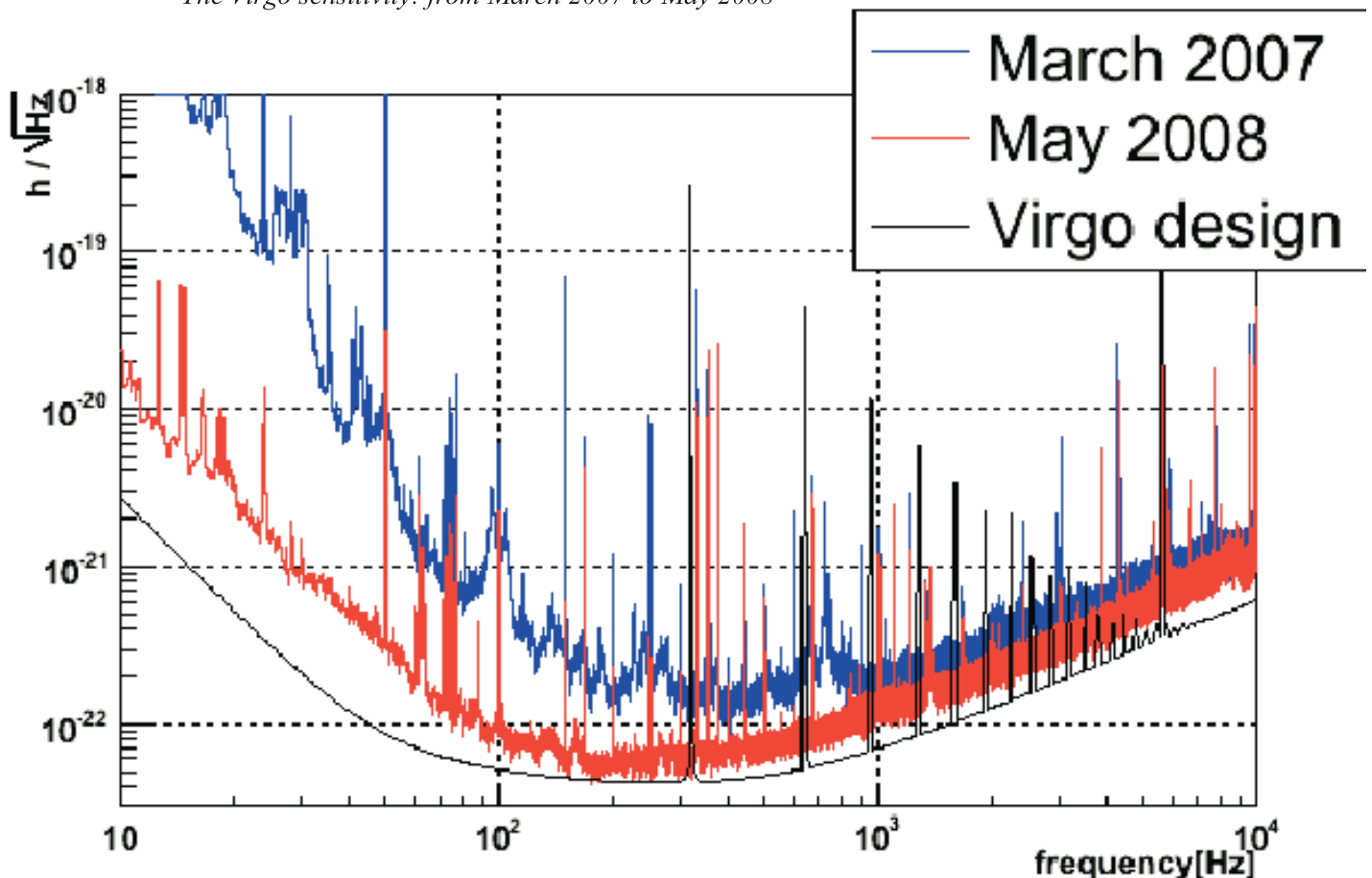
uncovered another family of noise sources with which the fight is not yet finished: the noise due to the combination of environmental noise and scattered light. When the interferometer beams are measured on optical benches in air a tiny fraction of these beams (1 photon among 100 million is enough!) can be back-scattered by the optics towards the interferometer and recombine with the main beam. If the optic which scatters the beam is shaken by environmental noise these scattered photons bring this noise with them and pollute the Virgo sensitivity. A campaign of improvements has been performed on all optical benches: better and cleaner optics, more rigid mounts, improved beam dumps, better acoustic isolations,... Measurements were also performed in order to understand what is shaking the optics. A big source was found to arise from the air conditioning system. An old noisy machine has already been replaced and other improvements are under study for the near future. This 'scattered light'

noise is now very close to the Virgo design sensitivity and other improvements are in preparation.

- Moving towards higher frequencies ($\sim 100\text{Hz}$ to a few 100Hz) we reach the region covered by the Brewster and mystery noises. Before and during VSR1 these two completely different ugly sources of noises were showing up in this region (see the blue curve on the figure below) which made things difficult to understand. After the death of the 'mystery noise' (September 2007, described above) it became easier to understand the 'Brewster noise'. The Brewster window is a window used to separate the high vacuum of the interferometer from the 'not so clean' vacuum of the detection tower, where the dark fringe exits. This window is connected to the vacuum tank and can therefore be shaken by the surrounding environmental noise. The dark fringe beam goes through this window. This window can communicate this noise to this beam, for example through the 'scattered light' process

described above. The Brewster saga started long ago when it was realized, in 2006, that playing music close to this window one could hear it in the dark fringe! It was first suspected that this window was too small and therefore clipping the beam. A larger one was prepared and installed before VSR1. After correcting some mistakes and making some measurements the answer was there: no change, the 'Brewster noise' was still thumbing its nose at us. It was then considered to remove this window. That was not so simple since one has to avoid that the dirt from the detection tower pollutes the interferometer (a source of nightmares to some of our colleagues): it was decided to install a cryogenic trap to catch all these particles (see $h8$ for a review of the cryogenic trap). This complex object was developed and finally installed early in 2008. The first success was that the 'Brewster noise' disappeared and the second one was that the cryo-trap was efficient enough in catching the particles escaping from the detection tower! So the cryo-

The Virgo sensitivity: from March 2007 to May 2008



trap remained in place!

- Another kind of environmental noise is the magnetic noise usually showing up as bumps or lines between 50 and 100 Hz. The way it enters the sensitivity is the following: Magnets are glued on the Virgo mirrors in order to control their position (through coils). An external magnetic field is therefore also able to displace the mirrors, as would a gravitational wave... Some magnetic noise was first found to pollute the sensitivity early in 2007 (some big bumps around 100 Hz): some very noisy power supplies (creating large magnetic field) located close to the mirrors were shaking them. The bumps went away when these were moved away. Since then, all sources of magnetic noise around the vacuum tanks were looked for and removed. A campaign of measurements has also been performed. It was found that the magnetic noise might limit the sensitivity below 50 Hz. In order to reduce the impact of this noise it was decided to replace the magnets with smaller ones. This tricky operation (one has to detach and re-glue magnets from the fragile Virgo mirrors without damaging them) was successfully performed on 2 mirrors (the input mirrors). It was under way on the end mirrors when the end window broke (see *h8*). The answer to whether and how much the magnetic noise is reduced will therefore be known only after this summer shutdown... Stay tuned!

- Moving from noise to the control of the interferometer brings us to another crucial point in Virgo: the thermal effects. Since 2005, when we first tried to lock Virgo at full power (10 Watts), we have to live with these thermal effects: a small fraction of the laser beam is absorbed by the interferometer mirrors, heating them and leading to deformation.

- These mirrors then act as a lens distorting the beam and making it impossible to control the interferometer. We could only control the interferometer up to 8

Watts of input power. Since our aim was to go up to 10 Watts (Virgo) and then to 25 Watts (Virgo+) for an improved sensitivity, these thermal effects have to be compensated for. A thermal compensation system has been developed: it consists of a CO₂ annulus beam which is sent on to the mirrors in order to heat the border of the mirror so that it becomes flatter (the Virgo laser beam heats the centre). This system was installed in April 2008 for one mirror (two will be equipped) and we were just starting to get it to work and getting interesting results (the interferometer was locked with a good sensitivity at 9.3 Watts!) when the end window broke. A lot of work still remains to be done in order to have the complete thermal compensation system working well and this system should be operational for the next Virgo science run (VSR2 expected to start in the first half of 2009)... Stay tuned!

On May 9th, as we were finishing the replacement of the magnets on the end mirrors a vacuum window broke (see *h8*), forcing us to cancel the planned commissioning run C8 (10 days at the end of May) and to advance the shutdown that was supposed to start right after C8. Now all the actions needed for the recovery of this incident are taking place (replacement of the damaged end mirror, replacement of unsecure vacuum windows,...) as well as all the planned upgrades: new laser amplifier to go up to 25 Watts together with many improvements to the injection system (pre-mode cleaner, improved optics, new mode cleaner mirror,...), bright new electronics for better performing controls of the interferometer, and works to reduce the environmental noise, like the displacement of electronic racks in an acoustically isolated room,...

That's it for the time being, now I am back in Annecy, watching all these activities remotely (rather nostalgically) preparing for a different but also very intense (that's

what I was told...) adventure: a baby!

I thank all the commissioners for those fruitful and very interesting 1.5 years and wish them good luck for the restart and towards VSR2, hoping that will be a very successful run for Virgo!

E. TOURNEFIER

The Thermostat

At EGO, a laboratory at the cutting edge of technological progress, "thermostats" are widely used to control the temperature of buildings and devices. The etymology of the word thermostat comes from the ancient Greek *thermos* = hot and the Proto-Indo-European base *sta-* = to stand. Even if people operating at EGO are very technically advanced, not all of them are acquainted with this new device that is sometimes misused. This is not surprising, since the thermostat is a device that has been invented relatively recently (1883, Wikipedia) in order to keep the temperature of an object or of an environment at a chosen stable value.

We believe it would be useful to explain how a thermostat works and provide suggestions on its use. The thermostat is just a switch put in series on the electricity line powering a heating or a cooling device (<http://en.wikipedia.org/wiki/Thermostat>). The peculiarity is that you don't need your finger to operate it. It is switched on and off by heat flowing in or out. In the basic thermostat the electrical contact is established/interrupted by a bi-metal strip, a strip made by two layers of two different metals having different thermal expansion coefficients (http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion). According to the environmental temperature the bi-metal strip stays straight, bends up or bends down, thereby connecting

or disconnecting the electrical circuit.

The thermostat in your office or home heating works in such a way. In winter, at a temperature below e.g. 18 °C, the bi-metal strip is bent to the side connecting the heater to the electricity causing your office/house to heat and become warm. The strip now becomes straighter, since the two metals expand differently, and the power circuit is cut when the temperature reaches 19 °C. In this way your office/house temperature will comfortably oscillate in the interval 18-19 °C. It is easy to add a turning knob to adjust the position of the contacts, in order to choose at will the preferred temperature. The cooling system operates similarly in summer.

It is now evident that with the thermostat you may choose the temperature of your office, but not the speed of reaching that temperature. On Monday morning in summer it is useless to set the thermostat all the way down if your office is at 30 °C after the week end. The temperature will reach 24 °C exactly at the same speed as if you set the thermostat at 24 °C! But you could make an even larger mistake. You could also open the window (the air outside is e.g. at 26 °C) and run away to work in the control room. Three hours later you come back and the air in your office will be far too cool, but the cooler will be still desperately running. The poor guy is trying (unsuccessfully) to cool the atmosphere of the Cascina plain down to 24 °C, wasting a lot of power. Bravo! Situations like this are very frequent in common spaces (e.g. the meeting rooms or the coffee space in building 1), where everyone passing by cannot refrain to put the hands on the poor thermostat, turning it all the way up or down according to the temperature of the moment. Nobody forgets to enhance his wise intervention by opening doors or windows, if available, in spite of the panels asking to keep them closed. Another example is the Seminar

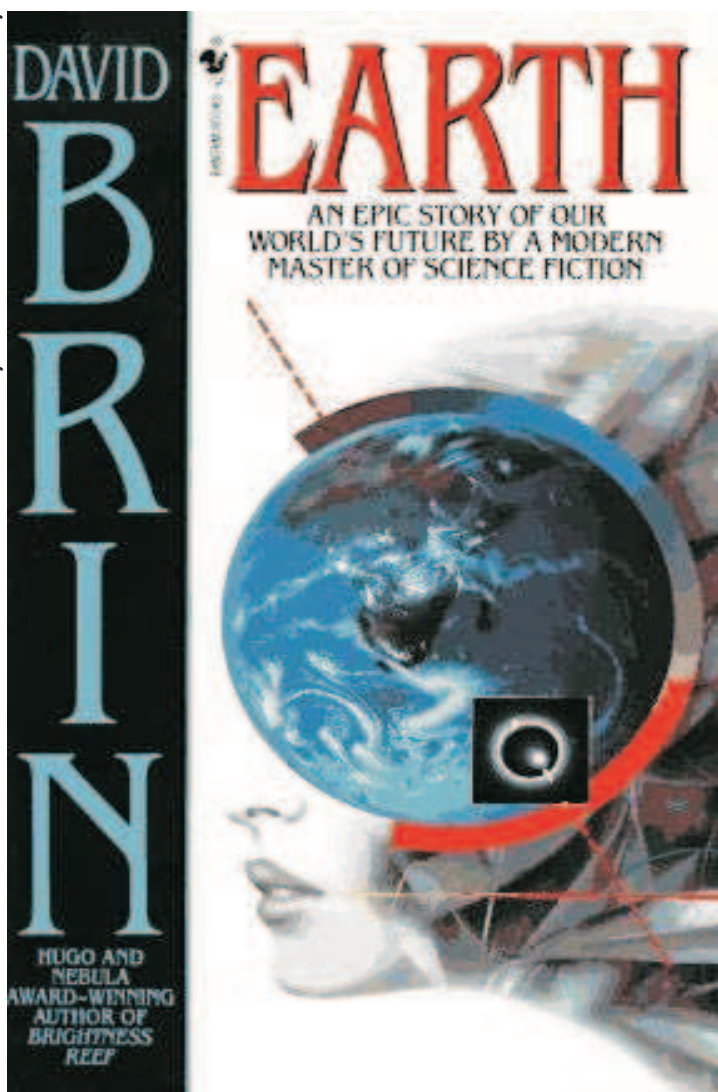
Room of Building 1 being used for shortcuts, leaving the two doors always open. This forces the dedicated climatization system to try to regulate the temperatures of the long adjacent corridors in addition to the task it was meant for. Doors and windows are the thermostats worst enemies. Even though they have been invented a very long time ago, we are not yet able to use them properly, when coupled with a thermostat. So, please, if you encounter a thermostat in the future, be gentle with it and friendly with the environment.

C. BRADASCHIA

Waves of Wonder

by Piero Rapagnani

I started reading Science Fiction as a child. I loved the mix of thought provoking ideas, fantastic landscapes, and sense of wonder which is often supported by a high literary quality. When I started to work in the field of Gravitational Wave Detection, as a young physics student, I tried to look into the sea of novels and stories I was reading for a hint of that particular shape of gravitation. But not a hint, nothing. At that time in the late seventies we



were at the top of the new wave in science fiction. The sociological science fiction novels of the sixties were going in the direction of inner space exploration (James Ballard novels). This left behind the stories of great galactic empires, Faster Than Light travel (FTL in Sf jargon), Ansibles (the instantaneous communicator of SF), and all that gadgetry that arose from the dreams of writers imagining the future in the golden age of science fiction (the forties and fifties). The new wave of science fiction with its heavy accent on psychological introspection did not leave much space for far fetched scientific concepts, and even less for a niche topic like gravitational waves. Therefore my first encounter with gravitational waves in science fiction was late and quite unexpected. It was 1980, and I was reading

"Gateway" (1), by Frederik Pohl. Pohl is one of the great masters of Science Fiction, the author of an evergreen classic of sociological sf "The Merchants of Space", a novel written in 1954 which is a fierce and still valid critic of consumerism. "Gateway" was one of his first novels with the scope and vastness of a space saga: in the future humanity has colonized the solar system and found Gateway hidden in an asteroid belt. Gateway is a space station built by aliens hundreds of thousand of years ago to shelter many small alien ships. No one understands how the ships work.

However with time humans have learn to make them start for their destination which is reached instantly. The transport process is unknown and completely uncontrollable. The traveller could find himself in a place where life is unsustainable or in a planet full of valuable alien technology (and become incre-dibly rich). Consequently the Gateway became a place for an all-powerful Corporation that thrives on a community of people desperate enough to risk their lives in a plunge into the unknown, seeking fortune but often finding death. The novel itself is not a swashbuckling saga but is centered on the evolution of the main character (Robinette Broadhead) and on the complex description of life at the Gateway. It was one of the few novel in science fiction to win all the most important literary awards in the field in its year. Without doubt one of the main assets of the novel is its description of the alien worlds reached by chance by the prospectors. Whilst immersed in the suspense of one such jump in the darkness I came across this passage:

"..the radio was pouring out static, and inside the capsule the sound was very loud. Metchnikov grabbed for the tuning and the gain. Over the static I heard a voice I didn't recognize at first, but it was Danny A.'s. - Do you feel that? - he yelled - It's gravity waves. We're in

trouble. Stop the scan! - Metchnikov switched off the radio, and in the silence that followed I heard Danny A. say prayerfully, - Dearest God! We've had it. That thing is a black hole - "

It was not much but for me was quite a thrill. For the first time I found a trace of my field of work which was also part of the vast imagery of science fiction. These were the years when we where just starting to build the first big Gravitational Wave resonant detector at CERN (Explorer). At that time we thought that first detection was not so far in the future (the same feeling we are having now...) and one of our common jokes was talking of a sand box antenna: a detector for gravitational waves so intense that they could leave traces in a box of sand. That passage in "Gateway" just described the same concept but with our body as the receiver. Since then the impression of the tickle of gravitational waves passing through my body remained with me. A pictorial view of what we are really trying to do with all our antennas, an extension of our senses.

Though interesting, "Gateway" makes only a passing mention of gravitational waves. A short time after finding that passage I enjoyed a short story where gravitational waves were protagonists, not only part of the background (The Hole Man (2), by Larry Niven). Larry Niven is a writer of what is called "Hard Science Fiction", a declination of the genre where the main emphasis is posed on scientific accuracy and speculative investigation of the possible consequences of frontier physics theories. Often Hard SF writers have a formal scientific education and Niven is no exception. He earned a Bachelor in mathematics at Caltech and did also some graduate work.

"The Hole Man" opens with the Percival Lovell spaceship reaching Mars for the first time. Before landing, the crew onboard has the task of mapping the "mascons"

(mass concentrations) on the planet using a gravity gradiometer, called a "Forward Mass Detector" (more on this later). While the ship hovers over Sirbonis Palus the detector starts to record a "sinewave signal", which is of course very unexpected for planetary mass concentration. The scientist on board, Andrew Lear, is overwhelmed with enthusiasm but is under the skeptical eye of ship captain Childrey:

"You don't understand, - he told Childrey. - Gravity radiation is harder to block than electromagnetic waves. Patterned gravity waves would be easy to detect. The advanced civilizations in the galaxy may all be communicating by gravity. Some of them may even be modulating pulsars... rotating neutron stars. That's where Project Ozma went wrong: they were only looking for signals in the electromagnetic spectrum. -

Childrey laughed. - Sure. Your little friends are using neutron stars to send you messages. What's that got to do with us? -

- Well, look! - Lear held up the strip of flimsy, nearly weightless paper he'd torn from the machine. - I got this over Sirbonis Palus. I think we ought to land there. -

Unfortunately, the messy behaviour of the scientist and his wild ideas induce the other members of the crew to consider him crazy. This is especially true for captain Childrey who makes a personal point to denigrate Lear at every possible occasion. Eventually a structure is spotted on Sirbonis Palus and the captain agrees to land there to investigate, perhaps hoping to prove Lear to be fool to the rest of the crew. The structure is indeed an alien building housing a complex machine sending the gravitational wave signal and the scientist devotes himself completely to its study:

"Lear had set up a Mass Detector next to the communicator, on an extremely complex platform

designed to protect it from vibration (3). The Detector produced waves so sharply pointed that some of us thought they could feel the gravity radiation coming from the communicator.

Lear was in love with the thing."

After two months of investigations, Lear becomes convinced that the communicator uses a quantum black hole driven by electromagnetic fields to generate the gravitational waves. Again, while the scientist is explaining his theory to a fellow member of the crew, who is also the narrator of the story, Childrey arrives to make fun of him:

He smiled down at me. - Let me show you something. -

- What? -

He flipped a toggle above a dull gray circular plate. - This thing is a microphone. It took me a while to find it. I am Andrew Lear, speaking to whoever may be listening. - He switched it off, then ripped paper from the Mass Indicator and showed me squiggles interrupting smooth sine waves. - There. The sound of my voice in gravity radiation. It won't disappear until it's reached the edges of the universe. -

- Lear, you mentioned quantum black holes there. What's a quantum black hole? -
.....

- There was a time when black holes of all sizes could form. That was during the Big Bang, the explosion that started the expanding universe.

The forces in that blast could have compressed little local vortices of matter past the Schwarzschild radius. What that left behind - the smallest ones, anyway - we call quantum black holes. -

up and throw it at you? -

The Captains persecution of Lear turns all crew rapidly against him. In a short time he is "The Hole Man", the man with a black hole between his ears for everyone on Mars. As time passes Lear is more and more harassed by Childrey who tries to find any occasion to embarrass and humiliate him. In a final confrontation, Childrey mocks again Lear on his theories. A member of the crew witnesses the quarrel:

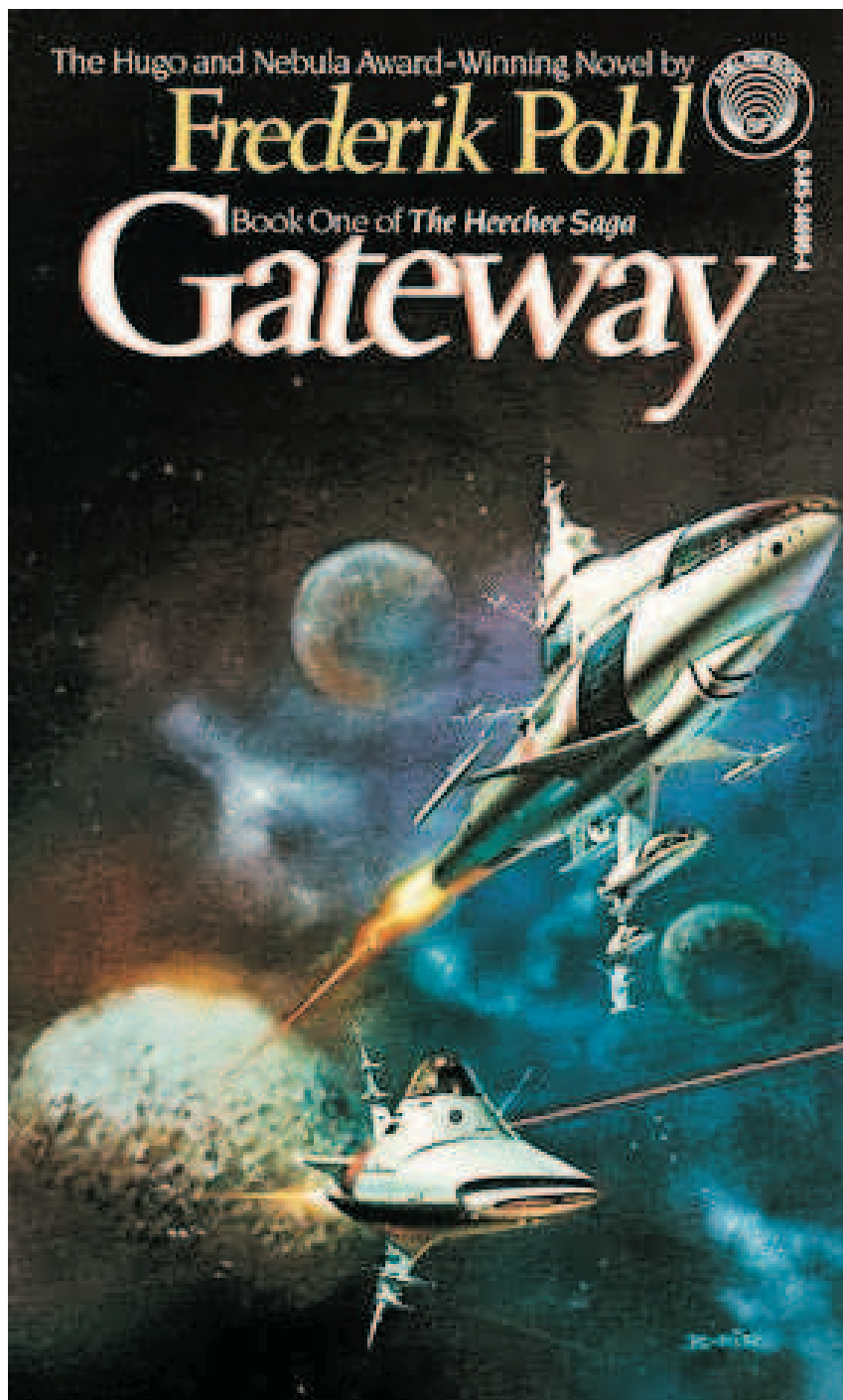
"He finished talking. For a time neither of them moved. Then Lear made a sound of disgust. He turned away and pushed one of the buttons on what might have been an alien typewriter keyboard.

Childrey looked startled. He slapped at his right thigh and brought the hand away bloody. He stared at it, then looked up at Lear. He started to ask a question. He crumpled slowly in the low gravity."

The exasperated scientist had freed

the black hole from its cage and it had passed through the captain repeatedly killing him. Childrey has become a "Hole Man".

The end of the story is grim: a makeshift court tries to judge Lear for killing the captain but it becomes rapidly clear that proof is non-



I heard a distinctive laugh behind me as Captain Childrey walked into view. The bulk of the communicator would have hidden him from Lear, and I hadn't heard him come up. He called, - Just how big a thing are you talking about? Could I pick one

existent. The captain was killed by something he did not believe in and the story is too far fetched to be brought up in court on Earth. However the suspicion that Lear released the black hole on purpose is present. In his own words:

" - Now the black hole isn't in there any more. I can get the mass of the black hole by taking the mass of the communicator alone.-

- And I can cut the machine open, see what's inside. How they controlled it. Damn it, I wish I were six years old. -

- What? Why? -

- Well. . . I don't have the times straightened out. The math is chancy. Either a few years from now, or a few centuries, there's going to be a black hole between Earth and Jupiter. It'll be big enough to study. I think about forty years. -

When I realized what he was implying, I didn't know whether to laugh or scream. - Lear, you can't think that something that small could absorb Mars! -

- Well, remember that it absorbs everything it comes near. A nucleus here, an electron there . . . and it's not just waiting for atoms to fall into it. Its gravity is ferocious, and it's falling back and forth through the center of the planet, sweeping up matter. The more it eats, the bigger it gets, with its volume going up as the cube of the mass. Sooner or later, yes, it'll absorb Mars. By then it'll be just less than a millimeter across - big enough to see. -

- Could it happen within thirteen months? -

- Before we leave? Hmm. - Lear's eyes took on a faraway look. - I don't think so. I'll have to work it out. The math is chancy... -

"The Hole Man" won a Hugo Award for best Science Fiction Story in

1975 and has been reprinted several times around the world. However it must be noted that when it was written in 1973 Hawking radiation was as yet unknown, although it was presented for the first time only a year later. A site at this address is dedicated to explain black hole theory and Hawking radiation using this story as an example. There one can find detailed calculations on the power of hard gamma rays emitted by the tiny black hole inside the communicator: it comes out that it is about 35 GW, sure enough to kill everyone of the crew of the Percival Lowell on Mars.

One final note on this story it is necessary, regarding the "Forward Mass Detector": here Forward means Robert L. Forward (1932 - 2002), a scientist well known in our field as one of the fathers of the interferometric technique for gravitational wave detection. Forward gained his PhD at the University of Maryland, working in the first experiment of Weber with resonant mass detectors. After graduating, he went to work at the research labs of Hughes Aircraft, and started a long career both in science and as a Hard SF writer. His Science Fiction novels are scientifically accurate and wildly imaginative. For instance, in the Rocheworld series, Forward describes a particular double planet orbiting Barnard's Star, in which the two elements are close enough that they share an atmosphere (4). Niven and Forward knew each other. They may have met at one of the Conventions of Science Fiction writers and fans held periodically around the world, Niven may have come across the concept of the Forward Mass Detector. This is a gravity gradiometer that Forward really developed to detect Mascon on the Moon. It is also described in detail in Gravitation, the famous textbook by Misner, Wheeler and Thorne. Following the tradition of Hard SF, Niven tried to write a story as up to date and realistic as possible at that time.

I had to wait several years, until

1992, to find a new example of Gravitational Waves in Science Fiction. Of course, I am not a Science Fiction scholar and cannot affirm that this long interval was due to a lack of material. It is simply the random results of my casual wanderings through genres and stories.

I then found Earth, by David Brin. This proved to be highly rewarding. It is a mature and complex work, a typical product of the evolution of Science Fiction literature at the turn of the century.

The plot of this novel, written in 1990, should sound familiar to people in our field: in 2038, an experimental power plant in Amazonia extracts energy from an artificial black hole trapped in an electromagnetic cage. During one of the riots of the population in the region, the plant is switched off and the black hole falls to the center of the Earth and begins to orbit around its core, eating it out. The author uses a large cast of characters to tell the story of the attempts to recover the black hole before it destroys the planet. He describes, as the plot gradually evolves, his views on the near and far future of humanity. Eventually the menace is overcome but not without developing a complete new technology based on the generation of gravitational waves. I was particularly impressed by this passage, where the old scientist who began it all hears the young people catching on to the new wave of ideas coming out of the newfound technology. His realization that he is witnessing a quantum leap in knowledge and technology and that he will unavoidably be left behind by it is intense and sobering:

"The NATO scientific commander had specifically asked him to stay. So Stan sat in on all the daily seminars, struggling to keep up with younger, more agile minds, even though his understanding grew more obsolete with each fast-breaking discovery. No matter. They all treated him with utter deference.

Hardly a moment passed without hearing the name Alex Lustig spoken with an awe customarily lavished on the shades of Newton and Einstein and Hurt, and as the great one's former teacher, Stan shared in that glory.

.....

That's where we're at right now . . . a singularity in the life history of mankind. It wasn't just the present crisis. Oh, certainly he was worried. Would the world's institutions--or the planet itself--survive the next few hours or days? Stan was as concerned as the next man. Still, even if tomorrow the spectre of reborn international paranoia evaporated like a bad dream, and all the gorgeous, terrifying new technologies were tamed, nothing would ever be the same. Earlier today, some of the youngsters had been discussing notions about gravitational circuits . . . equivalent, in collapsed mass and stressed space, to capacitors and resistors and transistors, for heaven's sake! To Stan it was proof the time had come. The moment he'd secretly been waiting for all his life. There's another kind of singularity . . . having to do

with society, and information.

.....

Those youngsters back in the encampment were talking about making gravitational transistors! It was enough to make a man cry out, "Stop! Give me a minute to think! What does it all mean?" Knowledge isn't restrained by the limits of Malthus. Information doesn't need topsoil to grow in, only freedom. Given eager minds and experimentation, it feeds itself like a chain reaction. A third type of social singularity, then, would be a true leap, some sudden, jarring shift to a completely undefined state--where changes manifest themselves in months, weeks, days, minutes.. "

Gravitational transistors... I would like to live to see that. This kind of mix of scientific extrapolations

typical of Hard Science Fiction and deep psychological analysis typical of mainstream literature is common in current Science Fiction. Like many modern science fiction writers, David Brin has a sound scientific education (he earned his PhD in Physics at the University of California in San Diego and besides being a writer, is a teacher and a NASA consultant). He also has some literary ability, which allows him to combine character introspection with complex plots which investigate the possible social and political evolution of the new perspectives given to us by modern science.

I confess that with time my literary wanderings are bringing me to countries ever more distant from Science Fiction. However I always keep an eye open for any reference to our field of work in the novels and in the fictions I come across. Therefore a smile came to my lips when I learned that Capitan Jonathan Archer of Starship Enterprise NX-01, during his first years in Starfleet, as a guest aboard the Yarahla Vulcan Starship helped to set up a Graviton Telescope in a Dark Matter Nebula (6). It was the time when we were beginning to think of third generation detectors, the start of what would later become the Einstein Telescope Design Study. It seems to me a good omen to find out that in the 22nd century, ET will be part of Vulcanian and Terrestrial science...

(1) Gateway, by Frederik Pohl, 1977, winner of the Hugo Award for best novel in 1978 and of the Nebula Award for best novel in 1979. Can be found very easily on Amazon. Edizione Italiana: Frederik Pohl, Le porte dell'infinito, Cosmo Oro n.38, Edizioni Nord 1979.

(2) The Hole Man, by Larry Niven, 1973. Edizione Italiana: L'Uomo del Buco", Robot n.6, Edizioni Armenia..

(3) "An extremely complex platform designed to protect it from vibration"... Have you ever heard of anything similar?

(4) Rocheworld (Baen, 1990); Return to Rocheworld (February 1993), with Julie Forward Fuller.

(5) Earth, by David Brin, 1990. Edizione Italiana: IperFICTION, Interno Giallo

(1991).

(6) Star Trek Enterprise Episode 1x08: Breaking the Ice - A few years prior to the launch of the Enterprise (NX-01), Archer was a guest aboard the Vulcan Maymora-class ship, the Yarahla, which made a run to a dark matter nebula. He helped set up the graviton telescope, and also spacewalked in a Vulcan EV suit (from http://memory-alpha.org/en/wiki/Jonathan_Archer-The_Star_Trek_Wiki).

Black Holes?

Black holes (BH) which were waiting to becoming world famous as gravitational wave sources decided to reach the front pages of newspapers thanks to the LHC. The Large Hadron Collider is the new powerful accelerator built at CERN, Geneva, and installed inside an underground circular tunnel with a 27 km circumference (<http://lh2008.web.cern.ch/lhc2008/index.html>, <http://en.wikipedia.org/wiki/LHC>). LHC is able to accelerate protons up to an energy of 7 TeV (1 Tera electron Volt = 10^{12} eV, that is 1 million million times the energy acquired by an electron travelling across a potential difference of 1 Volt). At this energy a proton flies at 99.999999% of light speed and has an energy of 1.1 microjoule, about the energy of a 1 mg mosquito flying at 1 m/s: you would feel it hitting your face! After a few months of tuning (commissioning we would say in Virglish) LHC will be able to shoot the two intense beams of these protons against each other. Then the expected interactions will finally happen, reproducing the conditions which existed at the Big Bang. From time to time a Higgs boson should be generated. The Higgs boson is the final missing clue of the generally accepted Standard Model of particle physics. Together with the Higgs confirmation, particle physicists eagerly expect new members of their micro-zoo, like "super-symmetric" particles, and possibly the existence of extra dimensions. Stephen Hawking

remarked: "Whatever the LHC finds, or fails to find, the results will tell us a lot about the structure of the universe".

Among the things foretold to be generated by proton interactions at LHC where also mini-black-holes. Events of this kind, however, are not expected in the well established General Relativity theory of Einstein; they are only possible in the framework of some speculative unproven theories. These same theories foresee that mini-BH, if produced, would evaporate immediately, without having time to start accreting mass. Mass accretion happens to the well known macro-BH of astrophysical origin. The absence of any danger at LHC is demonstrated by the fact that similar interactions have been happening frequently since the start of the Universe, when cosmic rays hit any celestial body. The difference is that at LHC the projectile proton and the target move towards each other at the same speed. In nature the cosmic ray proton flies, while the target proton is almost steady in the body of a star. If dangerous "hungry" BHs were produced the Universe would have already disappeared (<http://thelede.blogs.nytimes.com/2008/09/09/ha>

Latest news

As you have surely read in the press, an accident happened at LHC a few days after operation beginning. It will require a few months to be fixed, pushing the restart of proton beams to early spring 2009. This is also due to the CERN winter energy saving stop.

We would like to reassure our readers that the failure was not due to mini-black-hole generation but simply to a bad electrical connection causing overheating due to the high current. Just as happens at home when a poor contact melts the plug of the dish washing machine.

working-anticipates-colliders-start/?scp=3&sq=black%20holes&st=cse).

Real large BHs, in conclusion, will have to wait a few years to reach notoriety together with gravitational wave discovery at Virgo and LIGO.

C. BRADASCHIA

Black Hole Hunter

Cardiff University has a website which provides an interesting game concerned with gravitational waves.

Go to the website <http://www.blackholehunter.org> which proudly proclaims "Welcome to Black Hole Hunter. "The game that lets **YOU** search for gravitational waves".

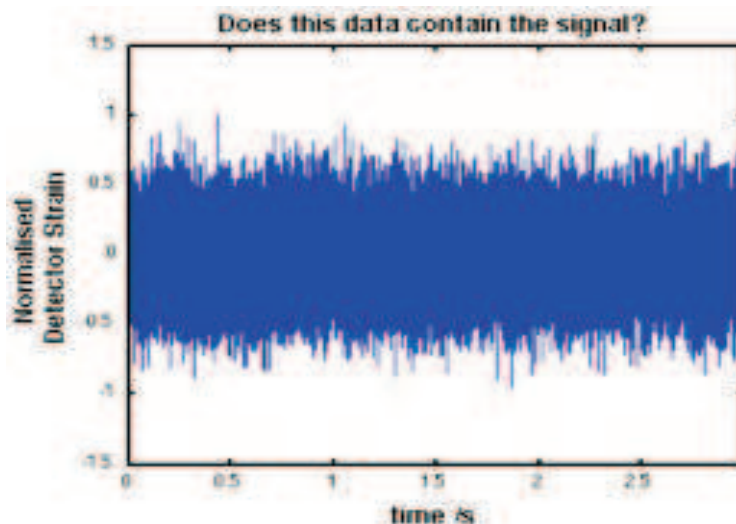
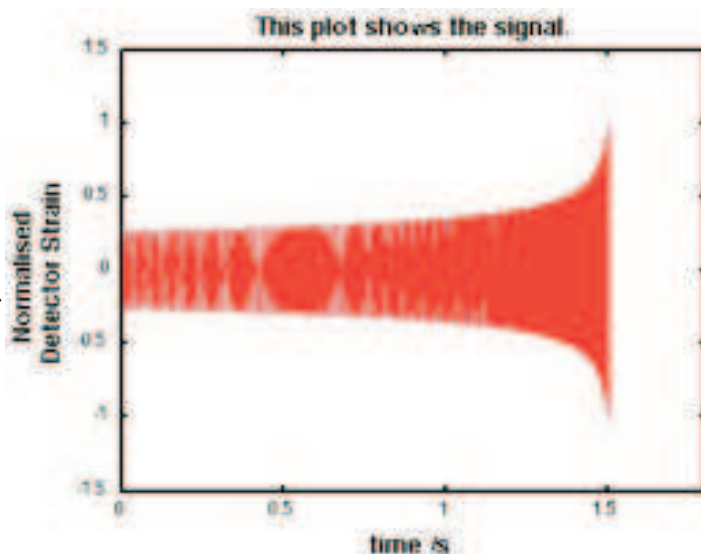
First you are given an example of what a gravitational wave signal sounds like. The game then provides four acoustic signals one of which has

the sound of a gravitational wave embedded in it among background noise.

Click on each signal to hear the sound and see if you can detect the one containing the gravitational wave. You can choose the level beginner, intermediate and advanced. After completing a stage you are provided with small "Did you know" information providing more about gravitational waves, black holes, event horizons etc...

There is also an interesting link to a gravitational wave tutorial by the school of Physics and Astronomy on the web page.

M. MOHAN



ET - WHAT IS THIS?

A new project has just started in the gravitational wave field. The Einstein Telescope (ET) is an international effort, aimed at providing a new research infrastructure in Europe. The project involves all the major institutions that created the Virgo and the GEO600 detectors. These are EGO, INFN in Italy, CNRS in France, Max-Planck Institute for Gravitational Physics (MPG) in Germany, NIKHEF in the Netherlands and the universities of Glasgow, Cardiff and Birmingham in UK. EGO is the project coordinator and in order to better carry out this duty a new employee, Virginie Bornes, has been hired. Virginie and Veronica Colautti (part time) are now creating the new European activities office that will deal with the administration of all the European Commission supported activities at EGO.

The ET proposal was submitted to

the European Commission in May 2007 under the Framework Programme 7 (FP7). Our project has been selected from many other very competitive proposals and after a long negotiation phase it is now supported by the European Commission with a budget of three million Euros for three years. The aim of this project is the realization of the conceptual design of a future European 3rd generation gravitational wave detector; in fact the evolution of the current (first generation) gravitational wave detector is well defined and shown in the Figure 1. After the current upgrade to the so-called enhanced level, the detectors will evolve toward their second generation called the advanced (Virgo and LIGO) detectors.

According to the current gravitational source modeling when these detectors reach their nominal sensitivity then the detection of the

gravitational waves is assured after a few months of data taking. However the sensitivity needed to test Einstein's gravity in strong field conditions or to realize a precision gravitational wave astronomy mainly of massive stellar bodies or of highly asymmetric (in mass) binary stellar systems goes beyond the expected performances of the advanced detectors and of their subsequent upgrades. For example, the fundamental limitations at low frequency of the sensitivity of the 2nd generation detectors are given by the seismic noise, the related gravitational gradient noise (so-called Newtonian noise) and the thermal noise of the suspension last stage and of the test masses.

To circumvent these limitations new infrastructures are necessary: an underground site for the detector (to limit the effect of the seismic noise) and cryogenic facilities to cool down

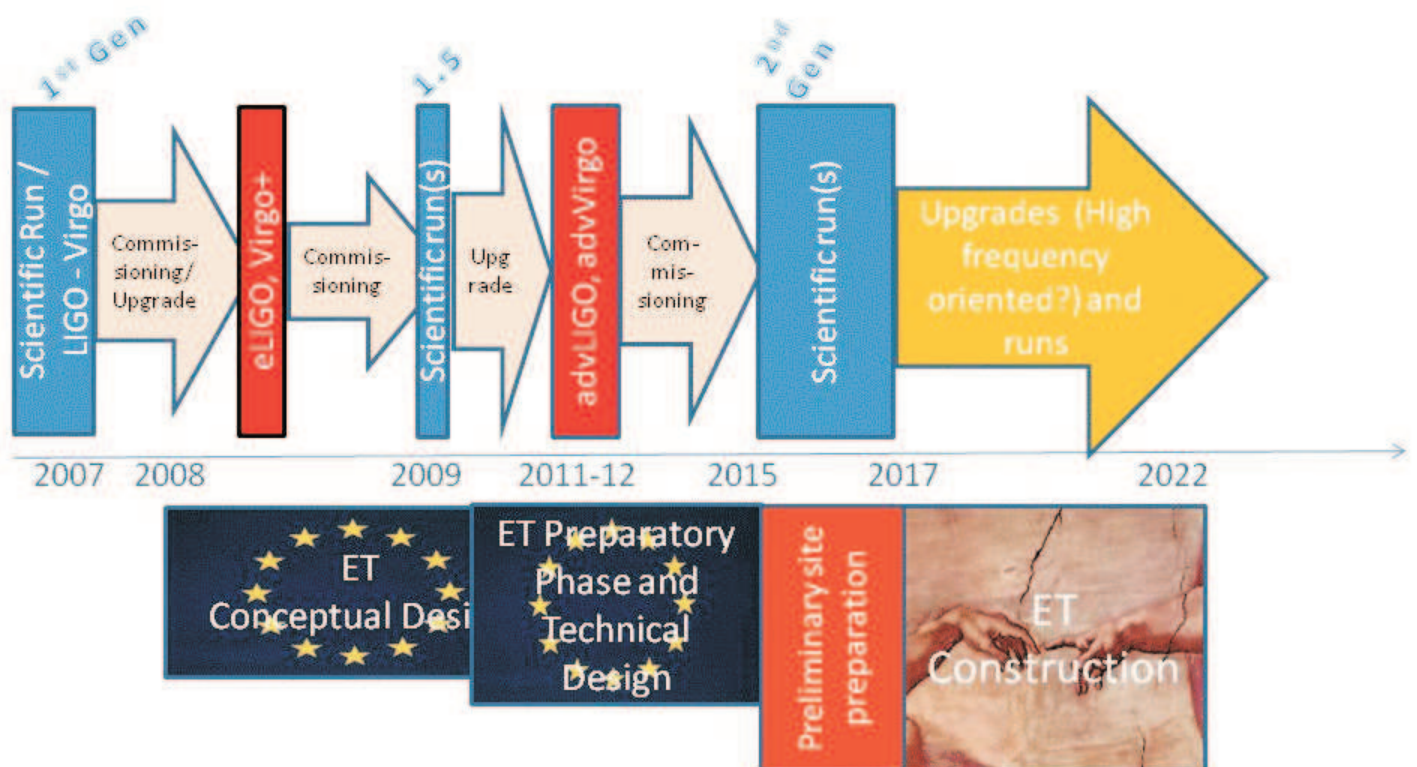


Figure 1- Evolution of the current GW detectors (upper part) and expected path of the ET project (lower part of the figure)

the mirrors to directly reduce the thermal vibration of the test masses. The ET-FP7 project, through its four technical working groups (WG, being formed just now!), will address the basic questions about the realization of this new observatory: site location and characteristics (WG1, chaired by J. v.d. Brand, NIKHEF), suspension design and technologies (WG2, currently chaired by P. Rapagnani, INFN-Roma), detector topology and geometry (WG3, chaired by A. Freise, Birmingham University), detection capabilities requirements and Astrophysics potentialities (WG4, chaired by B.S. Sathyaprakash, Cardiff University). The physicists directly involved in the ET project are aware of the difficulty of realizing a conceptual design for the new observatory in so short a time and for this reason the project is open to all the scientists who want to collaborate with the ET adventure. As the ET project is classified as a Design Study there is no need for equipment or experiments. The largest investment will be for additional dedicated man power. This is a good opportunity for young researchers willing to join us in exploring this new field of science.

The importance of the ET project is evident. Despite the fact that the design study activities have just started the need for a 3rd generation gravitational wave observatory has already been discussed in the roadmaps of the major astrophysics research institutions in Europe. For example, the ASPERA organization, a network of national government agencies responsible for coordinating and funding national research efforts in Astroparticle Physics includes ET in its official roadmap document.

M. PUNTURO
Scientific Coordinator of the ET Design Study
& Coordinator of the EGO European Office

Links:
- *ET Design Study:*
<http://www.et-gw.eu>
- *ASPERA Roadmap:*
<http://www.aspera-u.org/images/stories/files/Roadmap.pdf>
- *E-mail:* et-ds@ego-gw.it

Festival della Scienza 2008

The Festival della Scienza has been held in Genova since 2003. (<http://www.festivalscienza.it/it/festival/index.php>). After five years, it is now a well established and successful event with thousands of visitors.

In 2008 the Festival will begin on October 23 and will end on November 4. This edition is devoted to the many facets of "diversity". One of these facets is technological and cultural innovation, including scientific research: this is the link with Virgo. With the help of Gianluca Gemme, Genova group leader, we have proposed an event that has been accepted by the Festival Management. It will happen on Saturday, October 25, at 15:00, in the Sala del Minor Consiglio at Palazzo Ducale in Genova. After a conference on gravitational waves, by Francesco Fidecaro, the public in Genova will be able to pose questions directly to scientists at work in our Control Room at EGO. This will be possible through a video conference connection.

Being a Saturday, we hope that the Commissioning Coordinator will plan some special activity for that weekend; otherwise we will provide puppet-scientists and a ventriloquist.

C. BRADASCHIA

Biathlon 2008

On July 16th the over one-year-long wait for the 4th Virgo EGO Biathlon Relay Run finally came to an end. This year's was somewhat

different from the three previous ones since Naples, the winning team of all previous editions, opted to not compete as a team, although some of its hard-core members took part in the race split among different teams. The field then lay wide open for Naples' heirs.

Last year's grunting comments about the unbearable 3 km leg run did not bring about change to the rules of the competition: the first leg was 1 km run along the north arm, the second a 2 km run followed by a 6 km leg with bicycles all the way to the West End building and then the infamous 3 km run to the finish line.

The event was blessed by wonderful weather and a buffet party hosted on the porch of the canteen followed the race. A combination of Italian-style appetizers and drinks were profusely served. We should all thank the EGO Director for that. All the athletes with their families and friends had a chance to meet one another and to spend a very pleasant mid-summer evening enjoying the sunset in a complete state of relax.

Now some details about the race. Once again six teams lined up on the starting line. While some of their members were newcomers, some others had already competed in the past, judging from the names they picked for the teams they were in, like the Last Chance Team (Garufi, Huet, Cavaliere, Pinard) and the FCD Old Boys (Di Fiore, Braccini, Bradaschia, Calloni).

This edition was dominated by the Locking team (Swinkels, Campagna, Ruggi, Vajente); showing, as remarked during the medal

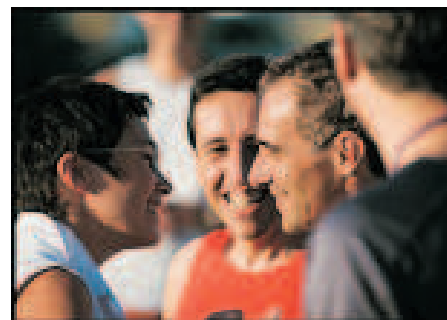


Photo: A. Freise

ceremony by Edwige Tournefier who officiated it, that “you can spend your life in the Control Room and still win”. They led from the beginning and basically there was no real suspense about the winning team’s name, but after them the competition was really intense. The FCD Old boys managed to find the stamina to leave behind the S-I & Co team (Romboli, Di Biase, L. Paoli, Richard) who were close in third place.

The already mentioned Last Chance Team finished fourth and the Optics one (LeGalliot, Canuel, Genin, Cleva), last but not one, before the Student Team (Jeff, John, Helene, Casey), who proved to be real sports. The performance of the Locking team seems to have elicited a proud reaction from the former members of the three time in a row winning team: watch out, Naples is planning to come back next year to rise to the challenge.

F. NOCERA

Recycling at EGO

You may have noticed that a couple of months ago a variety of assorted recycling bins have popped up in different areas of the EGO site. Following on from much discussion in the area of recycling and how best to implement it the decision has been taken to ensure that paper and plastics do not go to waste.

In reality, the recycling process has actually been going on for some time at EGO, as scrap metals and packaging materials are all collected when necessary, while the water dispenser bottles are also recycled, with Riccardo Romboli taking them to the Cascina recycling depot when required. Of course, power and signal recycling take place on site as well...ahem. However, since the introduction of the canteen a discussion has been on-going as to

how to deal with the consequent increase in the number of plastic bottles on site.



A decision was taken at the beginning of the summer to introduce a series of bins located in the various buildings in order to facilitate the process of recycling not only used plastic water bottles, but also scrap paper. These bins are to be found in and around all of the main hubs of activity and are easily discernable.

Good news indeed then as EGO firmly does its bit to contribute to a sustainable environment.

The boot is now firmly on the other foot and it is time for all of us to do a little something. Perhaps, to help in the maintenance and aspect of the site as a whole, a next step could be to stop using the external bins for disposing of used blue overshoes. One look out of the office window is enough to show that only a little wind is required to send these blue

plastic covers drifting all around the site. Of course, anyone can happily collect the errant shoes, or any other litter for that matter, should they encounter them, but throwing them away in the interior bins should help resolve the problem at its source.

G. HEMMING

Virgo EGO League 2008

The 9th of September was an auspicious day in the history of the little five-a-side football pitch that has been lovingly created by Fabrizio Rossi and others. The ‘Gelsomino’ as the pitch is now colloquially known has played host to a number of friendly matches throughout the summer months and has seen 27 different players don boots and shorts in order to participate.

The match that took place on the 9th of September was of an altogether different character however. Ladies and gentlemen, welcome to the Virgo EGO League 2008.

From the middle of September until the middle of October, four teams of Virgo and EGO’s finest will battle it out for the title of inaugural Virgo EGO League Champions title.



Photo: C. Fabozzi

League table		P	W	D	L	F	A	GD	Pts
1	Reds	3	3	0	0	18	8	10	9
2	Yellows	3	2	0	1	23	21	2	6
3	Blues	3	1	0	2	12	15	-3	3
4	Whites	3	0	0	3	16	25	-9	0

Whites	Reds	Yellows	Blues
F. Rossi	F. Nenci	R. Cosci	M. D'Andrea
G. Hemming	D. Le Galliot	M. Bazzi	M. Mohan
A. Paoli	D. Huet	L. Paoli	J. Marque
E. Genin	P. Ruggi	F. Richard	S. Chatterji
A. Pasqualetti	F. Berni	G. Di Biase	R. Macchia

Goal scorers		Goals
1	G. Di Biase	14
2	F. Rossi	7
=	D. Le Galliot	7
=	F. Nenci	7
5	M. Mohan	6
=	F. Richard	6
7	E. Genin	5
=	J. Marque	5
9	G. Hemming	3
10	M. Bazzi	2
11	S. Chatterji	1
=	D. Huet	1
=	A. Paoli	1
=	L. Paoli	1
=	P. Ruggi	1

The four teams, carefully selected by Federico Nenci, are shown in the graphics above. As you can see, there have been a few goals about.

The Virgo EGO League is the culmination of a summer of physical exertion and enjoyment that has taken place under the title of 'CalcioNE' – Football at the North End – and has served as a fantastic way of bringing together different people not just from the different departments and nationalities of EGO, but also from the Virgo Collaboration as a whole. It has proved to be a fine way of breaking down barriers, of keeping people in

good shape (most of the time!) and winding down too.

Let's just hope that whoever takes that Virgo EGO League Champions title has earned it!

G. HEMMING

Driving from EGO to Pisa A survival guide

The difference between Germans, French and Italian's has been defined in terms of their skiing habits. The Germans descend the slopes in tight formation with neat, crisp efficiency. The French come down the slopes slightly less efficiently but they are better dressed. Meanwhile on the Italian slopes they are throwing snowballs. The same analogy could be applied to Italian driving. Indeed the German pope in Rome was so concerned about Italian driving that he handed down 10 *motoring commandments* last year*.

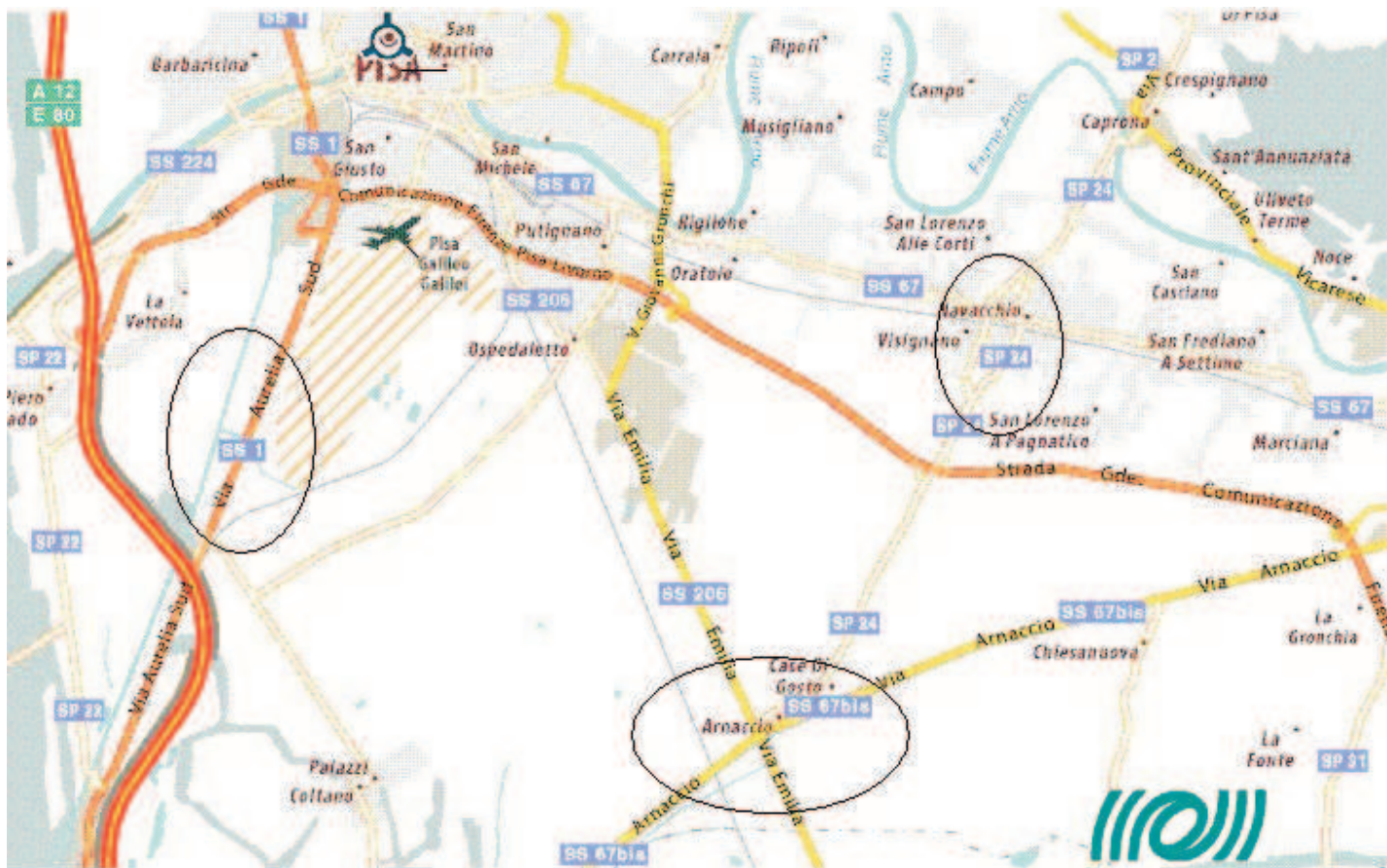
The fifth commandment is... "*Cars shall not be for you an expression of power and domination or an occasion for sin*".

This commandment paints a picture of an Italian male driver who makes "*rude gestures*" to other road users while speeding to pick up prostitutes on *via Aurelia***.

This type of driver exists but in general the drivers in Pisa seem to take things at a more leisurely pace than Rome. The more dangerous Tuscan drivers may be the older slower drivers who can be seen weaving around the Tuscan roads. An

example is the Italian woman (or man) on her way to the main Navacchio shopping centre which is located just outside Pisa. She can drive while talking on the mobile phone or smoking or both and she thinks it rude to talk to the co passenger without making eye contact. She is mainly concerned with what is going on inside the car and is oblivious to all else around her. In addition to phoning and smoking Tuscan drivers are usually twiddling, scratching, picking, fondling, arguing, chatting or smacking the children, indeed anything which distracts from concentrating on the road ahead. A disconcerting habit of the older driver is to pull out from side streets onto main roads by slowly edging across the main road forcing other drivers to stop. When driving along the main street you must always be prepared to stop or swerve suddenly to avoid cars edging on to the road from side streets.

On the daily commute from EGO to Pisa you often come across both the speeding younger boy racers and the weaving older driver. The most direct route from EGO to Pisa is the via Emilia. When driving from EGO to Pisa the Via Emilia has the infamous via Aurelia on the left and the large Navacchio shopping centre on the right. The route will lead you to the centre of Pisa in about 20 minutes (see map). The first crossroads on this road is the SS67 Bis which cuts across via Emilia.



Route from Pisa to EGO (A=EGO, B= Pisa Centre)

The main danger point on this road is the side street on the right just after the junction. This side street leads directly to the large Navacchio shopping centre and it is an accident black spot. The place is usually marked by shards of broken glass and you should be prepared to stop or swerve past cars slowly edging out on to the main road from here. After passing this spot the main worry will be boy racers coming towards you on the wrong side of the road (heading for via Aurelia?). It is common practice in Pisa to overtake by slowly edging out into the middle of the road forcing oncoming traffic to swerve to avoid. Roundabouts, traffic lights and one ways are not always respected (or understood) so be careful when getting near the centre. Pay attention to vehicles turning without warning or stopping suddenly as it is not cool to use indicators in Italy. Right of way does not seem to exist and if a driver has a faster car they tend to overtake regardless of road conditions or approaching bends.

The rear view mirror is for applying makeup or combing the hair and hazard lights are used to inform other road users that the driver of the car blocking the traffic is buying cigarettes or topping up the mobile phone in a nearby shop.

When you do eventually find a parking place in Pisa remember that you can use the bumper as a parking aid.

M.MOHAN
MAP: WWW.VIAMICHELIN.COM

***The highway to heaven**
(see <http://www.timesonline.co.uk/tol/comment/faith/article1957448.ece>)

The ten motoring commandments:
1 You shall not kill
2 The road shall be for you a means of communion between people and not of mortal harm
3 Courtesy, uprightness and prudence will help you to deal with unforeseen events
4 Be charitable and help your neighbour in need, especially

victims of accidents
5 Cars shall not be for you an expression of power and domination or an occasion for sin
6 Charitably convince the young and not-so-young not to drive when they are not in a fit condition
7 Support the families of accident victims
8 Bring guilty motorists and their victims together so they can experience forgiveness
9 On the road, protect the more vulnerable party
10 Feel responsible towards others

****http://en.wikipedia.org/wiki/Via_Aurelia .**

The via Aurelia is the oldest road in Italy (constructed 241B.C). It runs along the Mediterranean coast all the way to Rome passing through the towns of Pisa and its arch rival Livorno. It is a beautiful road mentioned in many guide books although the books omit that it is lined with prostitutes.

Daniel Enard

We are sorry to report here the death of Daniel Enard on August 2nd in Paris.

He is still very present in the minds of those of us who had the pleasure to work with him on the construction of Virgo. His human qualities were appreciated by everyone, and his technical and managerial abilities played a very important role in the success of Virgo. He joined Virgo in 1996, when he was solicited by CNRS and INFN to act as “technical manager” for the construction phase. He was very efficient in solving a number of worrying problems with the construction of infrastructures as well as technical issues concerning the instrument itself. In spite of this hard work, he took the time to think of the future of Virgo, as an observatory, and he strongly pushed for the creation of EGO, to guarantee the operation, the maintenance, and the realization of future upgrades of the first detector. When the EGO Consortium has been established in 2000, Daniel became its vice Director. He stayed in this function until he retired in 2004. After this date, he was still very busy, since he was asked by ESO to lead the design working group of the future ELT (Extremely Large Telescope), an activity that he kept until he was struck by a terrible illness.

In addition to appreciating the very strong role he played in the success of Virgo, we will remember Daniel for his communicative enthusiasm and his kindness.

Alain Brillet

Elena & Virginie

**Interviewed by
Emanuela Mercatali**

EM: Say “hi” to our readers in your

own language:

Elena: Ciao a tutti!

Virginie: Bonjour à tous !

EM: How did you find EGO?

Elena & Virginie: following the signs!

EM: What’s your job here in EGO?

Elena: I am Administrative Assistant and I tend my services to Franco Tosi and Emanuela Mercatali.

Virginie: I am Administrative Assistant on the E.T. project. I am not talking about Spielberg’s Character, ET is meant for Einstein Telescope.

EM: What do you like at EGO?

Elena: EGO is a dream come true... the job is interesting and my colleagues with whom I spend my day make it even nicer because they are all very caring.

They gave me and Virginie a warm welcome and we immediately felt part of this big project.

Virginie: After that, what can I add? I will try anyway... EGO gives me the opportunity of working in an international atmosphere which is something very important to me!

EM: What kind of jobs did you do before EGO?

Elena: I worked for a dentist, a publishing house and a company which specialized in Marble floor production.

Virginie: in Paris I worked for the Air France fidelity program “Flying Blue” and that was my first European melting pot experience. I moved to Pisa 6 months ago and my last job was the translation to French of a web marketing company website and the development of its French market.

EM: What do you miss from your own country and what do you like in Italy?

Elena: me? I am born in Italy... and what do I like.... Everything!!!!

Virginie: Pain au chocolat, real - French - croissants, but I console myself with “sfoglie alla mela”.

EM: What do you expect from the future?

Elena: surely not the “the moon in the well”, but a fair dose of serenity and sincere affection.

Virginie: In the future, I hope I’ll be able to answer this kind of question...



Note: Elena and Virginie thank you very much for your attention and offer you the wonderful picture shown in the previous page.

6 Babies and a Wedding

Since my arrival at EGO almost three years ago I have been witness to the very encouraging progress of the Virgo sensitivity curve! But, at the same time, another curve has kept rising here on site: the birth rate curve!

In three years, 16 babies have been born with a clear majority of baby boys (11!) over baby girls (only 5).

2008, and in particular the last 3 months, has been particularly rich in births: 6 of our colleagues have become parents, most of them for the first time! The *h* team wishes these new parents wonderful times in this amazing human adventure!

In addition to this baby boom, another happy event took place on September 20th, 2008: Gabriele Vajente married Claudia Passuello, as reported in entry 20994 of the logbook. Congratulations to our young newly-weds!

S. PERUS



GOOD NEWS!



Welcome to **Giorgia**, born July 2nd 2008, and our congratulations to Roberto and Maria Antonietta Cavalieri!

Welcome to **Santiago**, born July 16th 2008, and our congratulations to Matteo and Caterina Barsuglia.



Welcome to **Mattia**, born August 5th, 2008, and our congratulations to our *h* team member, Gary Hemming and his partner Annalisa!

Welcome to **Nicolas**, born August 30th, 2008, and our congratulations to Eric and Gratiene Genin!



Welcome to **Alessandra**, born September 13th 2008, and our congratulations to Vincenzo Dattilo and his wife, Innocenza!

And last but not least, welcome to **Peter**, born September 17th 2008, and our congratulations to Edwige Tournefier and her husband Gavin!

