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THE GRAVITATIONAL VOICE

number 15

JULY 2010



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A sociologist's view of GW research
Searching Atlantis

LIFE IN CASCINA

Get ready for the Biathlon 2010!
Football tournament

NEWS FROM THE SITE

A larger mechanical workshop
Laser safety
EGO *Open Doors* day
Researchers Night 2010



News from EGO and VIRGO

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

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EDITORIAL

As time goes by the editorial team of h changes. Two members have left and two new members have joined.

Dominique Huet went back to France and we are happy to know that his new job at the CEA in Chamb  ry is interesting and rewarding.

Angela Di Virgilio left the team although remains in Pisa. This was due to the increased work load on the gyro-laser and as "coordinatore di Gruppo II". She still has some involvement as a journalist. She is responsible together with Patrizia Cenci of the new "Pagine Rosa" (Pink Pages, devoted to women in physics and science) in Il Nuovo Saggiatore, the magazine of the Societa' Italiana di Fisica.

While being sad for the lost friends we are happy for the new ones: Henrich Heitmann and Frederic Richard arrived and are already strongly contributing: welcome!

C. BRADASCHIA



A strange visitor at EGO

Who could have imagined this visit to the EGO site on April 21?

An ibis emerita (*Geronticus Emerita*), a rare example of a migratory bird, more usually found in barren, semi-desert or rocky terrains somehow decided that EGO would be an interesting spot for some rest before continuing its long journey. The bird was wearing a ring and therefore can be easily identified. However, no one dared to check whether he belongs to the Virgo collaboration...

*Cover picture (photomontage):
Our Spring hikers take a break in a grotto!*

High power laser for AdV : DPSS or fibre?

Advanced Virgo requires a minimal laser power of 125 W, more than twice the Virgo+ laser. What will be the appropriate structure and technology for it?

We want to keep the 1064 nm wavelength, because this is the best compromise between available laser power, coating losses, detectors efficiency, scattered light level, and mirror size.

The main constraints are the extremely low frequency and power noise, beam quality, and, since it will have to run day and night for a few years, a very high reliability and low maintenance rate.

The structure of the laser system, including frequency and power feedback loops, will be similar to Virgo. It is represented schematically in Fig.1

through a bundle of optical fibres, by a number of high power pump laser diodes placed in a water cooled rack, external to the laser table. The beam noise is monitored before entering the interferometer. The frequency noise is fed back to the MO and the EOM, while the power noise is fed back to the current of the pump diodes.

The main choice to be made is the technology of the HPA.

One possibility is to extrapolate from the previous DPSS's (Diode Pumped Solid State devices), which have been satisfactory and reliable at lower powers. Remember that the typical system consists in a low power (1 Watt) DPSS Master Oscillator (MO), which is amplified in one or two steps by high powers DPSS's.

which affects beam shape and beam polarisation. With a sophisticated optical and cooling design, it is possible to realize a conditionally stable laser cavity, which delivers a satisfactory beam in a limited power range. This is the solution developed by LZH (Laser Zentrum Hannover) for Advanced LIGO. The last amplifier stage delivers about 200 W.

A better way to solve the thermal problem is to increase the surface to volume ratio of the amplifying medium.

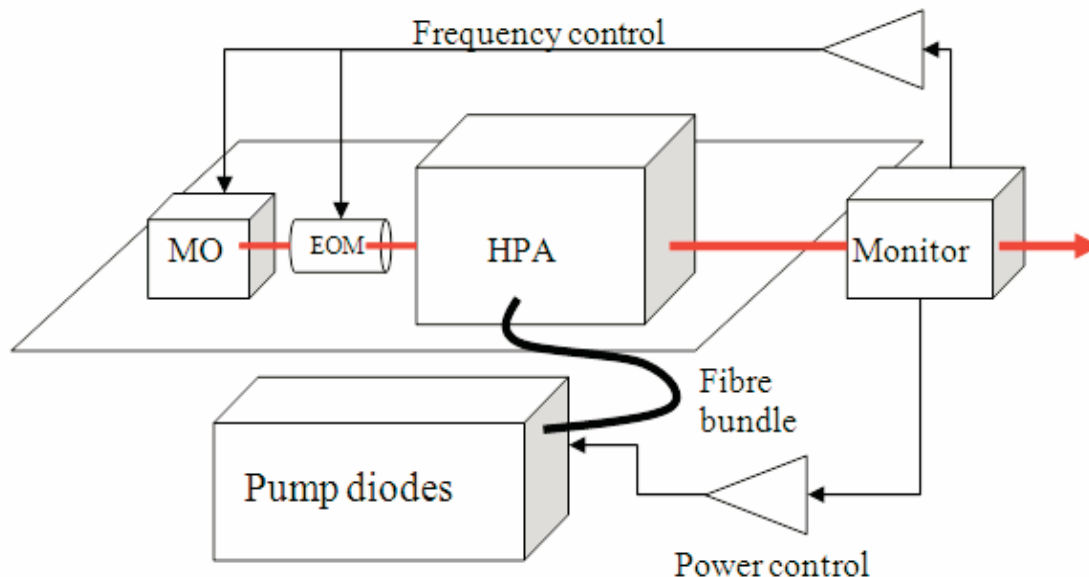
Two possibilities have been studied, that can provide much higher powers: thin disk lasers, and fibre lasers. Unfortunately, the thin disk technology, which can provide multikilowatt beams, has not yet been transferred from defence to

civil use, but high power fibre lasers are coming to the market.

We could already make some tests on one of the first 100 W single frequency fibre laser prototypes, built for us by the Nufern company. Obviously, the surface to volume ratio of a fibre is excellent and the thermal problem is minimized: as an example, the IPG company is able to propose a 50 kW amplifier (with which one can slice a submarine, if needed).

But if you need single frequency operation, there is a lower limitation: a non linearity of the fibres, called SBS (Stimulated Brillouin Scattering). This is an interaction between the electromagnetic field and the phonons in the fibre material, which generates frequency shifted light propagating backwards.

The SBS signal gain is proportional



The system will consist of a low power, single frequency, master oscillator (MO), followed by an electro-optic phase modulator (EOM) for fast frequency feedback, a high power amplifier (HPA) which amplifies the power, in one or two steps, from a few hundred milliwatts to more than 100 W. The optical energy of the HPA is provided

The main difficulty in the extrapolation to powers > 100 W is the thermal problem. More than 50% of the pump power is lost in the amplifying crystals (Nd-YAG or Nd-YVO4). The heat is evacuated by cooling the surface of the crystals with water, but their thermal conductivity is limited, so they become distorted and birefringent,

to the laser intensity and to the fibre length, and limits the power which can be transmitted to, typically, kilometres for a standard fibre and mW laser, to a few meters for a 100 W laser. One possible remedy is to spread the laser frequency, by phase modulating the laser (at a frequency which exceeds the 40 MHz linewidth of the SBS gain curve). Another possibility is to apply a thermal gradient along the fibre, in order to spread the gain curve (and thus to decrease the peak gain). If the fibre can stand high temperatures (400°C for instance), then it is possible to extract more than 2 kW (single frequency) from a 10m amplifying fibre. In practice, commercial single mode fibres cannot be heated to more than 80°C because of their polymer coating, and the power is presently limited to about 150 W.

So, what are the advantages and drawbacks for each solution? Technically, the noise issues are similar : the MO will remain what it is now, so that the frequency control problem is unchanged, except a small advantage for the fibre solution : the low power EOM for fast frequency feedback would be a fibered EOM, which does not require high voltage (15 V instead of 150 V).

The power noise problem is very similar in both cases: the noise is mainly the current noise of the pump diodes power supplies, and the solution is to feedback on that current.

The thermal issues are again similar: we need to use the same kind of water chillers to remove a few hundred Watts of heat (slightly less for the fibre solution, which is more efficient).

In favour of the fibre solution is the fact that the laser power can be continuously tuned from 4 W to 100 W by adjusting the pump current, while the DPSS cannot be tuned (but the power can be attenuated). The beam geometry is also better, and stable.

The pump diodes are different: 810 nm for the DPSS, 970 nm for the Y

doped fibres. Not only the efficiency is better for the fibre device (lower quantum defect), but also the 970 nm diodes have a better Mean Time Between Failure (100000 hours). Another advantage of the fibre solution is that all the high power part, and possibly the low power section also, is welded: there cannot be misalignments and there is no maintenance. Other advantages are the size (a shoe box instead of a kitchen refrigerator) and the cost (150 k€ vs 4(?) M€ for the whole laser system)

So why did not we decide immediately for a fibre solution? While the extrapolation of the DPSS technology is delicate and reaches its limits, it appears to be safe, while there are still some question marks concerning the new high power fibre technology.

- The end surface of the fibre is critical and needs to be protected from dust and pollution. Can we do it well enough to ensure long term operation? A priori yes, although that has not been the case initially for our prototype.

- The fibre laser is sensitive to optical feedback : backward amplification (added to SBS) could damage the low power section; what is the necessary optical isolation and can we guarantee it? Unless we play some expensive destructive tests, we have to rely on modelling.

- There were concerns about the aging of fibres operating at high power: darkening of the

doped core, aging of the fibre coating: these points seem to be solved nowadays. Furthermore, there is not yet much experience with 150W lasers operating continuously for years, but there is some experience with the same lasers operating for months at a kW level (not single frequency).

Considering that two commercial companies Nufern and IPG are now offering 100 W and 150 W single frequency laser amplifiers, can we assume that they are confident enough, and that the eventual remaining problems should be quickly solved?

A. BRILLET

Front face of the fibre laser amplifier, presently under test at Nice. The 100 W output is the thick green fibre, the thin red fibre brings the input (100 mW) from the master laser.



News from Artemis

Walid Chaibi arrived a few months ago in Artemis/OCA. He is a laser specialist and drives a new study about quantum radiation pressure noise and its effect in gravitational antennas. This noise has been well explained since 1980 by C.M. Caves, however has not yet been detected. Once the Advanced Virgo system is operational, this noise should dominate all others between 10 and 50 Hz!

Walid said that to study this quantum effect and how it competes with others the best way is to build a mini Virgo, scaled down like in Alice. There is no need for long arms but very light mirrors (1 gram) and 20 Watt of power will be needed - instead of 800 kW in Advanced Virgo. A simplified super attenuator is adjusted for the kHz range. The project started 6 months ago, is named QURAG and Walid is currently building this mini Virgo in the new experimental hall in Nice.

Gilles Bogaert

A sociologist's view of Gravitational Wave research



Harry Collins is Professor of Sociology at Cardiff University. He is conducting a long-term research project on sociological aspects of gravitational

wave research, during which he has been in close contact with the gravitational wave community, and which has led him to meet its main actors. This research has given rise

to a book ("Gravity's shadow"), which, apart from describing the results of the research, is also a review of the history of the quest for gravitational wave detection. "h" wanted to know how our community and our daily work is perceived by an outside observer, and what insight he has gained during the many years of his research.

h: What made you interested in the social aspects of science?

I don't think the answer to that is important; it is just biography. More important for an outsider is that my subject is not really sociology of science, but sociology of knowledge; and not only scientific knowledge. For example, I have written about Artificial Intelligence; and nowadays, I am studying expertise of all sorts, and I've just written a book on tacit knowledge. Science has always been very important to my work, however, because I like science, and science is an easy kind of knowledge to investigate, because you have people in well-defined locations, trying to make this knowledge every day, and you can watch them doing it. It is much harder to watch people developing new religions, or new ways of speaking.

h: Why have you chosen gravitational research for your long-term project, instead of e.g. a research group at a university, or particle physics?

I got into gravitational waves by chance. The first area I investigated for my master's degree was a new kind of laser, the TEA laser; I was looking at how the people working on them in Britain learned to build them from one another. Then, for my Ph.D., I wanted to look at a more controversial area of science, and I read in "New Scientist" about Joe Weber's arguments about whether he had detected Gravitational Waves, and I thought: "this is perfect, this is the contrast I want". I also chose some other things: parapsychology, which is also controversial, and the theory of amorphous semiconductors; but I didn't get far

with that, because I couldn't really understand it. At the time a lot of such thinking was informed by the book "The Structure of Scientific Revolutions" by Thomas Kuhn; he makes a distinction between 'normal science', which is going on in its untroubled way, and 'revolutionary science', where something very new suddenly turns up. So this TEA laser thing was more like 'normal science', and I wanted something controversial to contrast with it.

h: When and how did you get in contact with the GW community?

In 1972 I simply wrote to members of all gravitational wave groups and told them I would contact them for an interview. A few weeks later I went to America, called people up and arranged to see them. I bought an old car and I drove 7000 miles across Canada and the USA. The only person who didn't want to see me was Joe Weber, but I managed to persuade him over the phone. So in the first stage I was just driving and doing interviews with people; it wasn't until the mid 90's that I became deeply immersed in the field, really spending lots of time at conferences and so on.

h: How were you, as an outsider, accepted by GW researchers?

By the 1990s some people had read my earlier articles, and to my surprise they quite liked them, I think because they saw that I could understand the technical aspects pretty well, more than you would expect from a sociologist; but some were still suspicious. But just by going to all the conferences, never letting anybody down, always trying to get the best technical understanding I could, eventually many people in GW have become my friends. It is fortunate that most of the interviews I did in the 1990s were done in America. In Europe, if you ask somebody something, they would stop and think "What's the politics of it? Why should I tell this person the answer to this question?" Whereas in America they think "is there any reason why I shouldn't?"

h: Did you find differences between the physical and sociological science environments?

There are lots of differences actually, and I'm very pleased that I chose to spend such a large part of my career mixing with GW physicists; I find it a very happy atmosphere to be in. I like that kind of science, because it seems to me like the ideal of science, not too much influenced by industrial concerns, a pure search for knowledge, a slightly crazy enterprise; and I find people in GW physics have a great deal of integrity. I think the whole point of being an academic is attempting to discover new knowledge in a pure way. It is very tempting for people to become political actors, thinking of themselves as small businessmen rather than scientists; there is a lot of that in my own field. There have been occasions when I have been depressed by the community I am in, and it has been very pleasant and reassuring to see that things were still being done properly in the physics field, and that helped me to maintain some balance in my life as an academic. But there are also other differences; for instance if you are young and just beginning, it is in many ways much more exciting to be in the social sciences, because in the natural sciences you have an enormously long apprenticeship before you can really start to contribute, whereas in the social sciences you can start to argue from the beginning, because all the knowledge is so relatively insecure.

h: Physicists like to say that physics is a "hard (i.e. solid) science". Do you agree with this?

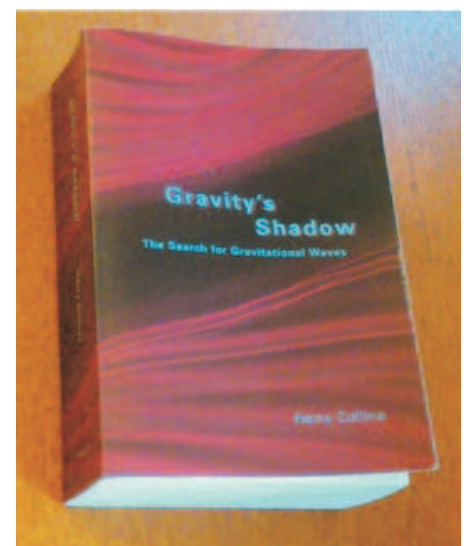
I think we have to be a little careful here. It is true that it is very hard to establish a new fact in the social sciences, but I think it has more to do with the people than with the subject. I think I have discovered a number of very hard, clear facts in social sciences, just as well and thoroughly established as you can establish them in physics. But whether that means that my colleagues are anxious to take them up is a different story. People in the

social sciences think they have a right to argue with everything, they never accept anything. So in that sense it is hard to establish a fact; but I don't think it's because the physical sciences have clean experiments and the social sciences don't. When you examine physical science very closely, it's pretty messy. For instance, if Virgo/LSC will discover a GW, they will give it a level of confidence, so many standard deviations or something; whereas I can bet you that I cannot get on the bus and ask the bus driver "give me two tickets: one for me, and one to reserve the seat next to me": I can guarantee that he won't do that, with more certainty than you have when you discover your first gravitational wave. So social findings can be very strong indeed; you can understand other human beings in a way that you cannot understand an atom or a molecule, because you aren't an atom or a molecule.

h: It seems that after years of field studies, you could participate in physics discussions just like a physicist. Wasn't that a strange experience for a sociologist?

Yes, this is where all my latest work has come from; some time in the late nineties I suddenly noticed that when talking to physicists over coffee, say about building a detector, I could share the conversation, and I could even occasionally make suggestions about how they might do it better or something like this; maybe still it was wrong, but they had already thought about it earlier, so my idea was not stupid, I just wasn't up to the frontier of the field. Still it remains that I am not a physicist, I cannot do the equations, I cannot build an electronic circuit, but I can understand the concepts underlying these things to a surprising extent when I actually hold conversations. So I started thinking about this, and I invented this category of *interactional expertise* which is slowly catching on in my own field: it means complete understanding of a field at the level of the language, but

without necessarily being able to do anything practical – make a contribution to the field – which is called *contributory expertise*. And the more you think about it, the more you see that this is a very important concept. In GW physics, people can actually do one, two, or three very narrow things, like suspension design, analysis of waveforms of inspiralling neutron stars, noise analysis, vacuum system and so forth, but nobody knows everything. What links everybody into the whole field is interactional expertise, the understanding of other people's activities through deep immersion in their language. And this is what enables a manager, like Barry Barish or Gary Sanders, to do his work; they don't actually make practical contributions in the sense of designing this or that; what they do is understand the whole thing through immersion in the language of the field. So it is a little less surprising that somebody like me who spent years immersing themselves in the language can come to be able to speak the language with some fluency. We actually did a test of this, where a GW physicist and I answered questions by email; we sent the answers to other GW physicists, and they couldn't tell who was who. ["Sociologist fools physics judges"; NATURE, Vol. 442 p. 8, 6 July 2006].



h: You wrote a book about your research, called "Gravity's shadow".

How did you choose the title?

Firstly, when talking about GW, we are speaking of something that is very weak, which I thought the word “shadow” might well express. And then, “shadow” is also a slang word for a private eye, a detective; so I am, as I might put it, this private detective investigating. It’s just a little joke, actually. Then “gravity’s shadow” has the same euphony as the well-known book “Gravity’s Rainbow” by Thomas Pynchon, so I thought people would remember the title more easily. But now it gives me the opportunity to write a series of books with related titles, so the next title is “Gravity’s Ghost”, and I plan that the final book, when we finally see gravity waves, will be called “Gravity’s Kiss”.

h: How much time did you devote to the GW project? Is this research on-going?

I did field work with interviews and so on from 1972 to 1987; then I did other work and kept watching what was going on, and I really started deeply again in 1995. From then until recently I spent more time with GW physicists than with my own community of sociologists. I hope I’ll continue until gravitational astronomy comes to be a reality. Actually some time in the 1990s I realized that with luck the evolution of the field of GW physics from birth to maturity would exactly coincide with my career, from Ph.D. to a few years after retirement, and that nobody would be able to do such a complete project again for many, many years. That has made me determined to try to stick with it.

h: Do you work essentially on GW sociology, or do you have other fields of research?

I would say that between 1995 and about 2007, GW physics was my main occupation, but I’m always doing other things as well; for instance, in 1990 and 1998 I published books on Artificial Intelligence. Now I am working a lot of the nature of expertise in general. My research on

gravitational waves now concentrates on the question of discovery or non-discovery. I’m not trying to write another book like “Gravity’s shadow”, which covers every social aspect of the field. So, for instance, I’m not really looking anymore at the social relations between Virgo and LIGO, which I did a bit in “Gravity’s Shadow”. I am nowadays looking at how physicists think about the problem of what is going to be needed to make a discovery and then I want to watch and see what actually happens.

H. HEITMANN

Searching Atlantis

Phase Two

In March 2010 (from the 4th to the 19th) the second phase of the archaeological investigation on Sherbro island took place, as planned.

Mission objectives

A – Measurement of underground resistance by geo-electric survey.
B – Surveys and excavations enabling the detection of artifacts, their measurement, triangulation and mapping.

C – Research activities on the terrain.

D – Analysis and evaluation of the difficulties and necessities involved in the creation of a field school, for use in accommodating the participants of the forthcoming excavations, to be carried out after the rainy season, presumably in October 2010.

Two areas of investigation have been outlined, indicating, respectively, **Sherbro 1** (‘Point 0’ zone) and **Sherbro 2**, both located on the east-west axis and at approximately 400 metres distance from one another.



The geo-electric survey - The operating base, consisting of a bafà (hut) built by Yoni artisans, near to Point 0.

An examination of the zones (Sherbro 1 and 2) – both covering a surface of circa 10,000 metres squared, was undertaken through the use of diagnostic estimates, applying geo-physical methods of resistance analysis.



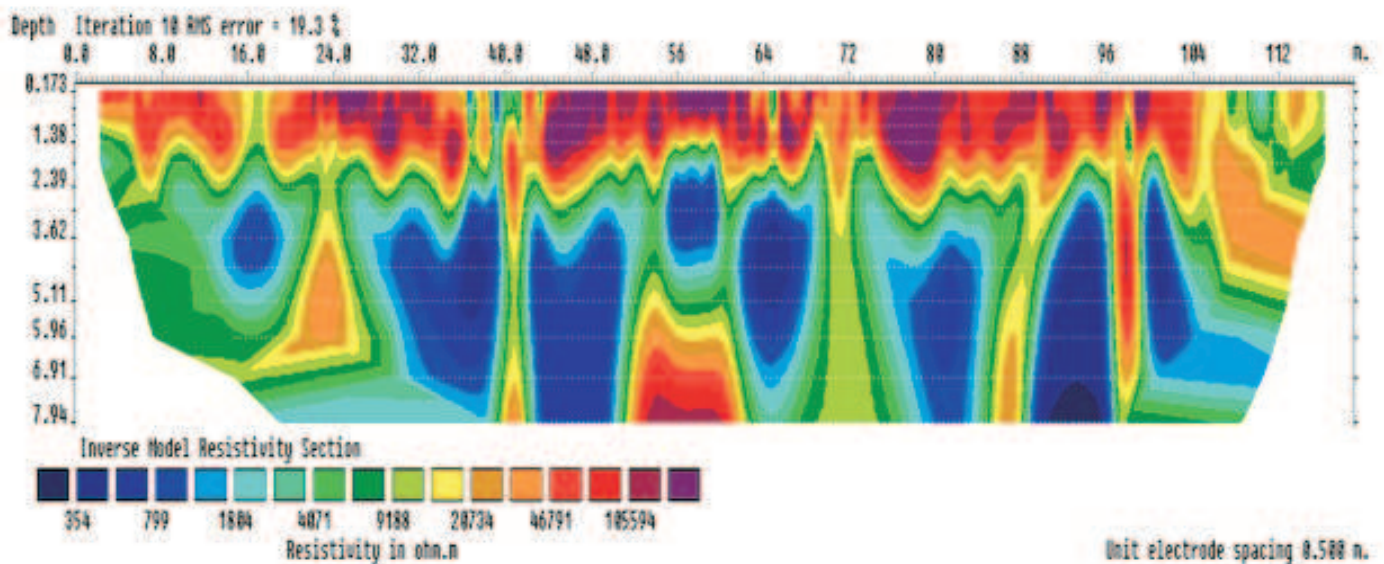
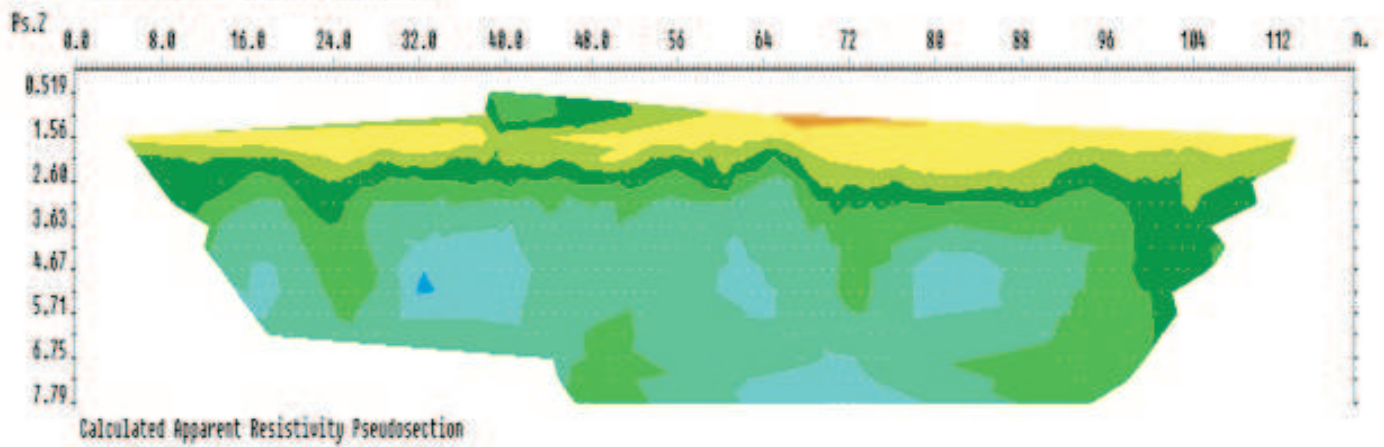
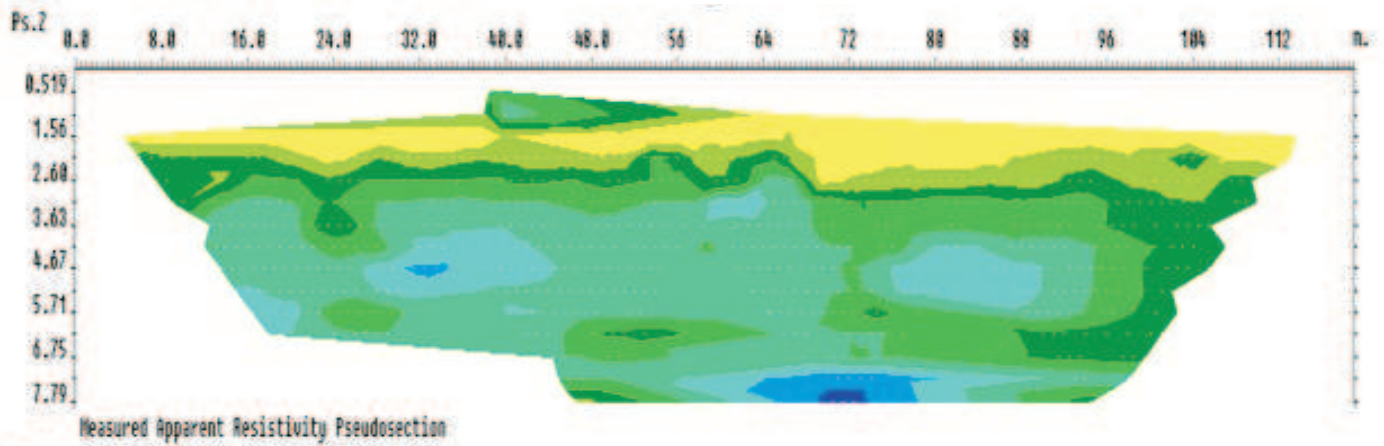
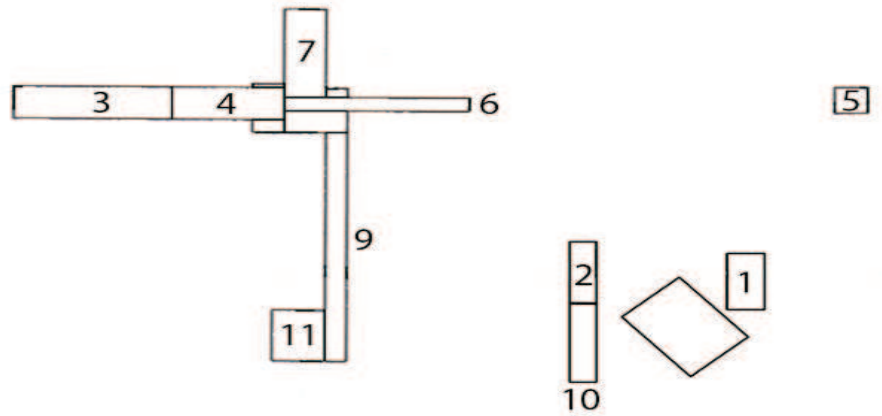
Data elaboration did not produce particular evidence of anomalies traceable to the presence of artifacts, but it did show strata with different levels of electrical conductivity and indicated the areas to be analysed with closer attention.

The excavation

The excavation, aiming to identify the different strata of the terrain and

its morphology, concentrated upon, as planned, the area of Sherbro 1, taking *Punto 0* as its point of reference. Tests were also undertaken in a few points where an analysis of the geo-electrical data highlighted anomalies.

The following map shows the excavation zone and the related progressive numbering of the tests.

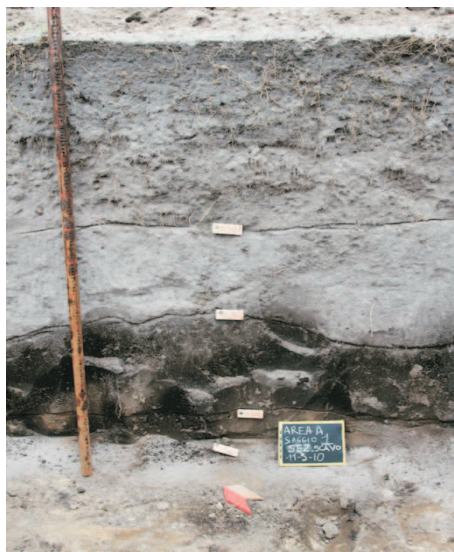


The excavation concentrated upon a main area of approximately 30 metres by 30 metre and on further tests in the range of circa 35 metres from 'Point 0', with a total length of 75 metres and variable widths, from 1 to 4 metres, and maximum depth of 2.76 metres (groundwater level).

The survey enabled the identification of four levels, observed across the entire explored surface and distributed relatively homogeneously.

The Tests

US-01 – The removal of the upper part of the terrain continued to a depth of 53 cm below the ground level. It consisted of light grey grains of sand, mixed with grass roots.



Excavation section - Test 1

US-02 – The test proved to be composed of a finer and more compact sand with respect to that of US-01, although still of the same colour. The test was on a 30 cm thick layer and arrived at a depth of 83 cm from ground level. To organic or man-made traces were visible in this test.

US-03 – A level of around 30 cm composed of fine, uniformly compact sand of a dark colour and characterized by the presence of humus-carbon terrain. Some

significant carbon fragments, chips of iron foam and some quartz detritus were found a depth of around 110 cm, with respect to ground level, and in correspondence with the start of US-04.

The photo shows the two types of sand (above, that of US-02)



The level that we consider to be of most interest is that of US-03, which, in the tests undertaken, showed a constant depth with respect to ground level, as well as anomalies that are potentially of

man-made origin, given that they present themselves as bumps at a consistent height of circa 15 cm and a width, which is also constant, of around 1 metre, and are geometrically arranged as shown in the photos above and the plan below.

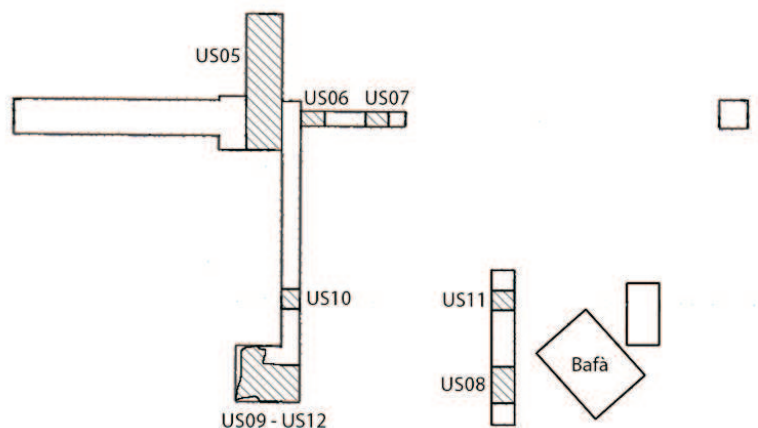
The level described above essentially indicates the level described above (US-03), to a depth of around 85 cm – in which clues as regards living material might be found. Up until now, however, no evidence of either accommodation structures or anthropological material has been uncovered. Radio-carbon analysis of the sand samples, extracted in the various strata, has not, as yet, been undertaken.

The surface survey

Simultaneous to the geo-electric survey and the excavation, a survey of the surface was undertaken. This survey covered an area of approximately 500 metres within the range of Point 0, the path that connects the village of Yoni to the village of Bimbi, and the coastal area over-looking the village of Yoni.

A few areas presenting traces of rural settlement were found; circular forms, intended for huts, were also visible in the area. A metal-detector was used for this survey, which signaled, at the center of one of the areas, the presence of materials in the sub-soil; a small excavation, to the depth of 35 cm, was undertaken, which un-earthed a significant

The shaded areas indicate the anomalies



number of metal granules together with a metal sphere with a circumference of circa 1.5 cm (presumably shotgun bullets dating back to the “Portuguese colonization” (*Photo 1*).



Photo 1

At a depth of circa 40 cm, during the excavation in other survey areas, a cutting flint was discovered (*Photo 2*).

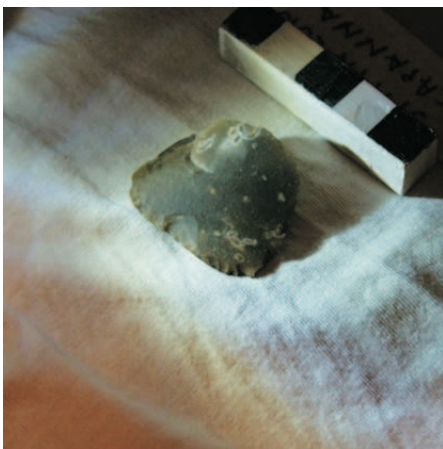


Photo 2

Other interesting finds were made, during the period of low-tide, in the area in front of the port area of the village of Yoni (*Photos 3 and 4*).

Conclusions

An attentive analysis of the collected data and detailed re-working of the site cartography, supported by photographic and video images collected during the March mission (without the more than a metre-high grass, visible in December), allows us to believe that we have been able



Photo 3

to correct errors made in December '09 in the localization of *Point 0*, which, as we have seen, was affected by significant tolerances introduced by the GPS and GIS systems.

Therefore we are certain that we have identified, with extreme precision, the excavation area of interest to us (or, to put it better, a corner of the Royal Palace wall, identified by Prof. Cosci, during his aerial-photograph research) and that we can relocate *Point 0* by approximately 50 metres in a south-west direct, with respect to the current location.

Convinced that the confirmation of the hypotheses of Prof. Cosci are still to be found, we are organising another

survey campaign, to be undertaken following the rainy season, but not beyond November '10, that might consist of multiple work shifts and last, presumably, until March 2011.

Marcello Cosci Foundation

Photo 4



Safety Corner



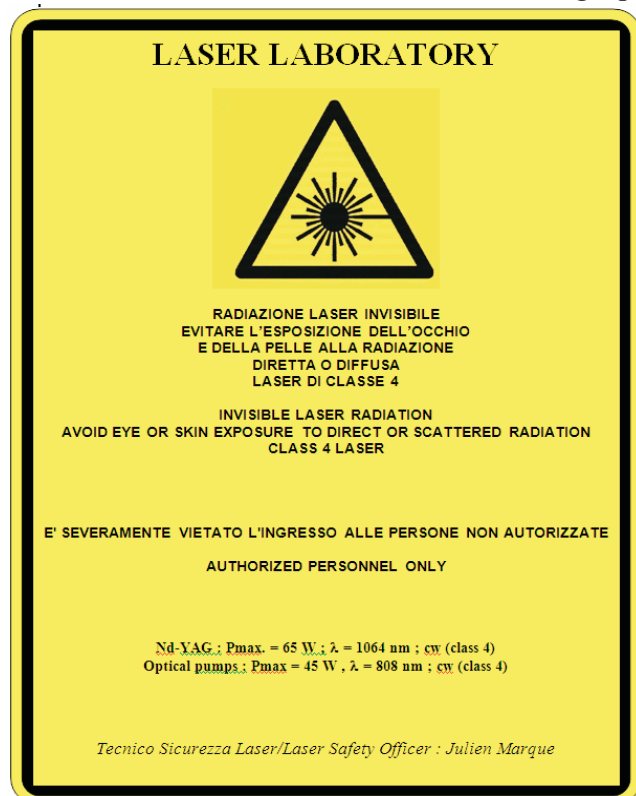
Laser Safety at EGO Virgo

Many kinds of lasers are present on site. A few (direct or diffuse) beams are innocuous; others can cause injury (especially to the eyes) or cause fires.

Besides the official documents and rules we think it is useful to our readers to recall a few points about lasers and precautions to be taken in their use.

The European referent technical norms have been acknowledged by Italian regulations through CEI and UNI Institutions and are enforced at the EGO site.

Among the lasers present in EGO, the Nd-YAG and the CO₂ lasers belong to Class IV, the last of a classification that categorise lasers according to their ability to harm people.



Due to the presence of such lasers, Julien Marque has been appointed by the EGO Director as Laser Safety Officer (LSO) and Eric Genin is his deputy. Julien is responsible for hazard evaluation of laser work areas, and for ensuring that safety regulations are followed.



Protection of the individual:

All the laser labs are restricted access areas and stringent rules have been enforced to avoid personnel being exposed to dangerous laser beams:

- ad-hoc safety rules have been established to operate on laser benches of the Thermal Compensation System (TCS): <http://www.ego-gw.it/reserved/documents/codifier/download.aspx?Code=EGO-PRO-SEC-55>.

- the ITF Operation Department is setting-up an interlock system to prevent unexpected entry of personnel through the lower part of the tower while the laser is in operation.

Protection for the Experiment:

The building / experiment is also a concern in EGO. The material used to enclose the laser has been proven to be adequate by testing. Considering the power of the beam foreseen for the next upgrade of the Interferometer the number of existing fume detectors present in the lab has been increased. For Advanced Virgo the Injection lab and

Detection lab have joined the list of critical rooms which have been equipped with auto-extinguishing systems.

Remember:

Even if you may feel safe with lasers don't trivialize their utilization, ask the LSO or his deputy in case of doubt about the laser status in the lab/tower you are going to work in. Check the label on the protective glasses available in a dedicated box close to the lab before entering it.

Rockwell Laser Industries has gathered a laser accident database from a broad range of sources since 1964: <http://www.rli.com/resources/accident.aspx>, this is just to remind us that laser safety is not only wearing the correct protective glasses.

F. RICHARD, Safety Officer

A larger mechanical workshop

The approach of the Advanced Virgo construction phase deserved the improvement of the functionality of the Mechanical Workshop, at the Intermediate Building of the North arm.

The changes performed also improved compliance with the Italian law.



Therefore it was decided:

- To enlarge and reorganize the internal space to facilitate the positioning of a new larger lathe, of a new saw and of the existing shearing machine;
- To set-up a brand new fume extraction system and secure electrical cabling of the machines.

The larger space, the two milling machines and the two lathes will allow more than one of our qualified technicians to work easily at the same time.

Riccardo Romboli has been enrolled since 2009 in the workshop activities and will act as deputy in case of absence of Michele Bazzi who is responsible for our mechanical workshop.

Please note that the mechanical workshop is not a free-access room and only authorised personnel can access using their badge (see the safety sheet on the main entrance). Requests for pieces to be machined must be made to the EGO mechanical group (Frederic Richard) in order to prioritize as best as possible the work and, in case of overload, to direct them to an agreed external company.

F. RICHARD

The EGO “Open doors” day

It was a very crowded day at EGO on the 24th of April. The record of number of visitors in one single day was increased to over 200.

We started in the morning with two high school classes. In the afternoon we had more than 60 visitors with us from 3 to 6 pm. The night attendance was limited to 100 at booking time and we were forced to refuse many more requests. Astronomical observations were performed during the night visit, with the invaluable help of “G. Galilei – Astrofili Pisani”. In spite

of some clouds and of a relatively cold temperature, the visitors enjoyed the sight of the moon, the rings of Saturn and many beautiful stars. In the afternoon a fully covered sky prevented the anticipated observation of the sun. This was not a great loss because given the absence of any activity on the sun we would have seen just a large bright disk.

The association “La Limonaia” gave us one of its telescopes for the Open Doors with the permission to keep it permanently at EGO for other similar events. It will be used also to organize sky observation soirees reserved for EGO and Virgo people on the occasion of Virgo weeks or of particular astronomical events.

C. BRADASCHIA

The Spring excursion

The destination chosen for 2010 was Parco dell’Uccellina (<http://www.parco-maremma.it/>). It is a beautiful natural park that can be enjoyed by following different trails. The trails involve limited climbing and finish at the sea. It is near the Alberese village close to Grosseto which is a bit far from Cascina but worth the trip. The date chosen through a poll was June 13 which was almost summer





but we were lucky as the temperature was pleasant thanks to a few kind clouds. The team was smaller than expected but very friendly: Bas, Carlo and Cristina, Gaelle, Giulio, Matteo, Mathieu, Rodolphe, Tatiana and Victoria, Virginie and Fabio.

We started with a trail leading to two medieval sighting towers. We rested at noon for lunch with some on the beach and some in the shade of a natural grotto. After lunch Virginie and Fabio stayed in the sun and went swimming in the sea. All the others tried to reach Cala di Forno (“the Oven Cove”) by walking along the beach but were stopped by an impassable rock wall.

Then we walked together to the last tower splitting into smaller groups according to the individual hikers’ inclination. The four best performers (B, Ga, M, M) succeeded reaching Cala di Forno by the appropriate trail.



On the way back we encountered a tame sympathetic fox.

At 6 pm we were again all together at the shuttle bus stop where beers or ice cream were had before going back to the cars.

C. BRADASCHIA

Forthcoming schools

After the success of the VESF school on Virgo data analysis organised at EGO between February 10 to 13, EGO is preparing for two further schools in 2010: the traditional VESF school and the ISAPP school.

While the VESF school introduces students to the gravitational waves, their detection and the technologies involved, ISAPP is more oriented to the composition and the evolution of the Universe, focusing on the study of its early history and on gravitational waves as a new tool to study the Planck epoch and to reveal the nature of extreme objects such as the black holes.

Unlike in previous years, the VESF school will be hosted at the Sexten Center for Astrophysics in the wonderful settings of the Dolomites, from July 26 to 30.

The ISAPP school which is actually divided across two sessions will be partly hosted at EGO from September 26 to October 5. Both schools provide Physics students with great occasions to enlarge their knowledge in the Astrophysics field and to meet their peers from various backgrounds.

You can find more information on the VESF and ISAPP schools at <http://www.roma1.infn.it/teongrav/VESF/> and <http://isapp10.roma2.infn.it/index.html>

S. PERUS

Researchers Night 2010

Following on from the successes of 2009, also this year EGO and Virgo will participate in the fifth “Researchers Night”, created by European Commission in the frame of FP7.

As you may remember, last year we repeated the effort of September 25 on October 24, in correspondence with the Galilean Nights of the International Year of Astronomy. Both events were organized informally, completely by ourselves. For 2010 we participated officially in the European Call, as partners of Frascati Scienza (<http://www.frascatiscienza.it/pagine/notte-europea-dei-ricercatori-2010/>). This is a cultural association in its fifth successful participation to FP7. In this way we will obtain some European funds, allowing a stronger program, including: guided visits, astronomical observations, “build your interferometer” workshops, Science Café and teleconference with LIGO all within the two days September 24 and 25. The “clou” event will be, on the evening of Saturday the 25th. This will be a debate between an astrophysicist (Margherita Hack), a philosopher (Corrado Senigaglia), a journalist and the public about “the pleasure

of research". The debate will follow an actor playing a monologue on "how wonderful is science". We expect a large participation due to the popularity of professor Hack and so we plan to extend the capacity of the auditorium to 200-400 seats by putting a gazebo in front of the main building.

There is already a small team of volunteers working on the organization of the Night but more help is needed particularly on days of the event. Any volunteers or people with further ideas are warmly invited to contact Elena Cuoco or myself.

C. BRADASCHIA and E. CUOCO

Biathlon 2010

The traditional "running/biking" competition will take place this year on Tuesday July 20 in the evening preceding the plenary session day of the Virgo Week. The traditional buffet dinner offered by the EGO director will conclude the night. The formula will be the well established one, consisting of the sequence: 1 km running, 2 km running, 6 km biking, 3 km running. Upon request of some colleagues (easy to guess), any two wheel vehicle will be permitted for the bicycle stretch provided that it is moved only by the muscles of one single man or woman.

We invite all our readers to start training and assembling new teams capable of overcoming Commissioning/Napoli's dominance. Consider that 4 is the maximum number of members of a team although even a single man team may be admitted. It would be amazing to discover such a monster among us.

C. BRADASCHIA

Please inform Severine before Friday 16 July if you wish to participate either in the biathlon or in the buffet, or in both of them!

This year's Football tournament

Football at the North End – CalcioNE - is once again well underway. Fabrizio Rossi has once again ensured that a perfect football surface has been prepared to cater to the needs of the expert purveyors of 'the beautiful game', once a week throughout the summer months.

Participating along with Fabrizio in this festival of football have been : Francesco Berni , Enrico Calloni, Antonino Chiummo, Carlo Nicola Colacino, Roberto Cosci, Alessandro Cosci, Richard Day, Giuseppe DiBiase, Eric Genin, Fabio Gherardini, Dominique LeGalliot, Giovanni Losurdo, Rodolphe Maillet, Julien Marque, Andrea Matteini, Martin Mohan, Federico Nenci, Luca Paoli and Matteo Tacca.

No doubt inspired by the World Cup, the technical level will only increase over the next few weeks, although the accompanying buzzing noise is likely to be the mosquitoes, rather than the vuvuzelas.

G. HEMMING

What do they do away from Cascina?

Argentine Tango in Tuscany

I would have preferred if someone had asked me to write a good code in C...but I'm happy to share some knowledge about Tango, or to be more precise about *Argentine Tango*.

It all started more than ten years ago: I was walking near Pisa's center, and the owner of

a Salsa class asked me if I would like some free *Salsa* lessons. There were too many girls in the class...and starting from that day, I have danced regularly. The start was a very good period. We did some shows in pubs and we were the first group to dance *Rueda* during the night of San Ranieri. Unfortunately in the last few years Salsa has become a fad and the business element has ruined the atmosphere. During a party, I heard music somewhere between *Bachata* and Argentine Tango. This mix was so good, that I decided to follow the common path of many dancers and moved from *Salsa Merengue* and *Bachata* to *Tango*. It was not easy. Sometimes tango music is too melancholy and the teachers are a bit too severe. It was especially difficult to learn both Tango's figures and the right posture but after some months of difficulties I discovered the smoke gray world of *Milonga*.

Milonga is both a kind of dance linked to Tango and the place where *milongueros* meet to dance. At milonga the women are very well dressed. Their heels are high and the shoes are elegant. The men dress in an elegant shirt which is generally black or brown. Tango shoes must only be used at milonga or during the lessons. The official language is of course Spanish and there are some laws that every milonguero must follow. The *Ronda* must always be performed counterclockwise to prevent unpleasant and painful



accidents. It is the man's responsibility to invite the woman and to decide the kind of *abrazo*. If a woman is impatient and she wants to dance quickly, she "calls" a milonguero with a *mirada*: a fast but unequivocal look: "if you want to invite me I will surely accept". Most milongas are held on a regular basis (usually weekly), and they sometimes begin with dancing classes and sometimes demonstration dances.

Usually three to five songs of similar type are played in a *tanda* followed by a *cortina* (a short musical break) to facilitate partner changes. When a man invites a woman, he should invite a dancer of the same level (in general at the beginning he invites someone from the same school) to prevent an educated "no, thanks". He must wait until the end of the *tanda* before accompanying her to her table. In general the number of women is greater than the number of men so usually it's not hard for a man to find a dance partner.

The Argentine Tango is not as popular as its cousin the Cuban salsa. Therefore if you want to dance every week-end you must visit different Tuscan towns. There is an internet site (www.faitango.it) where you can find all official events associated with tango. To take part in unofficial events like a *clandestine milonga* you need to receive a call or an SMS from a good friend.

Listed below is a selection of the places where you can Tango in Pisa:

- **C e n t r o N a g u a l**
(www.centronagual.it) near P.zza Santa Caterina;
- **T a n g o m i A m o r**
(www.tangomiamor.it) near Media World;
- **D i T a n g o i n T a n g o**
(www.ditangointango.it) at Stazione Leopolda.

G. BALLARDIN

GOOD NEWS



Martin Mohan put a ring to Niamh's finger on Saturday 10th of April. Congratulations to them!

h discovered that our colleague Francesco Berni married Samantha on Saturday 19th of June. We hope they don't mind that h announces it and congratulate them!

Also Virginie Bornes decided to make this step. She married Fabio Bronzini (whom many of us remember when he worked at EGO some years ago) on May 8th. Congrats!

MORE GOOD NEWS ...

Dominique Le Galliot “persiste et signe”, persists in wanting Raquel as his wife.

They celebrated on May 29th the Brittany version of their wedding!

Gourc'hemmenoù!



h is also glad to announce the births of:

Livia, born on May 10th second daughter of Nicola and Agnese Menzione: Welcome Livia! And on July 10th, the happy parents got married!

Piero (left), born on May 14th makes his parents Carlo Nicola and Laure Colacino and his little brother very happy! Welcome Piero!

And Sophie (bottom right), born on June 24th, daughter of Benjamin and Valentina Canuel. Welcome Sophie!

