PRESS PACK

ICHEP 2014

37th International Conference on High Energy Physics

Valencia, 2 – 9 July 2014

Between July 3rd and 9th, 2014, the Spanish city of Valencia will host the **International Conference on High Energy Physics (ICHEP),** organized by the **International Union of Pure and Applied Physics (IUPAP)**. This conference has been held on a biannual basis for more than half a century, and it is the most important worldwide in the field of Elementary Particle Physics. About one thousand researchers from all over the world are expected to come to Valencia these days, including François Englert, awarded with the Nobel Prize in Physics of 2013 for his work on the Brout-Englert-Higgs mechanism, and Alan Guth, father of the theory of cosmic inflation. This is the first time that Spain hosts such an important meeting, and it is regarded as an acknowledgement of the outstanding trajectory of the field in this country. The conference is organized by the Institute of Corpuscular Physics (IFIC), a joint centre of the Spanish Research Council (Consejo Superior de Investigaciones Científicas, CSIC) and the University of Valencia.

The congress will include parallel, plenary and special sessions, all structured in the following 15 topical areas, which cover the most important subjects of present-day particle physics:

- Brout-Englert-Higgs Physics
- Beyond the Standard Model
- Flavour Physics
- Neutrino Physics
- Heavy Ions
- Astroparticle Physics and Cosmology
- Strong Interactions and Hadron Physics
- Lepton Flavour Violation
- Education and Outreach
- Accelerator Physics and Future Colliders
- Top Quark and Electroweak Physics
- Detector RD and Performance
- Computing and Data Handling
- Lattice QCD
- Formal Theory Developments

These topics will be discussed along almost 500 talks, both experimental and theoretical, in the parallel as well as plenary sessions. Parallel sessions will cover the first three days of the meeting (July 3-5), while plenaries will take place in the latter three days (July 7-9).

Moreover, it is now 30 years since Spain re-entered the European Organization for Nuclear Research (CERN), which houses the biggest and most powerful particle accelerator in the world, the Large Hadron Collider (LHC), where the Higgs boson was discovered in July 2012. For this reason, there will be a special session discussing the successful evolution of the field in Spain and the role of CERN in this context. In the fruitful atmosphere of CERN several generations of Spanish scientists, engineers and technicians have been formed, and Spain contributes a 8.5% of its annual budget, being the fifth contributor, behind Germany, United Kingdom, France and Italy, and providing also a high qualified contingent of scientists, engineers and technicians.

Exhibition *Women in physics* during ICHEP

On Thursday July 3rd, at the Palau de Congressos in Valencia, will be held the opening of a graphical exhibition about the role of women in particle and nuclear physics, coinciding with the welcoming day of ICHEP 2014. The exhibition is sponsored by several institutions, such as the Commission for the Gender Equality of the University of Valencia, and companies such as Elsevier. The aim of the exhibition is to recognize the actual participation of women in physics (usually underestimated), as well as the effort of the new generations of women from third-world countries to stand a chance in science. Young researcher, Dr. Kate Shaw, from CERN (Geneva) and ICTP (Trieste) will address the audience with a few introductory words.

ICHEP 2014 HIGHLIGHTS

1. The Higgs boson opens a door to new physics

Two years ago it was discovered at CERN a particle with similar mass and properties to those expected for the Higgs boson. This boson has no interaction with massless particles, like the photon; it does, however, interact with massive particles, like the electron and quarks, via a complex process originating in the vacuum, named the Brout-Englert-Higgs mechanism. It is through this mechanism that massive particles acquire their mass.

During ICHEP, François Englert, awarded with the Nobel Prize in Physiscs in 2013, will give a lecture explaining the basics of this process and its importance for particle physics as well as to other realms of physics. In addition, there will be an event celebrating the anniversary of the announcement of the discovery, where Spanish students will have the chance to discuss with young researchers (Friday 4th in the morning, out-of-program).

With the new data that will be collected next year in a renewed LHC, which will double the energy of the collisions, scientists will be able to determine unambiguously whether the new scalar particle is indeed the Higgs boson predicted by the Standard Model (which would be the simplest explanation), or a different sort of exotic Higgs boson, part of some “New Physics” framework which would include new and still unknown forms of matter and interactions.

The Higgs boson is sometimes dubbed the “God particle”, so we could imagine, just as in Ancient Greece, an Olympus where each God has its own Higgs boson since, according to some new physics proposals, it is reasonable to think of a *family* of Higgs bosons, each with different mass and properties. In any case, the Higgs will play in the new phase of the LHC the role of a door towards unexplored territories, since we expect new and very massive particles to couple strongly to it.

Background information:
http://home.web.cern.ch/topics/higgs-boson/origins-brout-englert-higgs-mechanism

2. LHC will increase its energy in 2015

After the success of the LHC, working from 2009 at an energy lower than its nominal value, the beams of protons are expected to increase their energy from the current 8 TeV to 13 or 14 TeV in 2015. It will also improve its *luminosity,* which is a measure of the total number of collisions recorded.

As a consequence of both the increase in the energy (more particles produced after each collision) and the luminosity (higher probability that a collision happens), the detectors, the data acquisition system and the data analysis hardware will be subject to extreme requirements.

Though the increase in energy poses new challenges to the technology section of the LHC, as a consequence we will also be able to explore new territories where, hopefully, new particles can be discovered. Some clear candidates for discovery are: new classes of Higgs bosons, supersymmetric particles, or even extra dimensions, as predicted in string theory. In this latter case space could have more than the three known dimensions, but they would be curled and folded in minuscule distances, being invisible for beings as orselves, too large to delve in the tiny loops of the new dimensions; they might, however, be observed in high energy collisions which produce smaller and smaller particles, like the ones expected in the new version of the LHC.

3. Dark Matter searches

The Large Hadron Collider (**LHC**) is the most powerful particle accelerator ever built. With this machine, scientists can explore the limits of new physics by colliding proton beams; in these collisions new particles are created, and physicists expect some unknown kind of particle to show up. Some of them can have the appropriate properties to solve the Dark Matter mystery.

According the latest results of the **Planck** satellite, 85% of the mass of the universe is in the form of dark matter, an as-of-today unidentified form of matter that does not emit or absorb light and cannot be detected directly. The only effect that reveals the presence of dark matter is the gravitational force, which affects the surrounding matter that we can indeed see. The remaining 15% of the mass of the universe is "ordinary" matter, that described by the known laws of particle physics: up and down quarks (that compose protons and neutrons), electrons, and neutrinos.

Unfortunately, the LHC alone is not enough to unveil the identity of dark matter. We need to carry out complementary searches, like for instance advanced observation the sky, as it is carried out by the gamma-ray observatory **Fermi-LAT**, or the cosmic-ray detector installed aboard the International Space Station, **AMS-02**. With very different designs and purposes, both have one common mission: to observe signals that may be originated in dark matter annihilations or decays, which can happen in astrophysical scenarios like the center of The Milky Way. These searches for dark matter are known as indirect searches.

Additionally, dark matter particles can also be detected directly in our planet, exploiting the fact that the Solar System crosses the dark matter halo in which the Milky Way is embedded. For this purpose, we need very sensitive detectors that measure every dark matter interaction with an atom in the detector (essentially, an atomic-size collision). These experiments are located in underground laboratories to reduce as much as we can the background noise from particles created in the upper atmosphere; some of them are the **LUX** experiment, in South Dakota (USA), or **ANAIS**, in the The Canfranc Underground Laboratory (LSC, Spain).

Background information:
http://press.web.cern.ch/backgrounders/dark-matter

4. Supersymmetry

Matter and the forces known today in nature, despite its varied character, are described by means of a common physical and mathematical set of tools: the Standard Model. Matter is made of particles, like the electron, which carry spin one half, while forces are associated to particles which have integer spin.

To a certain degree, the spin of the particles can be understood as the manner in which the particle revolves, like the Earth does around its axis. Actually, the way electrons and photons rotate is very different, conferring characteristic properties to each one of them. If electrons did not have spin one half, Pauli exclusion principle would not be applied, and atoms could not exist in the way they do (atomic orbitals would not exist, for instance). Chemistry, biology and of course life (if possible at all) would be radically different.

The theory of Supersymmetry states that in a very remote past, shortly after the Big Bang, each particle, both matter particles and carriers of forces, should have appeared together with a copy, a "supersymmetric partner", mutually identical save for their spins. The existence of the electron should imply the existence of a *selectron*, identical but with integer spin, and the photon should also have a partner, a *photino*, with spin one half. These particles, whose masses need to be very large, as we have never seen them, could be produced in collisions between protons at the LHC. As of today, supersymmetry is still waiting to be observed; for now we know that the supersymmetric partners surely are *not* light particles, but maybe they will show up when we explore higher energies – that is to say, heavier masses.

At the conference of the ATLAS and CMS experiments during ICHEP the present limits for these extensions of the Standard Model will be shown, and the newest strategies to detect supersymmetric particles will be presented. The spokespersons of both experiments will be present during ICHEP.

Background information:
http://home.web.cern.ch/about/physics/supersymmetry

5. Quark-gluon plasma

The ordinary matter we are used to, the same we are made of, is basically built from protons, neutrons and electrons that bind together to form atoms. In turn, protons and neutrons are constituted by another particles, even tinier, called quarks, held together by their interaction with other particles called gluons. The force that binds quarks and gluons to form a proton is tremendously strong, much more than the electromagnetic force responsible of the stability of the atom. It is called Quantum ChromoDynamics (QCD), and it is the strongest force known to exist in nature. The ATLAS and CMS experiments, as well as LHCb, have performed very accurate tests of this theory, both in particle production and decay.

When enough energy is provided to a gas, its atoms end up splitting into nucleus and electrons, leading to a state of matter called plasma. This happens in the Sun, due to the very high temperatures that occur in its core, and this dissociation of nuclei and electrons helps to trigger the thermonuclear reactions that produce the prodigious and life-seeding amounts of energy that arrive in Earth as light and heat. At the LHC, the energy achieved in the collisions is so high that even the components of protons and neutrons form a state similar to the atomic plasma; in this case we call it *quark-gluon plasma*. The experiment ALICE of the LHC seekd to reproduce and study this extreme state of matter by colliding heavy nuclei at tremendous energies, “melting” for a brief instant protons and neutrons into quark-gluon plasma. The study of this plasma will also give us clues about the very early universe, when the temperatures were so high that protons and neutrons were promptly destroyed by energetic collisions.

Background information:
http://home.web.cern.ch/about/physics/heavy-ions-and-quark-gluon-plasma

6. Quantum Chromodynamics

Quantum Chromodynamics (QCD) is responsible for the interaction between quarks, both quarks up down, which constitute ordinary matter (protons and neutrons), and other varieties of quarks (top-bottom and charm-beauty), which are present in forms of matter that only existed right after the Big Bang. However, many of those massive particles can be created nowadays using accelerators, such as the LHC. The understanding of the properties of these pieces of matter, as well as the prediction of new states not yet detected experimentally is the object of study for QCD experts, and these topics will be deeply discussed during the corresponding ICHEP sessions.

QCD is a very important piece of our understanding of nature, since it is the force that holds protons and neutrons together, and in fact most of the mass of these particles is due to complex QCD interactions. However, fundamental as it is, it's a very difficult theory, since the gluons, the particles that mediate between the quarks in their interactions, can in turn interact among themselves, producing extremely complex processes that are difficult to elucidate mathematically. The number and importance of such processes of self-interaction depend on the energy: QCD interactions are very difficult to treat at low energies and become somewhat milder at high energies.

In order to overcome these problems it's convenient to study the processes of QCD in a computer, a machine capable of calculating much faster than humans. For that aim the space and time in which the interaction happens (a very small space if we wish to study, say, a proton) is divided in the form of a mesh, so that the calculations do not need to consider all points of spacetime, but just a bunch of them. This setup is called a *lattice*, and the corresponding QCD calculations are dubbed *lattice QCD*. Lattice QCD calculations use computational methods of utter complexity, which require the use of the best supercomputers currently available, but as time goes by they get better and better and are already yielding striking results about the nature of the interaction that holds together the nucleus. Some of these results will be discussed in the ICHEP sessions corresponding to QCD and lattice QCD.

Background information:
http://www.usqcd.org/

7. Neutrino Physics

Neutrinos are a very special class of elementary particle: they don't have any electric charge, they have a tiny mass and have a very small probability to interact with ordinary matter. They were predicted more than 80 years ago by Wolfgang Pauli, although he wasn't really sure that such particles could be detected experimentally. However, the wit and hard work of several generations of physicists have yielded in the past decades a lot of information about these elusive pieces of matter. These experimental discoveries allow us to assess many properties of the neutrinos, even some unexpected ones, and to cast doubts about their accommodation in the framework of the Standard Model, which is nowadays one of the hot topics of the field.

In ICHEP 2014 the latest experimental results on neutrino physics will be presented, gathering data from experiments studying solar neutrinos, neutrinos from cosmic radiation, those produced in human-made nuclear reactors, and even from the inner layers of the Earth. In many of these experiments, located in very unusual places like the bottom of the ocean or in underground laboratories below kilometres of rock, Spanish institutions play an important role.

One of these interesting experiments that will present their latest data on ICHEP 2014 is the neutrino telescope **IceCube**, an experiment located in the ice right under the geographic South Pole; IceCube was the first to detect high energy neutrinos arriving in Earth from remote astrophysical objects.

Background information:
http://icecube.wisc.edu/

8. Future accelerators

The LHC is just yielding its first results, but the community is already thinking about the next generation of large scientific facilities: linear and circular colliders for high energy physics and their associated detectors, neutrino beams and detectors, underground laboratories for the study of both neutrinos and dark matter, new experimental designs for the study of cosmic rays, and satellite-born experiments. These will be important subjects to discuss in the special session about Future Accelerators on Monday 7th.

Several regional strategy projects have been studied and developed in the past two years. In Europe, the process ended in June 2014 and in USA in late May 2014. India, Japan, Korea and China are also deciding their positions towards new accelerators and future large international facilities. In Japan a central office has been created to study during the coming two years the viability of a new linear collider, the International Linear Collider, or ILC.

In the special session the particular points of view of the particle physics community in each region will be presented, and there will be discussion about the challenges of globalization and the international coordination necessary for the construction of future scientific facilities. For this reason, each region has been given a separate talk in the special session: America (I. Shipsey), Asia (M. Nozaki) and Europe (M. Krammer).

We will have also a round table with the directors of the most important particle physics laboratories: CERN-Europe (S. Bertulocci), FNAL-USA (N. Lockyer), IHEP-China (Y. Wang) and KEK-Japan (A. Suzuki). The topics to be discussed include: how to equilibrate long-term and big inversions projects with the more modest, emergent ones; how to coordinate local and global inversion needs; and how the new results that the new LHC, updated to an energy of 13 TeV, will produce will affect the projects of future scientific facilities.

Background information:

http://home.web.cern.ch/
http://www.linearcollider.org/
http://legacy.kek.jp/intra-e/index.html
http://english.ihep.cas.cn/
http://www.fnal.gov/

9. The 60th anniversary of the CERN

The CERN was founded in the post-World War II era "*to assist and encourage the formation and organization of regional research centres and laboratories in order to increase and make more fruitful the international collaboration*" (Fifth Unesco General Conference, Florence 1950). CERN was created in 1954 by 12 founding states, predating in three years the Treaty of Rome, which started off the European Economic Community in 1957. Spain didn't sign initially the convention of 1954, but joined soon after for a few years, then left, and finally, in 1984, re-joined CERN after the establishment of democracy.

The CERN project was conceived to be a trans-national one, crossing every border: scientific, political and cultural, and bringing knowledge and collaboration to generate new knowledge to every interested nation. Today CERN is run by 21 member states, but tens of associated countries collaborate providing physicists, engineers, technicians and administrative personnel, whose nationalities amount to more than one hundred.

The Sesame project aims to evoke the original purpose of the CERN: a particle accelerator in Jordan with the collaboration of Muslim countries (Iranians, Palestinians…) and Israelite scientists with the advice and support of CERN. The idea is similar to that of Daniel Barenboim and Edward Sain: to create a workshop for young musicians from Israel and various Muslim countries, the West-Eastern Divan. It is a very good example of intitiative of Science for Peace.

During ICHEP, we will celebrate the 60th anniversary of CERN, emphasizing the ethical values of science. Also, at the beginning of ICHEP, we will enjoy a concert with the idea of mixing music and rhythms from different countries to highlight the joint efforts of science and music for peace and international collaboration. In the CERN 60th anniversary special session, a commemorative postage stamp will be presented, designed specially by Correos, the Spanish postal service, to celebrate this event.

Background information:

http://cern60.web.cern.ch/en
http://home.web.cern.ch/about/member-states

Main speakers

François Englert. Theoretical physicist, professor emeritus of the Free University of Brussels. Nobel Prize in Physics in 2013, shared with Peter Higgs for the discovery of a theoretical mechanism, the so-called Brout-Englert-Higgs mechanism, which contributes to our knowledge of the origin of the mass of the subatomic particles. The mechanism was confirmed in 2012 with the discovery of the Higgs boson by the ATLAS and CMS experiments in CERN. He will give the opening conference of the plenary sessions of ICHEP 2014: *"The Brout-Englert-Higgs mechanism and its scalar boson"*.
Monday, 7th July, 9:30 a.m. He will be present for the following press conference.

Alan Guth. He holds the Victor F. Weisskopf professorship of the MIT Center for Theoretical Physics (Massachussets Institute of Technology). Guth is considered the father of the cosmic inflation theory, a process which presumably took place right after the Big Bang and has recently been supported by the detection of primordial B-modes in the polarization of the cosmic microwave background by the BICEP2 experiment. Guth will take part in the session on Cosmology and Particle Physics with the conference "*Inflationary Cosmology and Particle Physics*".
Tuesday, 8th July, 7:30 p.m.

Rolf-Dieter Heuer. Particle physicist, Director General of CERN. Most of Heuer's career has been dedicated to the construction and operation of large particle detector systems to study electron-positron collisions. In 1984, he started to work at CERN in the first of its large particle colliders, LEP (the Large Electron-Positron Collider). In 2004, he became director of the Particle Physics and Astrophysics Department of the German particle physics laboratory, DESY (Deutsches Elektronen-Synchrotron), being responsible for the investigation carried out in the HERA accelerator and for the participation of DESY in LHC, as well as for investigating the future of particle accelerators. Heuer participates in the 60th anniversary CERN session, with the conference: "*CERN: a Large International infrastructure with impact beyond science and technology* ".
Saturday, 5th July, 6 p.m.

Nigel Lockyer. Director of Fermilab since 2013. Experimental particle physicist. He has been the director of TRIUMF, the laboratory for nuclear and particle physics in Canada, and has been Professor of Physics at the University of Pennsylvania. His research is focused on experiments dealing with high energy particles, with an special interest in probing fundamental symmetries and studying heavy quarks. He has been working at Fermilab for 25 years in different positions, mainly in the CDF experiment, which gained worldwide recognition for the discovery of the top quark. He will take part in the round table discussion about future accelerators along with other directors of particle physics laboratories.
Monday, 7th July, 6 p.m.

Wang Yifang. Director of the Institute of High Energy Physics (IHEP) of the Chinese Academy of Sciences. Wang has worked in the Massachusetts Institute of Technology (MIT), at the University of Stanford, and in 2001 as a research fellow at the Institute of High Energy Physics in Beijing. Wang has written more than 300 papers on neutrino physics, collider physics, cosmic rays and astrophysics, detectors and methods for data analysis. He proposed in 2003 the Daya Bay experiment, which in 2013 first proved that the third neutrino mixing angle must be nonzero. He will participate in the round table discussion about future accelerators along with other directors of particle physics laboratories.
Monday, 7th July, 6 p.m.

Atsuto Suzuki. Director of the KEK laboratory for particle physics in Japan. He participates in the round table discussion about future accelerators along with other directors of particle physics laboratories.
Monday, 7th July, 6 p.m.

Manfred Lindner. He is one of the directors of the Max Planck Institute for Nuclear Physics in Heidelberg (Germany). He is part of several international collaborations that deal with neutrino physics, both of solar and reactor neutrinos, and he is a member of the assessing committee of Gran Sasso, the large underground laboratory in Italy. He is responsible for the plenary session "*Properties of neutrinos*".
Tuesday, 8th July, 3 p.m.

Sergio Bertolucci. He is currently the Director for Research and Scientific Computation in CERN. He participates in the 60th CERN anniversary session (July 5th), with the conference: "*CERN: the scientific and technological quest*" and in the round table discussion about future accelerators along with other directors of particle physics laboratories.
Monday, 7th July, 6 p.m.

Tatsuya Nakada. Federal Polytechnic School of Lausanne (Switzerland). Convener of the special session on future accelerators. He coordinated the development of the European Strategy for Particle Physics (2013). He was spokesperson of LHCb, the LHC experiment dedicated to study asymmetries between matter and antimatter.

Dave Charlton. Spokesperson of the ATLAS Collaboration. University of Birmingham.

Tiziano Camporesi. Spokesperson of the CMS Collaboration. CERN staff.

Pierluigi Campana. Spokesperson of the LHCb Collaboration.

Paolo Giubellino. Spokesperson of the ALICE Collaboration.

Dr. Srubabti Goswami. Neutrino physicist, she is a researcher at the Physical Research Laboratory of Ahmedabad (India). She presents the plenary talk “*Neutrino Phenomenology: Highlights of oscillation results and future prospects*” about the implications of the experiments that study these elusive particles (Tuesday 8th, 16:00). She is part of the INO collaboration (India-based Neutrino Observatory), which aims to build an underground detector for the measurement of neutrinos in India.

Christophe Grojean. Theoretical physicist at CERN and at the Institute for High Energy Physics (IFAE) in Barcelona. He will summarize our theoretical knowledge of the Higgs boson (Monday 7th, 11:30).

Marcela Carena. Theoretical physicist at Fermilab (USA). She will present the plenary talk “*Physics Beyond the Standard Model*” (Monday 7th, 12:30)

Young-Kee Kim. Physicist in the ATLAS Experiment. She was deputy director of Fermilab until 2013. She will summarize the experimental results of the conference.

Marjorie G Bardeen. Director of the Department of Education at Fermilab since 1995.

Henrique Araujo. Experimental physicist specialising in astroparticles at Imperial College, London. He presents the searches on Dark Matter (Tuesday 8th, 16:30)

Spanish attendees

Juan Fuster Verdú: Reseach Professor of the Spanish Research Council (CSIC) at the Institute for Corpuscular Physics (IFIC). Experimental particle physicist who started his career in the CELLO experiment (DESY, Germany). From 1986 to 1996 he worked in the DELPHI experiment at CERN. After that he returned to Valencia and created a group at IFIC, pioneering in Spain the development of silicon detectors for particle physics experiments. His group joined the ATLAS experiment and has been responsible for a large part of the inner silicon detectors of ATLAS. From 2005 he also works in the development of the future linear collider (ILC), coordinating the Spanish network on this field. Currently he is the co-president and European representative for the Global Study for a Linear Collider. He was director of IFIC (2003-2007), Scientific Manager of the National Program for Particle Physics in Spain (2007-2010), coordinator of the Physics area of CSIC (2010-2012) and is co-president of the Local Organization Committee of ICHEP 2014.

Manuel Aguilar Benítez de Lugo. Researcher of the Spanish Center for Energetic, Environmental and Technological Research (CIEMAT), he was vice-president of CERN. He leads the participation of CIEMAT in the Alpha Magnetic Spectrometer (AMS), installed aboard the ISS to detect antimatter and dark matter. He is co-president of the Local Organization Committee of ICHEP 2014. He participates in the CERN 60^{th} anniversary session with a talk about the Spanish participation in CERN (July 5, 18:00h)

José Miguel Jiménez. Director of the Department of Technology of CERN. He participates in the CERN 60^{th} anniversary session with the talk "*Future CERN projects and their technological challenges*" (July 5^{th}, 18:00)

Antonio Pich. Professor of the Theoretical Physics Department of the University of Valencia. He was director of the Institute for Corpuscular Physics (IFIC), Institutional Coordinator of the Spanish Research Council (CSIC) in the Comunitat Valenciana and presently is coordinator of the Spanish National Centre for Particle Physics, Astroparticles and Nuclear Physics (CPAN). He was awarded the Humboldt Research Award (Alexander von Humboldt Foundation, Germany) in 2010 for his fruitful research career on Quantum Field Theory and Elementary Particle Physics Phenomenology. He will summarize the developments in theoretical physics presented in ICHEP (July 9^{th}, 16:00)

Antonio Ferrer, Professor at the University of Valencia. He participated in the DELPHI collaboration and is part of the ATLAS experiment at CERN. He is the chairman of the special meeting about the 60^{th} anniversary of CERN (July 5^{th}, 18:00)

Juan José Hernández Rey. Deputy director of the Institute for Corpuscular Physics (IFIC) and deputy spokesperson of KM3NeT, a project of a future neutrino detector of 1 cubic kilometre of effective volume at the bottom of the Mediterranean Sea.

Matteo Cavalli Sforza. Degree in Physics by the Università degli Studi di Pavia and PhD by the Laboratory of Frascati (Italy), his career focuses on experimental particle physics at large laboratories worldwide (Brookhaven, SLAC, Fermilab, CERN, DESY). In 1993 he joined the Institute for High Energy Physics (IFAE, consortium Generalitat de Catalunya-UAB) as principal investigator, where he is today the director. He also was a member of the CERN Scientific Policy Committee (2001-2008).

Alessandro Bettini. Director of the Canfranc Underground Laboratory (LSC), a facility located under the Pyrenees that hosts experiments requiring very low background radiation.

Enrique Fernández. Researcher and former director of the Institute for High Energy Physics (IFAE).

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