In the fourth edition of these awards upholding science as a motor of progress

The BBVA Foundation Frontiers of Knowledge Award in Basic Sciences goes to Mayor and Queloz, discoverers of the first exoplanet

- The award is granted to the two Swiss astrophysicists for their techniques enabling the indirect detection of planets orbiting other stars.

- Mayor believes the long-term challenge will be to determine whether life has evolved on some extra-solar planet.

- The BBVA Foundation Frontiers of Knowledge Awards recognize the role of science and cultural creation as levers of society's progress and wellbeing. Their eight categories span the main scientific, technological, social and economic areas and challenges of our times

Madrid, January 24, 2012.- The BBVA Foundation Frontiers of Knowledge Award in the Basic Sciences category has gone in this fourth edition to Swiss astrophysicists Michel Mayor and Didier Queloz "for their pathbreaking development of new astronomical instruments and experimental techniques that led to the observation of planets outside the solar system," in the words of the jury's citation.

This contribution facilitated "the discovery, in 1995, of a giant planet orbiting another star, which spawned a revolution in astronomy. Today, more than five hundred exoplanets are known and the first direct measurements of some of their atmospheres have been obtained," the citation continues.

There can be no doubt that Mayor and Queloz's breakthrough has expanded the frontiers of knowledge. When they first started looking for planets around sun-like stars, few astrophysicists believed it was feasible to detect a small, dark object moving close to another – its star – of enormous size and brilliance. But the two men invented and developed a technique known as radial velocity, based on the Doppler effect, to detect such objects by indirect means. It works by examining the star's light for tell-tale signs of changes in its movement caused by the gravitational pull between planet and star.

It is with this method that science has found most of the extrasolar planets catalogued to date. In addition, Mayor and Queloz were instrumental in developing HARPS or "the world's leading planet discovery machine" as the jury calls it; the most productive search tool based on their technique. And they have also been involved in the emerging "transit method", in which planets are spotted by the slight dimming of a star's light as the orbiting body crosses its disk. This method has already yielded the first detection of a rocky extrasolar planet.

"I feel extremely grateful and honored to have this prize," said a surprised Michel Mayor, who heard the news while taking part in a workshop at the famed radio telescope in Arecibo, Puerto Rico. Queloz, his doctorate student when they discovered the first signal of a planet orbiting the star 51 Pegasi*,* returned to Geneva from Paris after getting the jury's call: "I feel very proud. For me, it's a recognition of the work Michel and I have been doing for almost 20 years, which has been a game changer in astrophysics."

Both remember the announcement of their finding as just one in a chain of tumultuous events. As Queloz describes it: "At that time there were very few people doing this, it was a kind of bizarre, weird project. We had built this really precise machine and thought it was going to take years to detect a planet, then suddenly after a couple of months, there was the first signal. However, what we were observing didn't fit with any known planet in the solar system. At first I thought I was mistaken. But Michel has the kind of mind that is ready for the unexpected, and that was essential to our success."

Even so, Mayor decided it was best to wait until the star could be observed again, one year later. "In July 95 we repeated our measurements and got exactly the same signal. It was then we knew that we had really a planet," he recalled during yesterday's conversation.

Their initial wariness had to do with the type of planet detected; with a mass similar to Jupiter but, unlike the gas giants of our solar system, circling just a short distance from its star. 51 Pegasi b – as they baptized it – has an orbit of just four days. As it turns out, this is true of the vast majority of planets detected since, but at that time, as Mayor relates, "it was a huge surprise, we were saying 'what is this?'"

With their measurements confirmed, the men sent their findings to *Nature*. Two of the three astrophysicists whom the magazine asked to review the paper recommended it for publication. The date set was November 23, 1995, but in October Mayor and Queloz announced their results at a congress in Florence: the story was seized on by the press and, from that moment on, extrasolar planets have rarely been out of the headlines. "The media attention was entirely unexpected," explains Mayor. "It was only then we realized how important our work was for the general public."

In his view, "One pending scientific goal is to understand the physics of the formation of these planets." Though in the long term, "what really matters, the big,

big challenge is to understand if life is a common feature in the universe. I don't know when we might know whether a given planet sustains life, because these are very difficult measurements that can probably only be done from space. But we also know that life affects the chemical composition of a planet's atmosphere. I am sure space agencies will make this a priority objective."

Biographies

Michel Mayor was born in Lausanne (Switzerland) in 1942. After completing an MS in physics at his home-town university, he moved to the University of Geneva in 1966 to specialize in astrophysics. He would remain with this institution for the rest of his career, obtaining his PhD in 1971 and continuing there firstly as a research associate, then as associate professor, professor and, since 2007, professor emeritus. Between 1998 and 2004 he combined his university posts with the directorship of Geneva Observatory.

Mayor has more than 700 scientific papers to his name, the fruit of a research career that has earned him seven honorary doctorates and a score of other accolades, including the Albert Einstein Medal (2004), Knight of the French *Legion d'Honneur* (2004) and the Shaw Prize for Astronomy (2005).

Fellow Swiss Didier Queloz (1966) has also spent most of his career at the University of Geneva. A physicist by training, he took his PhD with Michel Mayor in 1995: it was indeed these doctorate studies that led to his discovery of the first exoplanet. From 1997 to 1999 he was Distinguished Visiting Scientist at the Jet Propulsion Lab (California, United States), before returning to his alma mater, where he took up a professorship in 2008. In 2005-2009 alone he published a total of over one hundred scientific papers.

The BBVA Foundation Frontiers of Knowledge Awards

The names of the new laureates were announced this morning in the Marqués de Salamanca Palace, Madrid headquarters of the BBVA Foundation, where the chair of the jury, Theodor Hänsch, winner of the 2005 Nobel Prize in Physics, Professor of Physics at LMU Munich and Head of the Department of Laser Spectroscopy in the Max Planck Institute of Quantum Optics (Garching, Germany) was joined by Juan José Damborenea, Deputy Vice-President of Scientific and Technical Areas at the Spanish National Research Council (CSIC), and Rafael Pardo, Director of the BBVA Foundation.

The BBVA Foundation established the Frontiers of Knowledge Awards in 2008 to recognize the authors of outstanding contributions and significant advances in a broad range of scientific and technological areas characteristic of our times. The quality of the nominations received, the stature of the international judges, appointed in consultation with the Spanish National Research Council (CSIC), and the excellence of the laureates in the first three editions have earned them a place among the world's foremost award families.

In the midst of a severe economic crisis which has pushed science, culture and the environment lower down the list of public priorities, the BBVA Foundation

Frontiers of Knowledge Awards enter this fourth edition firm in their commitment to the individuals and teams working for a better future for people through the advancement of knowledge and its dissemination to society.

The eight categories of the BBVA Foundation Frontiers of Knowledge Awards, each carrying prize money of 400,000 euros, reflect both the knowledge map of the early 21st century and the great global challenges of the day. Hence their inclusion of two dedicated environmental categories in the shape of "Climate Change" and "Ecology and Conservation Biology".

The BBVA Foundation primarily engages in the generation and diffusion of scientific knowledge and culture. This effort materializes in research projects, advanced training, lectures and publications, and a series of award families aimed at recognizing and drawing public attention to the work of scientists and creative practitioners.

Among the BBVA Foundation's areas of activity are basic sciences, biomedicine, ecology and conservation biology, the social sciences and literary and musical creation. Its initiatives mesh with the BBVA Group's strategy of fostering innovation and knowledge as development drivers and an effective means to expand citizens' individual and collective choices.

International jury

The jury in this category was chaired by **Theodor Hänsch**, 2005 Nobel Physics laureate, Professor of Physics at LMU Munich and Director of the Department of Laser Spectroscopy at the Max Planck Institute of Quantum Optics (Garching, Germany), with **Avelino Corma**, Research Professor in the Instituto de Tecnología Química (CSIC– Universidad Politécnica de Valencia, UPV) acting as secretary. Remaining members were **Douglas Abraham**, Professor of Statistical Mechanics in the Rudolf Peierls Centre for Theoretical Physics at Oxford University (United Kingdom); **Ignacio Cirac**, Director of the Theory Division at the Max Planck Institute of Quantum Optics (Garching, Germany) and BBVA Foundation Frontiers of Knowledge laureate in Basic Sciences in the first edition of the awards; **Hongkun Park**, Professor of Chemistry and Chemical Biology and of Physics at Harvard University (United States); **Martin Quack**, Professor of Physical Chemistry at ETH Zurich (Switzerland), and **Sandip Tiwari**, Charles N. Mellowes Professor in Engineering at Cornell University (United States).

Last year's award in this category went to the U.S. chemist of Hungarian origin **Gabor A. Somorjai**, "for his pioneering experimental and conceptual contributions to the understanding of surface chemistry and catalysis at a microscopic and molecular level. Somorjai led the transition to the chemical catalysis of the 21st-century, with the ability to explore the world on the molecular level and understand what was happening underneath."

In the second edition, the award was shared by physicist and chemist **Richard Zare** of Stanford University (United States) and physicist **Michael Fisher** of the University of Maryland (United States), for their independent, fundamental contributions to describing the world at molecular level. The former for "unraveling the secrets of nature's building blocks and the underlying interactions between

them," and the latter for "developing theoretical approaches that help analyze what happens when a large assembly of such building blocks is brought together," remarked the jury in its citation.

Finally, the winners in the inaugural edition were physicists **Ignacio Cirac** and **Peter Zoller** for their contributions to "quantum information science", in the words of the award certificate.

UPCOMING AWARD ANNOUNCEMENTS

CATEGORY	DATE
Biomedicine	Tuesday, January 31
Ecology and Conservation Biology	Tuesday, February 7
Contemporary Music	Tuesday, February 14
Economics, Finance and Management	Tuesday, February 21
Development Cooperation	Tuesday, February 28

LAUREATE'S FIRST DECLARATIONS AND IMAGES

A video recording of the new laureate's first impressions on receiving news of the award is available from the Atlas FTP with the following name and coordinates, along with photographic images and an audio MP3 recording of the announcement event, featuring more declarations:

Server: **213.0.38.61**
Username: **agenciaatlas1**
Password: **amapola**

The name of the video is:
"FBBVA PREMIO CIENCIAS BÁSICAS"

For more information, contact the BBVA Foundation Communication Department (+34 91 374 5210 or +34 94 487 4627/comunicacion@fbbva.es) or visit the Foundation website www.fbbva.es