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## 'Physics Awards' of the Spanish Royal Society of Physics and the BBVA Foundation

***Antonio Hernando, inventor of the 'anti-assault' bracelet, and Jose Manuel Fernandez de Labastida, awarded***

The "Physics Awards" of the Spanish Royal Society of Physics (RSEF) and the BBVA Foundation afford annual recognition to the most outstanding achievements of the Spanish physicist community. Ten award winners stepped up to the platform on this occasion, among them José Manuel Fernández de Labastida, Director-General of Research and Management on the Ministry of Science and Innovation's National RDI Plan; Antonio Hernando Grande, head of the Applied Magnetism Institute, and astrophysicist Eduardo Battaner, author of a number of popular science books.

Speakers at the award ceremony included Cristina Garmendia, Minister of Science and Innovation, the president of the BBVA Foundation, Francisco González, and RSEF president Antonio Fernández Rañada. Francisco González, who listed among the BBVA Group's distinguishing traits "a focus on knowledge and innovation that sets us apart from most of the banking sector", was adamant that "in today's circumstances, more and more of us share the conviction that Spain needs to advance with energy and conviction towards a new productive model based on the advancement of science and technology".

The study of physics runs the entire gamut from elementary particles – the smallest components of matter – to the most distant galaxies; from the invention of new materials with remarkable properties to the development of quantum computers able to perform calculations of astounding magnitude.

This variety was fully reflected in the Physics Awards of the RSEF and the BBVA Foundation. The year's awardees worked in theoretical physics, magnetic materials; the design of new materials at the atomic scale; sensors; spintronics –studying the interaction of magnetic properties and conductor materials; and the origin and evolution of the galaxies.

### 50,000 EUROS ACROSS EIGHT PRIZE CATEGORIES

These awards are funded with the combined sum of 50,000 euros. Aside from distinguishing quality research in all its facets, they seek to encourage young research talent – the more so given the current decline in the number of students taking science degrees – and to foster closer ties between physics and the business and educational communities.

The awards take in eight categories: RSEF Medal; Innovation and Technology; Young Researcher in Theoretical Physics and in Experimental Physics; Physics Teaching in University and Secondary Education; Best article on physics published in the Revista Española de Física; and Best article on physics teaching published in the Revista Española de Física.

The RSEF Medal, funded with 15,000 euros, honors the holder's research work, record of scientific achievement and collaboration with the Royal Society. On this occasion, the award went to José Manuel Fernández de Labastida for his "salient research contributions in theoretical physics" along with an "intense research and teaching labor accompanied by outstanding service to the academic and scientific community".

Fernández de Labastida, Director-General of Research and Management on the Ministry of Science and Innovation's National RDI Plan, has worked in quantum field theory, string theory, knot theory and topological quantum field theory, among other areas, and spent part of his career at the Institute for Advanced Study in Princeton (United States) and CERN (European Particle Physics Laboratory). Author of more than 80 scientific publications, he has participated as chief researcher in five national and European research projects and has served as vice president of the RSEF.

### KNOWLEDGE FOR TECHNOLOGY

The Physics Innovation and Technology award, with 8,000 euros prize money, recognizes applied research which has enabled technological innovation or promoted physics applications in the corporate world. In this edition, the RSEF and BBVA Foundation prize went to Antonio Hernando Grande for "the high rate of technology transfer to the business community" achieved in his work. His research efforts, as documented in over three hundred publications, have materialized in something near to twenty patents. Examples include an 'anti-assault bracelet' with no blackout zones, devised for situations of domestic violence; a series of developments for high-speed trains; and, in the biomedicine sphere, a vocal chord sensor-activator and a heart valve sensor.

The Applied Magnetism Institute (IMA) at the Complutense University, which Hernando has led since its founding ten years ago, combines high-quality basic research with innovation. Among the organizations contracting research from the IMA are companies Adif, Casa de la Moneda (the Spanish Royal Mint), Alcatel, Siemens, Asea, Atlas Copco, Alfa Laval, Volvo, AVE, AENA, Red Eléctrica de España, URBIS, Iberdrola, Aniel, TALGO and Dimetronic, and the hospital centers Hospital Clínico de Madrid and Hospital Puerta de Hierro.

For Hernando, the IMA is proof that the fundamental quest for knowledge can translate smoothly into practical applications. "We started looking round for money to fund our basic research" says Antonio Hernando. "And now we are publishing in top journals and, if we were a company, would be paying out dividends. Basic science is the life force of innovation".

### "A BORN TEACHER"

Awards for Physics Teaching in the University and Physics Teaching in Secondary Education, each carrying prize money of 8,000 euros, recognize a career dedicated to teaching, pedagogical excellence and collaboration with the Spanish Royal Society of Physics.

The prize in the university sector went to Eduardo Battaner López, Full Professor of Astronomy and Astrophysics at the University of Granada, for "his tireless teaching and educational efforts which have led to the formation of an abundant pool of scientists and the publication of valued text books and works of popular science (...)".

Battaner refers to himself as "a born teacher". A pioneer of modern Spanish astrophysics – he was among the founders of the Instituto de Astrofísica de Andalucía (IAA), his scientific output has been written up in high-impact journals. But Battaner has also supervised 13 doctoral theses – among them that of Rafael Rodrigo, current president of the Spanish National Research Council (CSIC) – and has helped place the University of Granada third in the national ranking of PhD production in astrophysics, behind Madrid and Barcelona. Among his most successful titles is Un Físico en la calle ("A Physicist in the Street"), published in 2006. "I have been a good 'channeller' of young people towards the exploration of the cosmos, an inspirer of vocations, and I still bring energy and enthusiasm to my teaching work".

The winner in the secondary education sub-category was Carlos Julio Sierra Mora for his "long career and numerous innovations in secondary-school physics teaching". Also cited was "his involvement in diverse educational activities including those organized by the Spanish Royal Society of Physics".

### THE GENERATIONAL CHANGE: THE FUTURE IN SAFE HANDS?

The awards for Young Researcher in Theoretical Physics and Young Researcher in Experimental Physics, each with 4,000 euros prize money, are reserved for researchers of exceptional scientific talent aged under 30 at the time of the award call. This time round the prize winners were Eva María Fernández Sánchez and David Ciudad Río-Pérez.

David Ciudad Río-Pérez is a postdoctoral research fellow in the Condensed Matter Group at the University of Leeds (United Kingdom). His area of research is spintronics, "a fascinating topic", Ciudad affirms, "because it lets you study basic physical phenomenon, but at the same time holds out great practical interest for industrial applications". His research is ultimately connected to the development of quantum computation devices.

Eva María Fernández Sánchez is currently employed at the Instituto de Ciencia de Materiales de Madrid (ICMM) belonging to the Spanish National Research Council (CSIC). Despite her youth, she has already authored numerous publications in high-impact international journals.

The award in the category Best article on physics published in the Revista Española de Física went to Fernando Barreiro, Claudia Glasman, José del Peso and Juan Terrón.

The award for the Best article on physics teaching in the Revista Española de Física was granted to Andrés Cassinello.

## PHYSICS IN SPAIN

As the following tables show, physics is among the scientific disciplines in which Spanish researchers are most productive. Data from the Web of Science database – tracking over 9,000 journals worldwide selected for their scientific quality – compiled by the ACUTE group of the CSIC's Scientific Information and Documentation Center, the production of physics in Spain puts it fourth in the national ranking behind other traditionally prolific disciplines.

And we are also talking about science of the highest quality to judge by the impact ratings of the ISI Web of Knowledge, which give the publications of Spanish physicists an impressive score of 26, a long way in front of remaining disciplines. Physics production in Spain, finally, corresponds to 3.21% if the worldwide total.

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