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Activities of Women in Physics Group in Spain

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Abstract. In this paper we present the activities of the Spanish Women in Physics group during the past three years. We also describe the relevant equality measures adopted by the Spanish Government and its impact on the status of women in science. The data show an alarming decrease in the number of graduate female students at the universities, although for senior researchers and professors, the percentage of women at the different staff levels remains approximately constant.

INTRODUCTION

The Spanish government has been a pioneer in the implementation of many equality policies for the sciences. According to the Law on Equality of 2007 and the Law on Science, Technology and Innovation of 2011, gender must be taken into account in scientific and technical research to guarantee effective equality between men and women. The laws also establish specific measures for parity in science and technology resulting in public research bodies adopting equality plans similar to those already in place for universities. These plans include incentives for centers that improve their gender indicators. A white paper on the position of Spanish women in science provides empirical evidence of the unbalanced presence of men and women. The driving force behind this initiative is the Women and Science Unit of the Ministry of Science and Innovation, which includes contributions by well-known Spanish econometrics professionals [1]. The data show a range of results: among men and women with similar backgrounds, males are 2.5 times more likely to be promoted to full professor than females, and little variation exists among research fields [1]. Data on the impact of family life on careers of each gender indicate that having children is clearly detrimental to a woman's career. A human resources survey reveals that only 38% of female full professors have children, as opposed to 63% of male full professors and that the percentage of single female full professors is 21% as opposed to 15% of single male full professors.

In 2018, the Ministry of Science and Innovation created the Women, Science, and Innovation Observatory (OMCI) as an interministerial collegiate body responsible for analyzing, monitoring, and measuring impacts on the situation of women in research, development, and innovation. The body also proposes, advises, and promotes the implementation of public policies and actions to end the visible and invisible obstacles in gender equality issues and promotes the improvement of the situation of women in the Spanish Science, Technology and Innovation System.

The Spanish Women in Physics Group of the Spanish Royal Physics Society (RSEF) was created in 2002, in accordance with the guidelines of the IUPAP Working Group of Women in Physics established by the 23rd General Assembly of IUPAP, Atlanta, Georgia in 1999 [2]. Since then, the main goal has been to increase the presence of women in physics in Spain and the visibility of their achievements; report instances of inequality; and defend the interests, equal rights, and opportunities of women in physics.

The number of Spanish women in science is gradually increasing at most levels, but in physics the situation is the opposite. Figure 1 shows the number of undergraduate and graduate students in physics from 1985 to 2021 and the increasing gap between male and female graduate students is increasing: In 1995, the difference was 106, and in 2018 it was 647. In addition gender gaps exist in STEM subjects as a result of family expectation and beliefs, self-confidence, gender-role stereotypes, and the challenges faced by girls in developing their identities as female physicists [3].

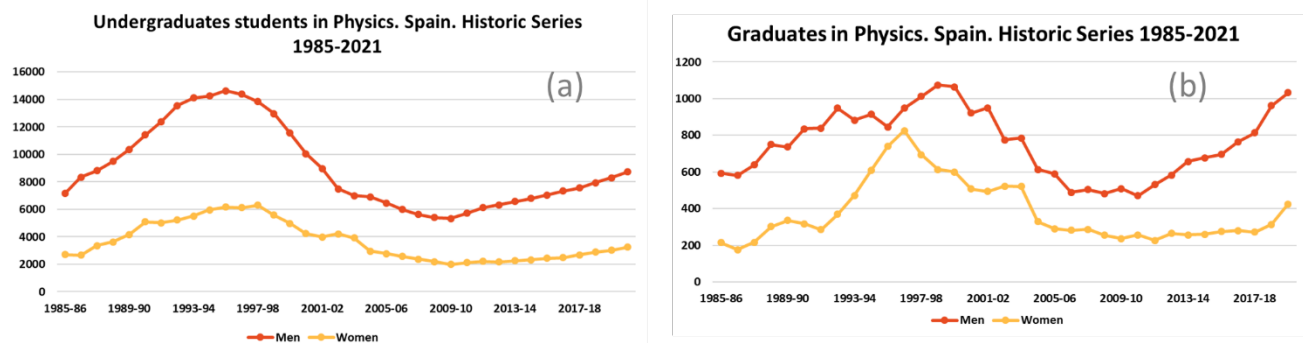


FIGURE 1. Number of undergraduate students (a) and graduate in physics (b) at Spanish universities from 1985–2021.

On the other hand, women represent about 25% of the professors in physics departments at Spanish universities, which is assumed to have remained constant over the past few years. Figure 2 shows data on the gender breakdowns at each level of research staff in the Spanish Research Council (CSIC). The percentages across all categories are shown in Fig. 2a. The percentage corresponding to women in the highest employment level (research professor) has increased the most, reaching close to 27% in recent years due to the increase in the number of positions, more women in the hiring and promoting panels, and the retirement of tenured male scientists. This improvement is smaller in the physical science and technology sector (Fig. 2b), due in part to the lower number of women. [4]

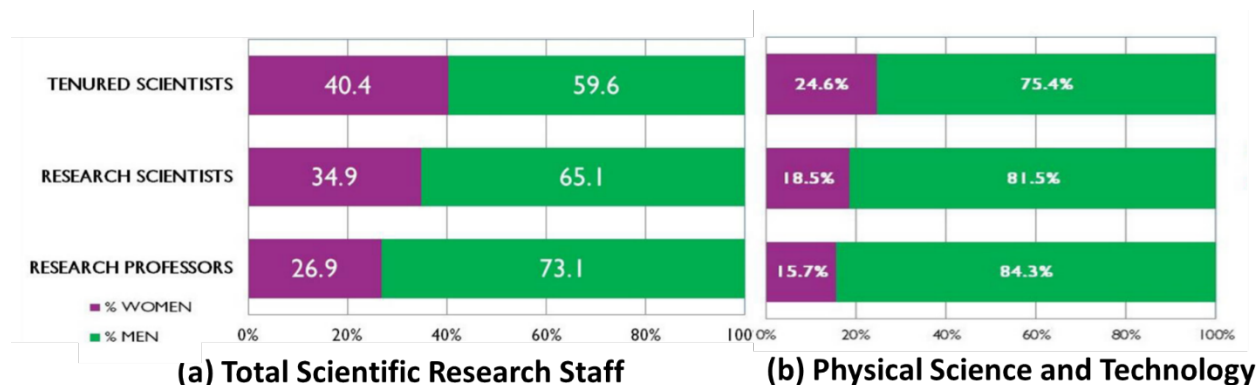


FIGURE 2. Percentages of male and female researchers at each level of research staff (a) in total and (b) in physical science and technology at the in Spanish Research Council (CSIC) in 2021. Data are from the CSIC Commission for Women in Science [4].

ACTIVITIES AND ACTIONS

The Spanish Women in Physics group has developed several activities during the last three years. The group organized of different activities at the 2019 RSEF Conference. One of these events was the Women in Physics Round Table, which included panelists Petra Rudolf, professor at the University of Groningen and president of the European Physical Society at that time; Tomas Brage, professor at Lund University and expert in gender in science; Pascuala García-Martínez, professor at the University of Valencia and president of the Spanish Women in Physics Group; and Leni Bascones, a researcher at the Madrid Institute of Materials Science Spanish Research Council (ICMM-CSIC) and an expert in STEM initiatives for girls. Moderated by Julia Herrero, professor at the University of Zaragoza, the

panel was attended by more than one hundred participants. We also honored professors María Josefa Yzuel Giménez and Pilar López-Sancho, founders of the Specialized Group of Women in Physics (GEMF) of the RSEF, for their work in defending equality of women's rights in science.

During the Physics Biennial in July 2019, we organized the first Women in Physics Symposium, which included 15 oral presentations and 2 posters. The symposium focused on how to increase the presence of women in physics, visualize their achievements, and defend their interests, equal rights, and opportunities. It featured two talks by invited speakers: “Work against bias for meritocracy” by Professor Tomas Brage from Lund University in Sweden and “Women in STEM: Why doesn't the trend change?” by Professor María Villaroya from the University of Zaragoza.

The COVID-19 pandemic also forced academic societies to move conferences, committee meetings, and other events to online platforms. We organized several webinars to celebrate February 11 as the International Day of Women and Girls in Science [5]. Recently we also organized the First Spanish Conference for Undergraduate Women in Physics, held virtually on July 12, 2021 [6]. The event poster is shown in Figure 3.



FIGURE 3. Poster of the First Spanish Conference for Undergraduate Women in Physics.

The program included morning lectures on different physics topics by young predoctoral female researchers, and talks, round tables and working groups to deal with gender and physics issues in the afternoon [6]. This conference was modeled on the Conferences for Undergraduate Women in Physics (CUWiP) in the United States, which are organized by the American Physical Society. CUWiP was founded with the goal of increasing the number of female physics graduates. We have chosen this model because there is a direct correlation between attendance at these conferences and an increase in the number of female students enrolled in physics [7].

The Women in Physics Group in Spain also has an active presence in social media, with more than 3,200 followers on Twitter (@GEMF_RSEF), and a website at <http://www.gemf-rsef.es/>.

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