

Women in Physics in the United States

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Abstract. The underrepresentation of women in physics and related fields in the U.S. remains significant despite an increase in doctoral degrees earned over the past 10 years. An even greater disparity is seen among minority women. Increasing recognition of the contributions of women to discovery and education in physics and related fields has led to government initiatives and other programs to promote broader inclusion, balance, and gender equity. These actions for advocating women in physics in the U.S. since the first IUPAP Women in Physics Conference in 2002 are presented.

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Since the first IUPAP Women in Physics Conference in 2002, several studies on the status of women in science and engineering in the U.S. have focused attention on women in physics [1-4]. These studies have recommended that academic institutions, professional societies, funding agencies, and Congress take steps to create “substantial and overarching reform of [the] academic enterprise” [1]. The proposed reform attempts to eliminate gender bias and bring women’s participation in science and engineering to parity. In May 2008, the U.S. House of Representatives Committee on Science and Technology held a hearing on gender equity in science (results pending). These initiatives have resonated within the physics community in significant ways.

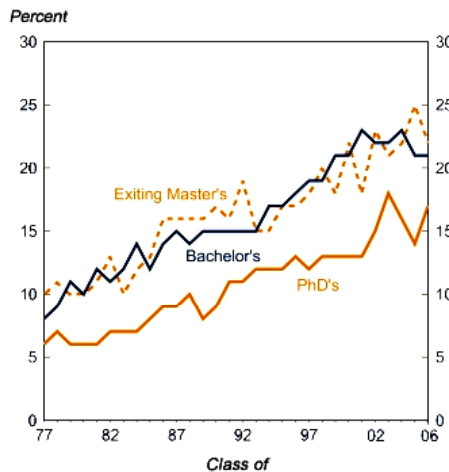


FIGURE 1. Percent of bachelor’s, exiting master’s, (i.e., terminal degrees for which students do not pursue subject any further), and doctorates in physics earned by women, 1977–2006 [5]. Reprinted with permission from AIP Statistical Research Center.

RECENT TRENDS

The proportion of women attaining bachelor’s degrees in physics has risen steadily to a high of 23% in the early 2000s [5]. Unfortunately, the percentage of women earning PhDs dropped in 2004 and 2005 to 14% after a high of 18% in 2003 (Figure 1). As shown in Table 1, only 13% of physics professors were women in 2006 [6]. However, the percentage of female professors at each level is equal to or greater than the percentage of PhDs awarded to women in the relevant years [7]. This indicates that young women have as good a chance at a physics academic position as their male peers.

Comparison with related fields shows physics lagging significantly: 42% of bachelor’s degrees in astronomy and 31% of those in materials engineering were earned by women in 2005, and 31% of all science and engineering faculty were women in 2003 [8].

Women of color (WOC) continue to be underrepresented in physics and related fields, and little progress has been made in recruiting or retaining them in the last decade. Fewer than 5% of faculty members in the “top 50” U.S. physics departments are from underrepresented minority populations [9]. The underrepresentation of women, and specifically WOC, in physics and related fields has been attributed to factors including unfriendly climate, difficulties

with recruitment and retention, absence of role models, unsuitable curricular and pedagogical structures, and the intrinsic masculinity of the scientific enterprise [1-4, 7]. Because they are so few in physics, WOC are in demand as role models and committee members—service that takes time, but does not help advance careers or achieve tenure [10, 11]. The Census Bureau projects that persons of color will be the majority of the U.S. population by 2050. Unless significant improvement is made, the overall presence of WOC may progress too little by then.

TABLE 1. Percent of Women Physics Faculty at Various Levels in 1998, 2002, and 2006 [6].

Academic Rank	1998	2002	2006
Full Professor	3	5	6
Associate Professor	10	11	14
Assistant Professor	17	16	17
Instructor/Adjunct	N/A	16	19
Other Ranks	13	15	12
Overall	8	10	13

ACTIONS FOR IMPROVEMENT

In addition to national activities [1-4] to improve the status of women in science and engineering, the physics community has promoted focused workshops, grants, and scholarships for women. The American Physical Society (APS) Committee on the Status of Women in Physics and Committee on Minorities continue their site visits, workshops, a national workshop targeted to physics department chairs and national laboratory managers, and summer programs to physics departments and national laboratories to identify, intervene, and address “problems commonly experienced by minority and/or women physicists” [12].

Committees addressing the situation of WOC in physics include the National Society of Black Physicists (NSBP) Women in Physics (WIP) Section and the American Association of Physicists in Medicine Minority Recruitment Sub-Committee (WMRSC). The American Association of Physics Teachers (AAPT) seeks more effective means of recruitment and retention of women in physics. To unite the efforts, NSBP-WIP, National Society of Hispanic Physicists (NSHP), WMRSC, AAPT, and APS recently initiated a collaboration to advocate for women in physics. Additionally, the National Science Foundation, through its ADVANCE Program, has financed efforts to support the advancement of women in academic science and engineering careers.

Significant yet insufficient progress has been made in the U.S. since the first IUPAP Conference on Women in Physics. Women, and particularly WOC, remain underrepresented in physics and related fields. Many physical societies are committed to addressing the issues. Working as a nation and in collaboration with other countries, we continue searching for ways to promote and advance underrepresented groups in physics and related fields.

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