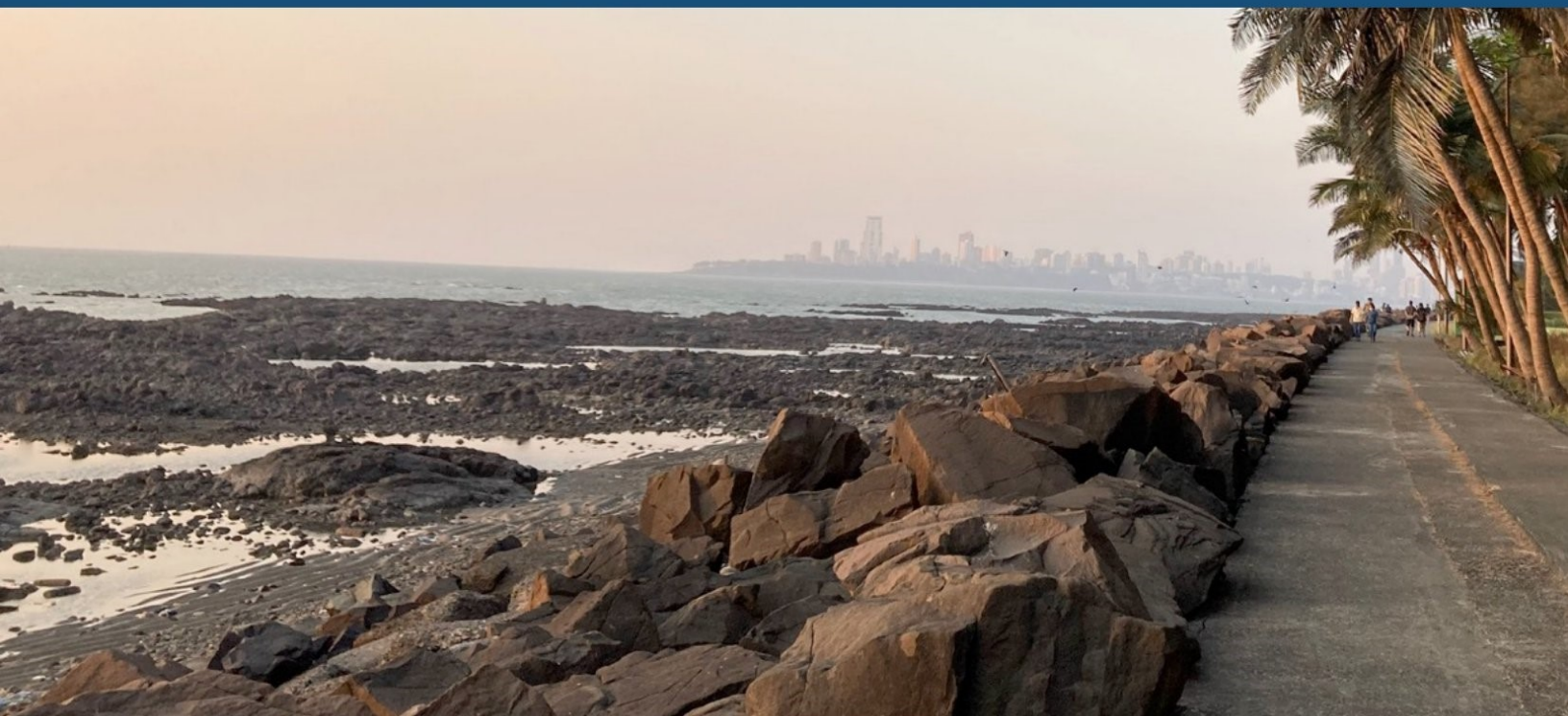




GENDER IN PHYSICS WORKING GROUP • INDIAN PHYSICS ASSOCIATION  
& TATA INSTITUTE OF FUNDAMENTAL RESEARCH

10-14 JULY 2023

# INTERNATIONAL CONFERENCE ON WOMEN IN PHYSICS





## Challenges for Improving the Status of Women in Physics: Insights from Bangladesh

*Choudhury, Shamima K<sup>1</sup>, Maria, Kazi Haniun<sup>1</sup>, Ferdous, Humayra<sup>2</sup>, Islam, Raihana Shams<sup>3</sup> and Sharmin, Mehnaz<sup>4</sup>*

*<sup>1</sup>Department of Physics, University of Dhaka, Dhaka-1000, Bangladesh*

*<sup>2</sup>Department of Physics, American International University-Bangladesh, Dhaka-1229, Bangladesh*

*<sup>3</sup>Department of Physics, University of Rajshahi, Rajshahi-6205, Bangladesh*

*<sup>4</sup>Department of Physics, Bangladesh University of Engineering and Technology, Bangladesh*

The country report highlights the urgent need to address the challenges faced by women in physics-related fields and careers in Bangladesh. Despite their ability to compete on merit, women's participation in physics career remains lower than men's, though student enrolment is higher than before. The report aims to provide a greater understanding of the underrepresentation of women in physics-related fields and careers, shedding light on the societal biases and stereotypes that impact women's engagement in physics, as well as the difficulties they face in balancing personal and professional obligations. Implicit gender biases and an unfriendly work environment further hinder women's careers in physics. Our recent study reveals that men have more opportunities than women in physics-related fields, adding to the complexity of the situation. Therefore, there is an urgent need for initiatives to address the challenges faced by women in physics.

The paper presents data on female faculty, scientists, and student enrolments in physics-related subjects at the country's few academic and research institutions. The study emphasizes the significance of empowering women and encouraging their participation in physics-related fields to assure their presence in the Fourth Industrial Revolution by creating mentorship and networking programs with successful female physicists and professionals [1]. By promoting gender equality and creating a more inclusive work environment, the field of physics can benefit from a more diverse and talented workforce. The paper concludes with a call to action for policymakers, educators, and professionals to work together towards the common goal of increasing women's participation in physics and related fields.

### Reference:

- [1] S. K. Choudhury, "Initiatives for mentoring women pursuing physics education and careers in Bangladesh", in *Women in Physics: 6th IUPAP International Conference on Women in Physics, AIP Conference Proceedings, 2019, 050006*.



## Trends of Career Development for Women in Physics and STEM in Belarus

*Tashlykova-Bushkevich Iya<sup>1</sup>, Bandarenka Hanna<sup>1</sup>, Khilmanovich Valiantsina<sup>2</sup>,  
Bobryk Aliaksei<sup>1</sup>, Rusetskaya Tatiana<sup>1</sup>*

<sup>1</sup>Physics Department, Belarusian State University of Informatics and Radioelectronics (BSUIR),  
6 Browka St., 220013, Minsk, Belarus

<sup>2</sup>Department of Medical and Biological Physics, Grodno State Medical University,  
80 Gorkogo St., 230009, Grodno, Belarus

The recent progress in involving females in Physics/STEM (science, technology, engineering, and mathematics) education all over the world gives a hope that fruitful contribution to these areas of distinguished females will have further been enhanced. Here, we report changes in the curricula of tertiary education and trends of career development for women in Physics/STEM in Belarus. In particular, we studied the ways that two reputable universities in Belarus have passed for the last decades to use women's potential in areas strongly dependent on knowledge and skills in Physics/STEM including microelectronics/nanotechnology and physics education to name a few.

In the present research we examined the statistics of enrolled and graduated male and female students in the educational programs at the BSUIR, which are tightly connected with classes on Basic Physics and Solid State Physics. The statistics of Physics Faculty, branch Physics, collected at the Yanka Kupala State University of Grodno was also analyzed by gender. The analysis was made for the period from 2003 to 2022, when gradual conversion of the 5-year Programs to the 4+2-year (Bachelor's + Master's) Programs took place. Also, decreasing by half of academic hours devoted to practical work in Physics happened those years. In addition, we found out how many males and females graduated with honor and then proceeded their career in science and technology. We saw that, in general, the content of female students is approx. ten times less than that of male ones. At the same time, traditional Programs (until 2005) has encouraged more females to pursue engineering education. However, the process of decreasing the hours of practical classes has led to less students graduated with honored diploma. What is more important, girls were more successful in passing exams with high grades than male students. Comparing the number of the enrolled and graduated students demonstrated that they are nearly the same, which shows rather strong intentions of both males and females to get the higher education in the engineering spheres. Approx. 10 % of youth has been enrolled in Master's Programs upon completion the Bachelor's Programs and females have constituted 30% of them. However, just 10% of girls defended Master's theses has proceeded their career in science and technology or engineering sphere (Fig. 1). Survey of 3<sup>rd</sup> year students of the above-mentioned programs shows that nearly 80–90% of females intended to develop their research or engineering career while 40–50% of the boys had doubts. We suggest this is a proof of the initial determination of girls to be engaged in technical activity, but then they face some hurdles and often quit their career. In summary, we consider the ways and approaches needed to overcome revealed challenges and negative trends of career development for women in Physics/STEM in Belarus.

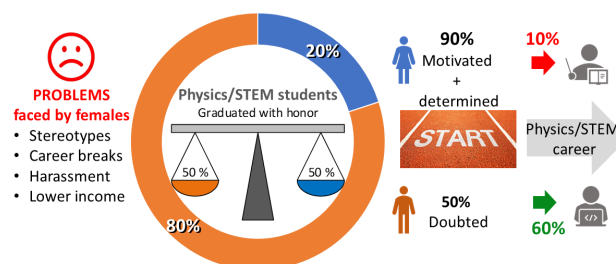


Figure 1. Career development layout for women and men in Physics/STEM in Belarus

## 8<sup>th</sup> International Conference on Women in Physics



## 8<sup>th</sup> International Conference on Women in Physics

### Impacts of the pandemic and governmental change on Brazil's Physics

*Parisoto, Mara Fernanda<sup>1</sup>, Mendes, Janaína Dutra Silvestre<sup>2</sup>, Cal, Taneska Santana<sup>3</sup>, Gabriela Padilha, G. P. B<sup>4</sup>, Santos, Antonio Carlos Fontes, A. C. F.<sup>5</sup>*

<sup>1</sup>*Department Engenharias e Exatas, Universidade Federal do Paraná, R. Pioneiro, 2153 - Dallas, Palotina - PR, 85950-000, Brasil.*

<sup>2</sup>*Nuclear Medicine Department, José Alencar Gomes da Silva National Cancer Institute, Praça Cruz Vermelha, 23 - Rio de Janeiro-RJ, 20230-130, Brazil.*

<sup>3</sup>*Programa Ensino de Ciências, Faculdade de Educação, Vale do Canela-Avenida Reitor Miguel Calmon, S/n-Canela, Salvador-Bahia, 40110100, Brazil.*

<sup>4</sup>*High Energy Accelerator Research Organization, Tsukuba, Japan*  
*Department of Nuclear Physics, Federal University from Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil.*

Over the past seven years, Brazil has experienced a systematic reduction of scientific and technological investments. In 2020, the budget for this sector was approximately US\$ 516 million, around 32.5% less than the previous year, being the smallest in 17 years [1]. As most Brazilian research is developed and conducted inside universities with public funding, this scenario has taken a toll on the country's scientific production. However, one of the great prospects for Brazil in 2023 in the new term of our now current president, Luiz Inácio Lula da Silva. Following a four-year long dismantling of science and countless other sectors in Brazil, we are hopeful for a new beginning. On 03/08/2023 (March 08<sup>th</sup>, 2023), the current president has announced countless policies for his term, further including women participation in science. One of the decrees signed by the Executive Chief foresees a National Inclusion Policy, Permanence and Growth of Women and Girls in Science, Technology and Innovation. According to the *Palácio do Planalto*, the CNPq (National Council of Scientific and Technological Development) will release a public notice focused on women in the field of hard sciences, engineering and computing, evaluated in R\$100 million. Another highlight of 2023, was the budget readjustment of research scholarships. There was an increase of 40% in master and doctorate scholarships from Capes (Coordination of Improvement of Higher Education Personnel) and CNPq. Despite the incentives, we still need to thread a long way to reach adequate and equal working conditions. The pandemic has increased inequalities between the rich and the poor in Brazil.



## Striving for Equity in Canadian Physics

*Barkanova, Svetlana<sup>1</sup>, Grinyer, Gwen<sup>2</sup>, Mammei, Juliette<sup>3</sup>, Sealfon, Carolyn<sup>4</sup>, Smolina, Anastasia<sup>5</sup>*

*<sup>1</sup>School of Science and Environment, Grenfell Campus, Memorial University, Newfoundland and Labrador, Canada.*

*<sup>2</sup>Department of Physics, University of Regina, Saskatchewan, Canada.*

*<sup>3</sup>Department of Physics and Astronomy, University of Manitoba, Manitoba, Canada.*

*<sup>4</sup>Ronin Institute, Ontario, Canada.*

*<sup>5</sup>Department of Medical Biophysics, University of Toronto, Ontario, Canada.*

We will discuss a number of new initiatives and events since 2020 which we hope will contribute to our understanding and advancement of equity issues within the physics community in Canada.

A recent analysis of high-school data shows men are still over-represented in high-school physics courses and the fraction has not changed over a decade [1]. Results from a national survey in 2020 showed that despite improvements over the years, the percentage of women and gender diverse physicists drops by around 35% between undergraduate students to those in a physics career. This decline is even more notable among BIPOC women and gender diverse physicists, whose representation drops by almost 60%. Additional data were collected on the impact of the Covid-19 pandemic, showing disparities in the impact on individuals' careers and caregiving responsibilities [2].

The national funding agencies have begun an initiative called Dimensions, which aims to increase equity, diversity and inclusion (EDI) and help drive deeper cultural change within the research ecosystem by identifying and eliminating obstacles and inequities [3]. This has forced grant applicants to at least consider questions of EDI in their research. The Canadian Association of Physicists Division for Gender Equity in Physics is striving to showcase best practices to acknowledge EDI work in physics.

### References:

1. [STEM for Everyone Visualization \(genial.ly\)](https://genial.ly)
2. A. Smolina, K. Hewitt. Inclusion for Excellence: the Physics Community in Canada. Physics in Canada Magazine, Vol. 77, Issue 1. (2022)
3. Tri-Agency EDI Action Plan for 2018–2025. Natural Sciences and Engineering Research Council of Canada. <https://www.nserc-crsng.gc.ca/> (2017)



## Online Round-table Symposium Given by Female Scientists during COVID-19

*Lu, Ying, L.Y.<sup>1</sup>, Guo, Xia, G.X.<sup>2</sup>, Peng, Ruwen, P.R.<sup>3</sup>, Jin, Kuijuan, J.K.<sup>1</sup>*

<sup>1</sup> *Institute of Physics, Chinese Academy of Sciences, Beijing, China.*

<sup>2</sup> *Beijing University of Posts and Telecommunications, Beijing, China.*

<sup>3</sup> *Nanjing University, Nanjing, China.*

The special activities of "Round-table Symposium Given by Female Scientists in Women in Physics Working Group of Chinese Physical Society (CPS)" started in 2003, which is a session of the CPS Fall Meeting, aiming to promote the establishment of a fair and harmonious environment women fully and appropriately played in the Chinese physics community. Working Group summarizes the work of that year and discusses the plan for the next year during the symposium. The winners of the Xide Xie Prize in Physics, awarded by the Chinese Physical Society to women physicists who have made outstanding contributions to physics and physics education, will be invited to share their research and life experiences and insights at Round-table symposium. Some male physicists will be invited to participate.

From 2020 to 2022, the world was swept by COVID-19, and many academic meetings were greatly hindered. As the year 2022 marks the 90th anniversary of the founding of CPS, CPS Fall Meeting 2022 was held at Southern University of Science and Technology from November 18 to 20 organized in a hybrid format, the Joint Session was live-streamed on the academic platform KouShare. Therefore, this Round-table symposium of female physicists was also held online. First, Professor Kuijuan Jin from Institute of Physics of CAS, made a report on the work of Women in Physics Working Group of CPS. The winners of Xide Xie Prize in Physics were Professor Haiyang Bai of Institute of Physics of CAS majoring on development of amorphous alloy materials, and Professor Bingbing Liu of Jilin University majoring on high-pressure physics. At the symposium, they shared their research experience with everyone. At the same time, other participants also raised relevant questions to them and had an active discussion. There were up to 500 online participants.

Emails: [yinglu@iphy.ac.cn](mailto:yinglu@iphy.ac.cn) (Y.L), [guox@bupt.edu.cn](mailto:guox@bupt.edu.cn) (G.X.), [rwpeng@nju.edu.cn](mailto:rwpeng@nju.edu.cn) (P.R.), and [kjjin@iphy.ac.cn](mailto:kjjin@iphy.ac.cn) (J.K.).



Women & Girls in Physics, Democratic Republic of Congo.

*Elvire Banza Ling*

<sup>1</sup>*Department of Physics, Faculty of Science, University of Kinshasa. DR Congo*

<sup>2</sup>*Department of Physics and Computer Science, Faculty of Science University of Laurier.*

*ON CA*

We can observe a significant difference and a remarkable change in the physics department of the University of Kinshasa in the Democratic Republic of Congo. Women are now actively pursuing physics as their preferred field of study, which is a notable shift compared to previous years when there were hardly any women involved in physics. This transformation did not occur abruptly; it began with my promotion. Our determination was to educate and inspire the youth of our country in various subjects, including engineering, mathematics, and more importantly, physics. We conducted workshops, conferences, laboratory days, and discussions aimed at elucidating the impact of physics on our society. I have been frequently asked what one can do with physics, but the answer is quite diverse, and it depends on an individual's aspirations. Personally, I have had the opportunity to work in different domains of physics, collaborating with engineers, mathematicians, and even in the medical field. I always emphasize that when you pursue your chosen scientific path with determination and purpose, you can define your desired future. We are immensely grateful that we now witness the presence of women in the physics department, even if there are only a few per class. It still marks a significant progress compared to previous years when there were hardly any women in the department. We remain committed to organizing scientific conferences, workshops, and similar events to inspire and encourage women and other young individuals to pursue Physics.

**References:**

1. Elvire Banza Nzeba, Status of Women in Physics, University of Kinshasa Democratic Republic of Congo (2014)



## **Facing gender bias to young women physicists: subtle or explicit?**

*Nyirongo A. Pérez Martínez\*, E. Rodríguez Querts\*, A. Castillo Ayóna, A. Martínez Quinteroa, M. Más Díaza, D. Camejoa*

*\*Instituto de Cibernética Matemática y Física (ICIMAF), Calle E esq 15 No.*

*309, La Habana, CP 10400, Cuba*

*aFacultad de Física, Universidad de la Habana, San Lázaro y L, La Habana, CP10400, Cuba*

Since the university of Zambia's inception, it took 38 years for it to produce its first female physics graduate. In 1966, the first physics department in Zambia was established in Lusaka together with the University of Zambia. At the time, it was the only institution offering a physics degree. Today there are about 58 private universities and 6 public institutions from which a physics degree is offered, additionally the country recently registered its first Physics Society of Zambia (PSZ) in 2022 which is responsible for promoting the study of physics in Zambia, organize seminars, workshops and conferences to disseminate knowledge and exchange ideas among physicists, plus many more. As a result, there has been an increase in the number of physics graduates, including women, compared to the previous decade, when only two universities existed; the University of Zambia (UNZA) in Lusaka and Copperbelt University (CBU) in Kitwe which offered a physics degree. This paper looks at the current status of Zambian women in physics, the obstacles they face on their way to becoming physicists and the initiatives taken to make their career path easy as they advance in the field.





### **Progress of Women Physicists in Egypt Supported by Legislations**

Kahil<sup>1</sup>, Ebraheem H<sup>1</sup>, S El-Din Nermeen<sup>2</sup>, M. Abd-Elkhereem Reem<sup>1</sup>, Mohsen M<sup>1</sup>

<sup>1</sup>Physics, Ain Shams University, Cairo, Egypt.

<sup>2</sup>Physics, German University, Cairo, Egypt.

The study highlights the legislations concerning working females in general, mothers and children. The texts of the laws reflect the legislator's appreciation for the status of women and their pioneering role in society [1]. The laws also explicitly stipulate that there is no discrimination between women and men in employment, except in matters that endanger women or any form of disrespect or human trafficking. The laws also grant women the right to maternity leave and childcare, in addition to obliging employers to provide suitable nurseries for children. All this creates a suitable working environment that is free from discrimination. The study also sheds the light on the extent to which high school girls are interested in studying physics compared to biology. The statistics represent one of the schools in the capital, Cairo. The provided high school educational system allows the student to select the qualifying subjects for university study. Numbers reveal no variation in the gender distribution in the enrolment of students in the ordinary level of physics, but female students significantly exceed their male counterparts in biology. Whereas, in the advanced level, girls exceed boys in biology, the case is reversed in physics. In addition, the number of female staff members of physics and biophysics specializations in Mansoura university [2], as an example, shows that biophysics attracts females more than physics. Nevertheless, it can be inferred that interest in physics is increasing among female scholars by time which.

#### **References:**

1. court of cassation: [https://www.cc.gov.eg/legislation\\_single?id=417919](https://www.cc.gov.eg/legislation_single?id=417919)
2. Physics Department, Faculty of Science, Mansoura University: <https://scifac.mans.edu.eg/index.php/about-the-department-50>



## Postwar Consequences on Tigray Female Physicist on Northern Ethiopia

*Tsega Berhane Teklu<sup>1, a)</sup> Meti Desalegn-Tadesse<sup>2, b)</sup> and Kidan Gebreegziabher Gebremaria<sup>3, c)</sup>*

<sup>1</sup>*Department of Physics, Mekelle University, Mekelle, Ethiopia*

<sup>2</sup>*Department of Physics, Adama Science and Technology University, Adama, Ethiopia*

<sup>3</sup>*Department of Physics, Kotobe Education University, Addis Ababa, Ethiopia*

*a) Corresponding author: tsega.teklu29@gmail.com; b) meti.desalegn7@gmail.com*

*c) Kidaney2005@gmail.com*

In Ethiopia, women are traditionally expected to work in the home, taking care of domestic chores, raising children, and serving their husbands. However, there are few female physicists in the country, including in the Tigray region, which has been severely affected by COVID-19, a locust invasion, and a two-year conflict. Prior to the war, the poverty level in the region was 29%. This study, based on interviews with female physicists in Tigray, reveals that their professional and personal lives have been significantly impacted by the conflict. As women, mothers, and physicists, they have been particularly vulnerable. Unlike other fields, such as engineering and technology, which offer better opportunities for industry work, physics has limited job options, leaving them with few alternatives to teaching. Even before the conflict, their salaries were just enough to cover basic necessities, leaving little room for savings. During the conflict, the region was under siege, with no work or salaries for nearly six months. Despite being on the frontlines of providing humanitarian aid, the female physicists felt that their contributions were not enough. They report feeling that they have been left behind, with traders and merchants better equipped to rescue their families during this challenging time. This trauma has affected their post-war decisions, as well as the aspirations of the youth, particularly young girls. Many of them are already considering changing disciplines or leaving the country altogether. To address these challenges, we recommend an integrated effort from the local government and the international community. This includes providing special support and incentives, funding for research, and offering short and long-term training or summer schools to inspire and uplift these women. It is also important to form a national and international physics working platform/networking to connect female physicists in Tigray and beyond.

Keywords: poverty, war, physics, female, support, networking



## Women in Physics: State of the Nation (France)

Nathalie, Lidgi-Guigui<sup>1,2</sup>, Sandrine, Morin<sup>1,3</sup>, Véronique Pierron-Bohnes<sup>1,4</sup>, Dominique Chandesris<sup>1</sup>, Caroline Champenois<sup>1,5</sup>

<sup>1</sup>SFP, Women in Physics committee, 33 rue Croulebarbe, 75013 Paris, France

<sup>2</sup>LSPM - CNRS UPR 3407, Université Sorbonne Paris Nord, 99 avenue J.B. Clément, 93430 Villetaneuse, France

<sup>3</sup>Equipe BioMMAT-PBS - UMR CNRS 6270 - Université de Rouen - IUT d'Evreux 55 rue St Germain CS 40486 27004 Evreux Cedex, France.

<sup>4</sup>Institut de physique et chimie des matériaux de Strasbourg, 23 Rue du Loess, BP 43 67034 Strasbourg Cedex, France

<sup>5</sup>PIIM, CNRS, Aix-Marseille Université, Marseille, France

The progression of women in physics support in France has evolved from mainly observation to active intervention. This presentation aims to provide an overview of the development of such support and to compare it to the data. The French Physical Society has been actively engaged in supporting women in the field of physics. Its Women in Physics Commission has played a significant role in promoting gender equality by initiating various commendable initiatives. Notable among these is the formulation of a Charter for Gender Fairness at Conferences (reported at ICWIP in 2017 [1]) and the creation of a guide outlining best practices for inclusive videoconferencing in (reported at ICWIP in 2021 [2]). While quantifying the precise effects of these initiatives remains a challenge, this article seeks to evaluate the current status of women in the field of physics in France. The poster will try to report on both the historical context and the broader european perspective. Drawing on the initial findings of the "Diversity" working group from the prospective research at the CNRS Institute of Physics, this contribution will attempt to project into the future.

### References:

1. [https://www.sfpnet.fr/uploads/tinymce/PDF/Gender%20Fairness\\_6juin2017.pdf](https://www.sfpnet.fr/uploads/tinymce/PDF/Gender%20Fairness_6juin2017.pdf)
2. <https://www.sfpnet.fr/uploads/tinymce/FemmesetPhys/Good%20Inclusive%20Practices%20Video%20-%20EN.pdf>



### Gender Imbalance in Physics Education and Employment in Germany: Trends and Challenges

Authors in alphabetic order: Agnes Sandner<sup>1</sup>, Andrea Bossmann<sup>1,2,3</sup>, Angelica Zacarias<sup>1,4</sup>, Anja Metzelthin<sup>5</sup>, Iris Traulsen<sup>6</sup>, Ruzin Aganoglu<sup>1</sup>, Ulrike Böhm<sup>1,7</sup>.

<sup>1</sup>German Physical Society, Working Group on Equal Opportunities, Hauptstr. 5, 53604 Bad Honnef, Germany.

<sup>2</sup>Department of Physics, Freie Universität Berlin, Arnimallee 14, 14195 Berlin, Germany.

<sup>3</sup>Department of Humanities and Educational Sciences, Center for Interdisciplinary Women's and Gender Studies, Technische Universität Berlin, Fraunhoferstr. 33-36, 10587 Berlin, Germany.

<sup>4</sup>Max Planck Institute of Microstructure Physics, Weinberg 2, 06120 Halle, Germany.

<sup>5</sup>German Physical Society, Hauptstr. 5, 53604 Bad Honnef, Germany.

<sup>6</sup>Leibniz-Institut für Astrophysik Potsdam (AIP), An der Sternwarte 16, 14482 Potsdam, Germany

<sup>7</sup>Carl Zeiss AG, Carl-Zeiss-Strasse 22, 73447 Oberkochen, Germany

The situation of female physicists in Germany is characterized by a persistent gender imbalance, with fewer women pursuing advanced degrees. While the percentage of female students in bachelor and master physics programs slightly increased from the mid-90s, a reversal was observed in 2022 for female enrollment, which may be partly associated with the Covid-19 pandemic [1]. The number of female physics Ph.D. students and the representation of foreign female students has increased over time, suggesting a trend towards diversity. Despite targeted recruitment efforts, and equal opportunities policies implemented, the percentage of female professors in the field of physics and astronomy at German universities stagnated in 2021. It stayed below 14%, indicating a significant underrepresentation of women in research leadership positions[2]. The upcoming revision of the German law that regulates the employment of scientific staff in universities and research institutions (WissZeitVG) [3], is expected to be controversial in terms of its impact on female mainstreaming efforts. The revision is anticipated to allow for more fixed-term contracts, which could contribute to the precarization of research staff, particularly for early-career researchers and women. Moreover, women still constitute only 17% of employed physicists [4], in all public and private sectors. The visibility of women in the physics community has also been inadequate. Among the 14 esteemed physics awards of the German Physical Society (DGP), female physicists account for only 5% of awardees in the German physics community [5]. Therefore, more efforts are needed to address this imbalance with respect to careers in physics. Ideally, these efforts and measures must also deal with structural issues beyond encouragement. In this study, the working group of equal opportunities (AKC) of the DPG reports on the situation in Germany in detail, highlights its current activities, and suggests further solutions to facilitate the empowerment of women in physics in Germany.

#### References:

1. Aĝanoĝlu, R., Klösgen, B., Sandner, A., & Traulsen, I. (2023). Managing Work-Life Balance During the COVID-19 Crisis: A survey with more than 1,500 participants. AIP Conference Proceedings Series, 1-4. <https://doi.org/10.48550/arXiv.2303.05447>
2. Federal Bureau of Statistics, [Fachserie 11 Reihe 4.4 Bildung und Kultur – Personal an Hochschulen](#)
3. Federal Ministry of Education and Science, <https://www.bmbf.de/bmbf/de/forschung/wissenschaftlicher->
4. Anja Metzelthin, DPG Studie „Physikerinnen und Physiker im Beruf“
5. [DPG Awards](#), the calculation excludes the Hertha-Sponer-Preis which is solely given to female physicists.



## Update on the Status of Women in Physics Ghana

*Andam Aba Bentil<sup>1</sup>, Opoku-Ntim Irene<sup>2</sup>, Hood Christiana Odumah<sup>3</sup>, Nyarko Savannah<sup>3</sup>, Amponsah Paulina Eku<sup>1</sup>, Gyamfi Kwame<sup>2</sup>*

*<sup>1</sup>School of Nuclear and Allied Sciences, P.O.Box AE1, Atomic, Accra, Ghana*

*<sup>2</sup>Ghana Atomic Energy Commission, P.O.Box LG 80, Legon, Accra, Ghana*

*<sup>3</sup>University of Cape Coast, Cape Coast, Ghana*

This study examines the current status of female physicists in Ghana, focusing on their achievements, challenges, and the efforts made by the Women in Physics Group in Ghana. Statistical data is presented to illustrate the situation. Despite facing obstacles, the Women in Physics Ghana has made significant progress in promoting gender equality in the field. They have organized various workshops, seminars, and conferences to provide networking and learning opportunities for women in physics, as well as established mentorship programs to support aspiring female physicists. Furthermore, the group has been actively advocating for policies and programs that promote gender diversity in physics by engaging with government officials, academic institutions, and other stakeholders to raise awareness about the importance of gender equality in this field.

**Keywords:** women, physics, mentorship, achievements, situation



## **Experience with the Development Workshop with Gender Perspective for Early Career Scientists and Students**

*Sánchez López, Angie Alejandra<sup>1</sup>*

*<sup>1</sup>Physics, UNAH-CURLA, La Ceiba, Honduras.*

The Faculty of Sciences of the National Autonomous University of Honduras, with the collaboration of the International Union of Pure and Applied Physics (IUPAP) and members of WITRAL Science and the Network of Science, Technology and Gender (CITEG) is developing the Virtual Workshop DEVELOPMENT WITH A GENDER PERSPECTIVE FOR YOUNG SCIENTISTS AND STUDENTS on July 26, 27 and 28, 2022.

It is the first incursion that is carried out in the area of Natural Sciences in Honduras, on this subject of Women Scientists with a Gender perspective and it is expected that it will be the first of several events that we can carry out annually on this subject that is so important for the scientific development of women.

Learn about the experiences lived by scientific women in the areas of the Faculty of Sciences, such as Biology, Microbiology, Mathematics and Physics and how they managed to emerge in their scientific development, with the purpose of motivating recently graduated students and professionals to face and get ahead in her role as a scientific woman within the Honduran and international environment.



## **Toward Gender Equity in Physics: The Changing Scenario in Indian Academia**

*Chatterjee, Suchetana<sup>1</sup>, Goswami, Srubabati<sup>2</sup>, Nanal, Vandana<sup>3</sup>, Bhatia, Tripta<sup>4</sup>, Chari, Deepa<sup>5</sup>, Devi, Moon Moon<sup>6</sup>, Ghoshal, Debashis<sup>7</sup>, Madhurima, V<sup>8</sup>, Mavani, Krushna<sup>9</sup>, Pandey, Pragya<sup>2</sup>,*

*<sup>1</sup>Presidency University, Kolkata, India.*

*<sup>2</sup>Physical Research Laboratory, Ahmedabad, India.*

*<sup>3</sup>DNAP, TIFR, Mumbai, India.*

*<sup>4</sup>Indian Institute of Science Education and Research Mohali, India.*

*<sup>5</sup>Homi Bhabha Centre for Science Education, TIFR, Mumbai, India.*

*<sup>6</sup>Tezpur University, Tezpur, India*

*<sup>7</sup>Jawaharlal Nehru University, New Delhi, India.*

*<sup>8</sup>Central University of Tamil Nadu, Thiruvavur, India.*

*<sup>9</sup>Indian Institute of Technology Indore, Indore, India*

The Gender gap in physics is a global problem that the community has acknowledged and tried to address for the past several decades. In addition, various policies adopted by the institutes as well as the funding agencies, have tried to bridge this gap. India is not an exception. Unfortunately, despite efforts from the stakeholders, mitigation is not as much as one would have hoped. For example, the fraction of women faculty, as well as their presence in leadership positions, have been significantly lower than in other STEM fields. Post ICWIP- 2017, the Indian Physics Association - Gender in Physics Working Group (GIPWG) was formed. GIPWG systematically examined the gender gap prevalent at different levels in the physics community. Campaign for gender awareness was also undertaken by several professional physics societies and institutions ranging from research institutes to colleges and state universities.

The Working Group for Gender Equity (WGGE) of the Astronomical Society of India (since 2015) and GIPWG (since 2017) were the only two gender groups in existence before ICWIP-2021. Currently, other sub-disciplines of physics (e.g., High Energy Physics, Condensed Matter Physics) have constituted their discipline-specific gender groups. In 2023, the Indian Association for General Relativity and Gravitation (IAGRG) and the Indian Association of Physics Teachers (IAPT) formed gender panels. Several national conferences are making conscious efforts to ensure representations of women in scientific organizing committees, and among the plenary and invited speakers. A survey of institutional colloquia in major research institutes indicates that the shift to online mode has helped to get more women speakers. GIPWG has initiated the lecture series PAVINARI (*PA*darth *VI*gyan *ki* *NA*riyan) showcasing important contributions made by women physicists and PAWS (Program for Aspiring Women Scientists) to nurture and motivate young talent.

As noted in our earlier papers, we emphasize that the notion of “gender” goes beyond the simple binary, hence efforts toward promoting inclusivity and diversity throughout the gender spectrum is a major part of the program we envision to carry out in future. We strongly believe that a cross-disciplinary interaction to address these issues is the path forward. *The country paper will present gender statistics for national conferences and discuss some of the recent initiatives in India.*



## The activities of the women's branch of the Iranian Physics Society

Iraji zad, Azam<sup>1</sup>, Kimiagar, Salimeh <sup>2</sup>, Mosivand, Saba<sup>3</sup>

<sup>1</sup>*Physics Department and Institute for Convergence Science and Technology,  
Sharif University of Technology, Tehran, Iran*

<sup>2</sup>*Nano physic Research Lab (NRL), Physics Department, Central Tehran Branch,  
Islamic Azad University, Tehran, Iran*

<sup>3</sup>*Physics Department, Faculty of Science, Lorestan University, Khorram-Abad, Iran*

As a result of Iranian women's efforts in learning and teaching physics, the number of female students and faculties has grown. In 2021 around 12600 female students (56% of total students) studied in physics departments of public and private universities[1]. About 30% of teaching faculties in universities and more than 80% of physics teachers in girls' schools are women. From 12000 member of Iranian physics society, PSI, in year 2022, about 53% are female[2]. The records shows, girls have surpassed boys at the graduate level since 2015. The high rate of university graduated population and the weak link of the educational system and the labour market results many unemployed graduates or job disunifications. The women's branch of the PSI has tried to empower women in work environments by presenting workshops on "Entrepreneurship in Physics-Challenges & Opportunities for Women". Possible fields of employment were introduced to the Physics graduate attendees by the invited experts from academia, industry, and knowledge-based companies. They presented their life stories and challenges, and how they overcame barriers to achieve success and be accepted by the male-dominated job environment.

In the last two years, the world has been facing the COVID-19 disease. The quarantine situation had a great impact on the quality of education. Although it caused innovation in teaching methods and more use of virtual education, it created many challenges and negative impacts on the quality of education, childcare problems, disruption of concentration and lack of publications for females. We organized many meetings on "COVID-19 and Physics Education: Challenge and Solutions". In presentations, negative effects on teaching physics courses including lack of experiments and class demonstrations and academic integrity (file sharing, exam cheating...) were discussed. In round table sessions many recommendations including preparation of demo videos, simulation programs, and offline tutorial materials are introduced.

The women's branch and Physics school of the Institute for research in fundamental sciences (IPM, Tehran) organized some webinars open to the general public during the International Year of Basic Sciences for Sustainable Development 2022/2023. Talks and videos on female physicists' life story and their academic achievements were chosen such that they resonate with the needs of female science enthusiasts.

### References:

1. Institute for research and planning in higher education, Ministry of science, research and technology, (2022), [www.irphe.ir](http://www.irphe.ir)
2. Statistic from Physical Society of Iran, Tehran, (2023), [www.psi.ir](http://www.psi.ir)





## Women in Physics in Israel: An Overview

*Nir Yosef<sup>d</sup>, Eran-Jona Meytal<sup>1</sup>, Ranen Esthi<sup>1</sup>*

*<sup>1</sup>Department of Particle Physics and Astrophysics, Weizmann Institute of Science,  
Rehovot 7610001, Israel.*

There is a significant and persistent gender imbalance in the field of physics in the Israeli academy. The situation in Israel in this regard is interesting due to several reasons [1]. First, there are some relevant unique characteristics of the Israeli society, which is very familial. Second, in Israel, the percentages of women among physics students and academic staff are even poorer than in the US and western Europe. Third, these small rates are even more striking when compared to other fields in the Israeli academy, such as medicine, chemistry and biology, where women constitute well above 50% of the students. This paper presents the data on gender balance in physics in Israel (updating a report from six years ago [2]), from the first encounter of young pupils with the subject, mainly at high school, through higher education and post-doctoral research, and concludes with gender distribution of academic staff at the Israeli academy. Various initiatives to promote gender balance in the academy that have been applied in recent years are described.

### References:

1. M. Eran-Jona and Y. Nir, Choosing physics within a gendered power structure: The academic career in physics as a “deal”, *Phys. Rev. Phys. Edu. Res.* **17**, 020101 (2021)
2. M. Eran-Jona and Y. Nir, Women in physics in Israel: An overview, *AIP Conference Proceedings* **2109**, 050022 (2019)



## **Gender Equality in Physics: numbers and actions in Italy**

*Badalà Angela<sup>1</sup>, Di Ciaccio Anna<sup>2</sup>, Masullo Maria Rosaria<sup>3</sup>, Pirrone Sara<sup>1,4</sup>*

*<sup>1</sup>Istituto Nazionale di Fisica Nucleare - Sezione di Catania, Catania, Italy*

*<sup>2</sup>Istituto Nazionale di Fisica Nucleare - Sezione di Roma Tor Vergata, Roma, Italy*

*<sup>3</sup>Istituto Nazionale di Fisica Nucleare - Sezione di Napoli, Italy*

*<sup>4</sup>Società Italiana di Fisica, Italy*

The theme of gender equality requires a serious and large discussion in any field of human activity and knowledge, but the presence of women in Physics research and more in general in STEM (Science, Technology, Engineering and Mathematics) deserves particular attention and care.

The statistics data tell us that there is an increase in the participation of women in these topics, even if gender asymmetries are persistent. At top levels of the career and in the managerial and responsibility positions a strong discrepancy between man and woman is still evident.

To close the gap in academia, research and in technical-scientific professions, it is fundamental importance not only to encourage women to undertake and continue a path of study and work in STEM subjects but also to foster structural changes in the organizations.

This paper presents recent gender data for Scientific Faculty in Italy, for the Italian Physical Society (SIF- Società Italiana di Fisica) and for the National Institute for Nuclear Physics (INFN - Istituto Nazionale di Fisica Nucleare). Furthermore, some of the more recent (from 2017) initiatives and affirmative action to promote gender equality in Physics done by SIF and INFN are presented.

For the SIF the focus is on the initiatives carried out during the Annual National Congress (the most important meeting of the Society), from the organization of dedicated facilities for childcare during the congress, up to the proposal of positive role model actions, for the young generation. In addition, in the last year, data from the SIF annual Congress, since 2010 were analysed to produce the first SIF report on gender budget. Moreover, the SIF organized many interviews and round tables with different components of the civil society to promote equal opportunities in Physics.

In April 2022 INFN has approved its first Gender Equality Plan which incorporates all the affirmative actions carried out in INFN as: 1) actions to support maternity, 2) awards and scholarships reserved to female students, 3) organization of a Gender Mentoring program devoted to women and men, 4) fostering equality in scientific careers monitoring that the probability of success by sex in public competitions for recruiting and career progression in INFN is independent from sex and informing all the components of recruitment and selection INFN panel of the gender discriminating effects of the unconscious biases.

In particular, the project "More Women in Physics" funded to promote and support the study of Physics provides for the issuing of a call for 25 scholarships for women. The project of Gender Mentoring program, devoted to women and men, has the scope not only to sustain the career of young generations but also to increase their awareness on gender issues.



## Current status and Perspective on Diversity in Physics-related Fields in Japan

*NONAKA, Chiho*<sup>1,3,4,5</sup>, *MATSUKI, Nobuyuki*<sup>2,6</sup>, *SHOJI Ichiro*<sup>2,7</sup>, *CHIKUMOTO, Noriko*<sup>1,8</sup>  
*HAMAGUCHI, Koichi*<sup>1,9</sup>, *ITAKURA, Akiko*<sup>1,10</sup>, *KOBAYASHI, Kaya*<sup>1,11</sup>, *NOJIRI, Mihoko*<sup>1,12,13,14</sup>

<sup>1</sup>*The Physical Society of Japan, 2-31-22 Yushima, Bunkyo-ku, Tokyo, Japan*

<sup>2</sup>*The Japan Society of Applied Physics, 1-21-5 Nezu, Bunkyo-ku, Tokyo, Japan*

<sup>3</sup>*Graduate School of Advanced Science and Engineering, Hiroshima University, Japan*

<sup>4</sup>*International Institute for Sustainability with Knotted Chiral Meta Matter / SKCM<sup>2</sup>, Japan* <sup>5</sup>*Kobayashi Maskawa Institute, Nagoya University, 464-8602, Furo-cho, Chikusa-ku, Nagoya-shi, Japan*

<sup>6</sup>*Department of Electrical, Electronics and Information Engineering, Kanagawa University, Japan*  
*3-27-1 Rokkakubashi, Yokohama, Kanagawa 221-8686, Japan*

<sup>7</sup>*Graduate School of Science and Engineering, Chuo University, Japan*  
*1-13-27 Kasuga, Bunkyo-ku, Tokyo 112-8551, Japan*

<sup>8</sup>*Department of Innovative Energy Science and Engineering, Chubu University,*  
*1200 Matsumoto-cho, Kasugai-shi, Aichi 487-8501, JAPAN*

<sup>9</sup>*Department of Physics, University of Tokyo, 7-3-1, Hongo, Bunkyo-ku, 113-0033, Japan*

<sup>10</sup>*National Institute for Materials Science, 1-2-1 Sengen, Tsukuba, Ibaraki, Japan*

<sup>11</sup>*Research Institute for Interdisciplinary Science, Okayama University, 3-1-1, Tsushima-cho,*  
*Kita-ku, Okayama, 700-8530, Japan*

<sup>12</sup>*Theory Center, IPNS, KEK, 1-1 Oho, Tsukuba, Ibaraki 305-0801, Japan*

<sup>13</sup>*The Graduate University of Advanced Studies (Sokendai), 1-1 Oho, Tsukuba, Ibaraki 305-0801, Japan*

<sup>14</sup>*Kavli IPMU (WPI), University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8583, Japan*

This paper introduces current topics and perspective on diversity and related issues in physics-related fields in Japan. There are two major academic societies related to physics in Japan: The Japan Society of Applied Physics (JSAP) [1] and The Physical Society of Japan (JPS) [2].

First, number of members and affiliation of JSAP and JPS is shown from point of view of women fractions. Also, the summer school for junior high and high school girls (Natsugaku) [3] and the Kansai science school for junior high and high school girls [4], which we have been working on, are introduced.

Furthermore, we report the symposium which is organized by the Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering (EPMEWSE). A large-scale questionnaire (19,505 respondents for the 5th survey) conducted regularly by the liaison group was discussed. As for the distribution of respondents' positions, as in the results of the third and fourth questionnaires, the ratio of female respondents decreased as their positions increased. The proportion of female respondents decreased as they moved up the job ladder, and there was a corresponding difference in their annual income. There were also gender and age differences in the length of employment. In addition, the main topic of the symposium is "Considering Measures to Improve Positive Gender Inequality (e.g., Female-only Recruitment and Quota System) - Aiming to Realize a More Equitable Society". The system to ensure that the percentage of women is constant is called the quota system. Japan's gender gap index ranks 116th out of 146 countries, showing little growth since 2006. The point was made that, in order to raise the ratio of women to 30% in 10 to 20 years, it is not enough to wait for the situation to change naturally, and that it is important to introduce a quota system. The year 2023 marks the beginning of a new phase in which quota systems for female students and faculty members will be actively implemented in many university science and engineering departments [5, 6]. The current status of this trend and the perspectives on the expected changes are also discussed.

[1] <https://www.jsap.or.jp/english>

[2] <https://www.jps.or.jp/english/>

[3] <https://natsugaku.jp/en/>

[4] <http://www.kansai-kj.org/> (in Japanese)

[5] <https://www.japantimes.co.jp/news/2023/04/01/national/social-issues/female-university-students-science/>

[6] <https://mainichi.jp/english/articles/20230118/p2a/00m/0op/011000c>



## Women in physics in the United Kingdom: A review of recent policy and initiatives

*Jordan, Sally<sup>1</sup>, Bakewell, Sarah<sup>2</sup>, Berry, Tracey<sup>3</sup>, Campbell, Holly<sup>4</sup>, Coltman, Josie<sup>5</sup>, Sadler, Wendy<sup>6</sup>, Setty, Chethana<sup>1</sup>*

<sup>1</sup>*School of Physical Sciences, The Open University, Milton Keynes, UK.*

<sup>2</sup>*Institute of Physics, London, UK.*

<sup>3</sup>*School of Engineering, Mathematical and Physical Sciences, Royal Holloway, London, UK.*

<sup>4</sup>*UK Atomic Energy Authority, Culham Science Centre, Abingdon, Oxfordshire, UK.*

<sup>5</sup>*AWE, Aldermaston, Berkshire, UK.*

<sup>6</sup>*School of Physics and Astronomy, Cardiff University, Cardiff, UK.*

Across the United Kingdom (UK), initiatives designed to increase the participation and outcomes for women in physics continue, working with children of various ages as well as with adults. Significant improvements have been brought by a combination of these initiatives and an accompanying strengthening of policy. Equality, diversity and inclusion is firmly established as a priority at the Institute of Physics and at UK Research and Innovation (the government-sponsored group which brings together the seven disciplinary research councils and other research-related bodies) as well as at most universities and schools and many employers of physicists. In addition to being a moral imperative and a legal duty, drivers for improving equality, diversity and inclusion in all aspects of the Institute of Physics' work include the knowledge that diverse organisations and teams outperform those that are not and the fact that there is a shortage of people trained in physics-related skills [1].

Since the Athena SWAN Scheme was introduced in the UK in 2005 and the launch of the Institute of Physics' Project Juno in 2007, the prospects for women in physics have improved markedly. For example, in this time the number of women who are full professors has doubled, though the percentage of full professors of physics who are female (14% in 2020/21) indicates that there is still room for improvement [2]. A review of the Athena SWAN scheme has led to the publication of transformed Athena SWAN Charter principles in November 2022. Meanwhile, following extensive consultation, Project Juno is being retired in 2023, to be superseded by a new, broader, inclusion model from 2024.

Illustrating the power of international collaboration, we report on the success of the annual Conference of Undergraduate Women in Physics (UK and Ireland), which was modelled in the APS conference of the same name and has run in the UK since 2015. The conference name was changed in 2023 to explicitly include non-binary physicists, and it will be hosted in Ireland for the first time in 2024. Before coming to the conference in 2020, 32% of attendees said they felt confident enough to apply for postgraduate studies, after the conference, the number rose to 53%.

Meanwhile, the Bell Burnell Graduate Scholarship Fund, established in 2018 following a generous gift from Dame Jocelyn Bell Burnell, is now in its 4<sup>th</sup> cycle of awards to enable students from under-represented groups in physics to complete a doctoral research degree. A noteworthy finding from an analysis of recent applicants (80% of whom are women) is the large proportion of applications who are in multiple under-represented groups [3].

### References:

1. Institute of Physics (2023) The importance of equality, diversity and inclusion in physics.
2. Institute of Physics (2023) Physics staff in UK universities.
3. H. Gleeson, Breaking barriers and opening up physics – the growing impact of the Bell Burnell Graduate Scholarship fund, *Physics World*, 18<sup>th</sup> April 2023.



## EU policy initiatives promoting women in science:

### Lithuanian Women in Physics in 2023

*Šatkovskienė Dalia*<sup>1</sup>, *Pralgauskaitė Sandra*<sup>2</sup>, *Rutkūnienė Živilė*<sup>3</sup>,  
*Palaimienė Edita*<sup>4</sup>, *Lengvinaitė Dovilė*<sup>5</sup>

<sup>1, 2, 4, 5</sup>*Faculty of Physics, Vilnius University, Saulėtekio av. 9, III, Vilnius, Lithuania*

<sup>3</sup>*Department of Mathematics and Natural Science, Kaunas University of Technology, Studentų str. 50–218, Kaunas, Lithuania*

The contribution aims to show initiatives and progress towards gender equality in research organizations performing physics research in Lithuania. Since the current situation and its changes in the main scientific institutions of Lithuania, are closely related to the EU policy on gender equality in science, the key EU policy guiding principles will be summarized and presented. For example, the one of EU policy initiatives towards improvement of gender balance in research institutions and universities is addressed when applying for EU-funded scientific projects are drawn. One of the eligibility criterion is that a Gender Equality Plan (GEP) is in place. The GEP establishes priorities and clear-cut objectives (based on a thorough status quo assessment), and the specific measures that will be implemented to improve gender equality within research organisation. Moreover, the requirement by default in applied scientific fields is the integration of a gender dimension into research and innovation content. As a result, Lithuanian universities and research organizations performing physics have been called upon to focus more on gender balance and gender equality. This has reduced resistance to structural change within the physics community and increased career opportunities for women physicists.

Lithuanian physicists work for three Physics research organisations: The Faculty of Physics of Vilnius University (VU FF), the Centre for Physical Sciences and Technology (FTMC) and the Faculty of Mathematics and Natural Sciences of Kaunas University of Technology (KTU). All these organisations have GEPs in place and a Gender Equality Officer responsible for coordinating the implementation of gender equality issues within the organisation and for reporting annually to the organisation's governing bodies on the results.

Among other initiatives to raise the visibility of women physicists, a book-album "Lithuanian Physicists 2021" was published [1]. It was sponsored by all Lithuanian organizations performing physics research. The book was presented at the 44th Lithuanian National Physics Conference. The initiatives by Lithuanian women physicists aimed at raising their visibility have, however, yielded some results. The National Lithuanian Radio & TV established the "Discovery of the Year" Award. The first Lithuanian female scientist to receive this honourable title was a physicist.

In addition to the achievements made through various policy measures in Physics research organisations in Lithuania, the contribution will also provide statistics on gender balance and on trends in this area. This will be discussed in greater detail in the Lithuania Country Report.

#### References:

1. Lithuanian Women Physicists 2021. *Editorial board D. Šatkovskienė & S. Pralgauskaitė, BASNET Forumas 2021*. ISBN 978-609-96258-0-5 (in Lithuanian).



## 7th IUPAP International Conference on Women in Physics

### Networks and collaborations that increase Mexican women's participation in physics.

*Romero-Salazar, Lorena<sup>1,2</sup>, Magaña Vargas-Mariana<sup>3</sup>, Ledesma, Mónica<sup>4</sup>, Monroy-Hernández, Melissa<sup>5,2</sup>, and González-Fernández, Belinka<sup>6,2</sup>*

<sup>1</sup>*Departamento de Física, Facultad de Ciencias, Universidad Autónoma del Estado de México, Instituto Literario No. 100., C.P. 50000, Col. Centro, Toluca, Estado de México, MEXICO.*

<sup>2</sup>*Red de Ciencia, Tecnología y Género, Avenida Alcanfores esquina San Juan Totoltepec S/N, C.P. 53150, Naucalpan de Juárez Estado de México, MEXICO.*

<sup>3</sup>*Instituto de Física, Universidad Nacional Autónoma de México, Circuito de la Investigación Científica Ciudad Universitaria, C.P. 04510, CDMX, MEXICO.*

<sup>4</sup>*Instituto de Física "Ing. Luis Rivera Terrazas", Benemérita Universidad Autónoma de Puebla, Av. San Claudio y Blvd. 18 Sur, Col. San Manuel, Ciudad Universitaria, C.P. 72570, Puebla, Pue. MEXICO.*

<sup>5</sup>*Facultad de Arquitectura y Diseño, Universidad Autónoma del Estado de México, Instituto Literario No. 100. C.P. 50000 Col. Centro, Toluca, Estado de México, MEXICO.*

<sup>6</sup>*Departamento de Ciencias e Ingenierías, Universidad Iberoamericana Puebla, Blvd. del Niño Poblano No. 2901, C.P. 72820, Puebla Pue, MEXICO*

The pandemic has been a difficult task to overcome and has delayed some strategies to promote the participation of women in physics at different academic stages. Nevertheless, since the last International Conference of Women in Physics, the Mexican Team has increased its collaborations, implementing valuable networks with younger female researchers to identify feasible and efficient pathways to take advantage of the virtual and physical media. Hence, we will communicate to our peers at WiP-IUPAP some additional strategies that have reached country wide undergraduates and graduates to create a gender equity environment for the development of education, research, technology, and innovation. We will comment on the congress for undergraduate Mexican students named CUWIP-Mexico. Through the Mexican Physical Society there have been yearly activities for promoting science for kids and youngsters, not only during the National Congress but also with a year agenda. On the other hand, we would like to present the data for female registration, postgraduate and researcher programs in Physics. An additional legislation breakthrough has yet to be analysed, and for our presentation it will be only announced in general as a modification in the National Law Science and Technology approved in May 2023. Continuing with projects to avoid androcentric stereotypes for young girls when approached to STEM areas, we will show recent advances in collaboration with the Network on Science, Technology and Gender (Red de Ciencia, Tecnología y Género, A.C.) to create multidisciplinary guidelines to promote STEM vocations and scientific dissemination under a gender equity and pedagogical framework.

---

## **Gender imbalance in university scientific career in Morocco**

*Mina Bettachy\*, Soumia Mordane\*, Fatiha Maaroufi\*\*\*, Hasna Akarni\**

*\*Hassan- II- Casablanca university/ Casablanca- Morocco*

*\*\* Mohamed Premier University / Oujda – Morocco*

In its strategy aimed at rooting and developing perceptions of human rights, in particular the rights of women, Morocco is part of a process of recognition of the international covenants of the United Nations (UN) which recognize equal rights between women and men. It has thus ratified the Convention on the Elimination of Discrimination Against Women (CEDAW) although with some reservations.

As a result, numerous actions and initiatives have been carried out to amend women's rights, particularly in the constitution, the family code, the Nationality code, penal code, etc...

Despite the recognition of equal rights between women and men, inequality persists to a greater extent in both private and public life. The observation of this inequality is apparent in many sectors of activity, notably in that of Higher Education.

The participation of women in higher education in Morocco has undergone an important evolution since the creation of the first modern university. The femininity rate having evolved from 13% in 1960 to 25% in 1980, to 37% in 1990 to 48% in 2012-2013 to reach 54% in 2016-2017

However, this participation differs between access to education and the exercise of administrative and supervisory functions. Certainly woman was able to acquire equality in access to university benches, the analysis of data related to access to higher education, shows that female students quickly gained ground.

With regard to scientific research, there is an evolution in the participation of women in scientific research there are more contributions from women in publications and the supervision of theses, as evidenced by the distinction at the international level in 2021 of two female physicists; Rajaa Cherkaoui ElMoursli (34th) and Farida Fassi (40) – according to “AD Scientific Index”. Nevertheless, the involvement of women is still low, particularly in physics.

In this study, supported by statistical data, we are interested at Hassan-II University of Casablanca (UH2C) to show the persistence of inequalities between men and women in university careers.

Thus, we provide disaggregated statistics showing the underrepresentation of women at university. These data relate to the presence of women in the various university bodies and making decision positions (university council, school and faculty councils, university institutions departments, commissions and laboratories, etc.) as well as at professor's grade level.

[1]- Shemera report 2014 ( Shemera.eu) R. Nafaa and al. SHEMERA project (2011-2014).

[2]- Annual Report of the Ministry of National Education, Higher Education, Management Training and Scientific Research

[3] Activity Report of UH2C -2016-2017 (uh2c.ma)



## Women in Physics in Aotearoa New Zealand: update for 2023

*Shepherd, Jami<sup>1,2,3</sup>, Pahl, Elke<sup>1,2,3</sup>, Jack, Michael<sup>4</sup>, Housden, Helen<sup>5</sup>, Housden, David<sup>6,5</sup>, Ruck, Ben<sup>7,3</sup>, Adam, Ludmila<sup>8,2</sup>, Seppala, Annika<sup>4</sup>, Adams, Jenni<sup>9</sup>, O'Neale, Dion<sup>1,10</sup>, Vanholsbeeck, Frederique<sup>1,2</sup>*

*<sup>1</sup> Department of Physics, University of Auckland, Auckland, New Zealand*

*<sup>2</sup> Dodd-Walls Centre for Photonic and Quantum Technologies, New Zealand*

*<sup>3</sup> The MacDiarmid Institute, New Zealand <sup>4</sup> Department of Physics, University of Otago, Dunedin, New Zealand <sup>5</sup> New Zealand Institute of Physics, New Zealand <sup>6</sup> Saint Bernard's College, Lower Hutt, Wellington, New Zealand <sup>7</sup> School of Chemical and Physical Sciences, Victoria University of Wellington, Wellington, New Zealand <sup>8</sup> School of Environment, University of Auckland, Auckland, New Zealand <sup>9</sup> School of Chemical and Physical Sciences, University of Canterbury, Dunedin, New Zealand <sup>10</sup> Te Pūnaha Matatini, New Zealand*

We will summarise the situation for female physicists in Aotearoa New Zealand in 2023 and identify some of the issues that directly or indirectly impact women in physics. In particular, we will identify the point in the educational timeline where the discrepancy in male / female participation in physics begins, and follow the “leaky pipeline” through to the gender imbalance at the faculty level throughout Universities in Aotearoa New Zealand. We will discuss possible reasons for the disparity and propose actions to improve female participation in physics.





## **Nigeria: Exploring the computational challenges of women in physics**

*Ibiyinka A. Fuwape<sup>1,2,a</sup>, Samuel T. Ogunjo<sup>1</sup>, Rabia Sa'id<sup>3</sup>, Madu A. Chinyere<sup>4</sup>, Okwesili N. Agatha<sup>5</sup> and Aderonke Obafaye<sup>6</sup>*

*1 Department of Physics, Federal University of Technology, P.M.B. 704, Akure, Ondo State, Nigeria*

*2 Office of the Vice Chancellor, Michael and Cecilia Ibru University, Ibru Village, Agbarha-Otor, Ughelli North, Delta State*

*3 Department of Physics, Bayero University, Kano, Kano State, Nigeria*

*4 Department of Physics, University of Technology, Owerri, Imo State, Nigeria*

*5 Department of Physics, University of Nigeria, Nsukka, Enugu State, Nigeria*

*6 United Nations African Regional Centre for Space Science Technology and Education - English, Obafemi Awolowo University Campus, Ile Ife, Nigeria*

*a) Corresponding author: yfuwape@yahoo.com*

The need to increase the participation of women in physics in Nigeria has been highlighted [1] - [3]. The challenges hindering/limiting the enrolment of women in Physics programmes across the country include: awareness and the perceived difficulty of the subject. In recent times, there has been a slight increase in women's enrolment in physics. However, this raises another challenge - access to relevant technological and computational skills. The computational requirements in any physics programme vary from one institution to another and from various aspects of physics. Computational skills are proving important due to their relevance outside of academia. Therefore, it is pertinent that women in physics get the appropriate training, not only to excel in the programme but also to survive after graduation. Addressing the challenges associated with computational skills for women in physics will increase their chances of successful completion and gainful employment after the programme. A nation-wide survey was conducted to assess the computational needs of students and researchers in different areas of physics and associated challenges. The results of the survey will help in designing holistic solutions that will cater for the needs of women in physics - both students and staff.

### **References:**

1. I. A. Fuwape, B. Rabi, and S. Ogunjo, Women in physics in Nigeria: Status, actions and progress (2011 - 2014), AIP Conference Proceedings **1697**, 060034 (2015)
2. I. A. Fuwape, S. T. Ogunjo, and E. O. Owoola, Nigerian women in physics in Nigeria: Advances and challenges (2014 - 2018), AIP Conference Proceedings **2109**, 050029 (2019)
3. I. Fuwape, Marshak Lectureship: Women in Physics in Nigeria and other sub-Saharan African countries: Progress and Challenges, APS April Meeting Abstracts **2018**, X06-001



## Women Leadership in Physics, Pakistan

Parveen Shahida<sup>1</sup>, Qamar, Anisa<sup>2</sup>

<sup>1</sup>Department of Physics, Shaheed Benazir Bhutto Women University Peshawar, Pakistan

<sup>1</sup>Department of Physics, University of Peshawar, Pakistan.

It is reported that the Pakistan population is comprises of 51% male and 49% female over of 232 million [1]. In different field of life Pakistani women play their role as a leader including Prime Minister, Speaker of the NA, Leader of the Opposition, Ministers, Judges, Scientists and Generals in Forces [2]. Many women have got the chance to work at public and private universities including research institutions [3]. It is analysed that women physicists, are about 40% of students enrolled at universities level. Brilliant women have achieved the positions of Chairs, Deans, Vice Chancellors and Director Generals at various organizations. The number of these women is small compared to their male fellows specially in terms of publications, production of PhD students and, winning of projects. This paper gives a critical study of the women in general at the top positions like Vice Chancellors, Deans, Chairpersons and professors. We collect data from different provinces of Pakistan to analyze women physicist at the leadership position and find out the reasons that why they are fewer at the top position.

### References:

1. <https://en.wikipedia.org/wiki/Pakistan>
2. [https://en.wikipedia.org/wiki/Women\\_in\\_Pakistan](https://en.wikipedia.org/wiki/Women_in_Pakistan)
3. [https://en.wikipedia.org/wiki/Category:Women%27s\\_universities\\_in\\_Pakistan](https://en.wikipedia.org/wiki/Category:Women%27s_universities_in_Pakistan)



### Comparative Analysis of the Situation of Female Students in the Physical Sciences at the Universidad Nacional Mayor de San Marcos

*Cerón Loayza, María Luisa<sup>1</sup>; Tesillo Quispe, Mabel Erlinda<sup>1</sup>; Montoya Burga, Jenny Aleida<sup>1</sup>; Mori Escobar, Fanny E.<sup>1</sup>; Mejía Santillán, Mirian E.<sup>1</sup>; Michuy Suyo, Regina<sup>2</sup>; Rimachi Gálvez, Karin<sup>2</sup>, Silva Vidal De Millones, Fey Yamina<sup>3</sup>; Quispe Quispe, Adita<sup>4</sup>; Torres Guillen, Roxan<sup>5</sup>; Hanampa Roque, Hermelinda<sup>6</sup>; Quispe Crisolo, Tiffany<sup>7</sup>; Ortiz Rojas, Senayda<sup>7</sup>*

<sup>1</sup>*Soils Analysis Laboratory, Faculty of Physical Sciences. Universidad Nacional Mayor de San Marcos Av. Amézaga. Cercado de Lima, Perú.*

<sup>2</sup>*Graduated of Faculty of Physical Sciences. Universidad Nacional Mayor de San Marcos*

<sup>3</sup>*Instituto Geofísico del Perú*

<sup>4</sup>*Master's student policies and management of science, technology and innovation. Peruvian University Cayetano Heredia*

<sup>5</sup>*Universidad Nacional de San Agustín de Arequipa-Arequipa*

<sup>6</sup>*Universidad Nacional San Antonio Abad del Cusco. UNSAAC-Cusco*

<sup>7</sup>*Undergraduated of Faculty of Physical Sciences. Universidad Nacional Mayor de San Marcos*

We present the comparative results of the statistical study on the number of women entering the Faculty of Physical Sciences study programs at the Universidad Nacional Mayor de San Marcos (UNMSM) in Peru. Our previous studies showed that the population of female students in the Department of Physics at the undergraduate level was disproportionately low compared to the number of male students [1, 2]. Many female students registered in the physical sciences majors transferred to other areas of study for various reasons: work, family problems, or simply because physics did not seem to be the career they liked. We have the statistics of admission of female students for several years with a very variable number: in 1992, 1993, 1997, 1998, 2000, 2003 to 2005, only one female student entered per year. In 1995 and 2002 only two female students per year entered; in the years 1996 and 2001 there was no female students admitted to the Faculty of Physical Sciences; and in 1999 only five female students entered. This was the highest number of women admitted during these fourteen years (1993 to 2005).

In the last thirteen years, the statistical data shows that the number of women that were admitted to the Faculty of Physical Sciences had increased proportionally over the years from 2010 to 2020; it is an average between 6 and 7 students per year that represent a percentage between 6 - 7% of all the students entering the undergraduate study program. Pleasantly, in the years 2021, 2022 and 2023 there is an exponential increase of 13.6 %; 19.62% and 30.16% respectively; this percentage is very important and interesting. It is important to continue with this work about the statistical data, because it allows us to visualize how the female population has increased considerably, this data is relevant. Surveys should continue to be carried out to discuss and analyze the situation of that population that decided to pursue a career in physical sciences. How many graduated? How to continue postgraduate studies? And above all, stimulate and continue with the different activities that have been carried out for more than 10 years.

#### References:

1. Cerón Loayza, M.L. Preliminary Analysis of Female Physics Students at the Greater National University of San Marcos, Peru. *AIP Conference Proceedings* 795, 147–148 (2005) <https://doi.org/10.1063/1.2128306>.
2. María L. Cerón Loayza; Mirian E. Mejía Santillán; Fanny E. Mori Escobar; Mabel E. Tesillo Quispe; Jenny Montoya Burga; María C. Trujillo Sáenz. Meeting of scientific women in Perú. *AIP Conference Proceedings* 2109, 050031 (2019). <https://doi.org/10.1063/1.5110105>



## Women in Physics in the Philippine Academe

*Roxas-Villanueva, Ranzivelle Marianne, Piñol, Chryslie Margus, Colambo, Ivy*

*Institute of Mathematical Sciences and Physics, University of the Philippines Los Baños,  
Philippines*

The Philippines is one of the leading performers in terms of gender equality within the East Asia and Pacific (EAP) region and even worldwide. According to the most recent Global Gender Gap report, the Philippines holds the 19th position, with a gender parity score of 78.3% [1]. However, even with the good performance in closing key gender gaps, the participation of women in Physics remains persistently low. This paper aims to examine the current landscape of women in physics within the Philippine academe and shed light on the challenges they face. The paper explores the existing statistics on female representation at various levels, including faculty positions and leadership roles. Drawing from interviews and surveys conducted among female physics students, researchers, and faculty members, the study examines the experiences, perceptions, and motivations of women pursuing physics in the Philippine academe. It explores their work-life balance challenges and the impact of these factors on their career progression and job satisfaction. Furthermore, the paper highlights initiatives and policies implemented within the Philippine academe and collaborating agencies that have aimed to improve gender inclusivity. Ultimately, this paper contributes to the growing body of knowledge on women in physics by highlighting the unique experiences and challenges faced by women in the Philippine academe. It underscores the need for concerted efforts from academic institutions, policymakers, and the broader physics community to create an equitable and supportive environment that fosters the participation and advancement of women in physics, thereby harnessing their full potential for scientific discovery and innovation.

### References:

1. World Economic Forum Global Gender Gap Report 2022. <https://www.weforum.org/reports/global-gender-gap-report-2022>. Retrieved May 24, 2023



## **In our language, POLAND is a 'she', just like PHYSICS**

*Drabińska, Aneta<sup>1,2</sup>, Mika, Aneta<sup>1,3</sup>, Szczygielska-Łaciak, Aneta<sup>1,4</sup>, Osada, Martyna<sup>2</sup>, Petelczyc, Krzysztof<sup>4,5</sup>*

<sup>1</sup>*Polish Physical Society, Poland.*

<sup>2</sup>*Faculty of Physics, University of Warsaw, Warsaw, Poland.*

<sup>3</sup>*College of Education and Therapy The Szczecin Faculty, Szczecin, Poland*

<sup>4</sup>*Faculty of Science and Technology, University of Silesia, Katowice, Poland*

<sup>5</sup>*Faculty of Physics, Warsaw University of Technology, Warsaw, Poland*

In Poland, for centuries, women were present in public life and recognised not only locally, but also abroad. We had powerful queens like Jadwiga, great scientists like Maria Curie-Skłodowska, heroic leaders like Emilia Plater, and beautiful actresses like Pola Negri. Polish women have made significant contributions to physics, breaking gender barriers and transforming scientific thinking. Here, we would like to present to you modern Poland and her heroines in the field of Physics in Science, Education, Business, and Leadership.

We will introduce you to some individualities of Polish physics, such as prof. Katarzyna Chałasińska-Macukow - an outstanding optician, former rector of the largest university in our country - the University of Warsaw, and former president of the Polish Physical Society, prof. Teresa Rząca-Urban - nuclear physicist, former dean of Faculty of Physics in University of Warsaw, and present president of the Polish Physical Society, prof. Agnieszka Zalewska - specializing in high energy physics, former president of the CERN Council, prof. Lidia Morawska - one of the 100 most influential people of 2021, selected by TIME magazine for her work on modeling aerosols that are revolutionizing our thinking about viruses, and dr. Olga Malinkiewicz - the inventor of the method of producing perovskites solar cells using inkjet printing. We will also present some social activities implemented in Poland, such as Girls as Engineers! & Girls go Science! Campaign that promotes gender equality in technical and science education. The best Polish teachers, mostly women, have been also active participant of the prestigious international initiative Science on Stage Festival, which brings together educators and science communicators to share innovative teaching methods and inspire students' interest in science.

The National Science Center, the main organization financing scientific research in Poland, showed that in 2011-2022 women applied with almost 15,000 projects in the field of Science and Technology. They were awarded more than 300 million dollars of funds over the last 10 years. Although these numbers are much lower than those of men, in the younger generation, this percentage increases in favor of women. If we only consider doctoral female researchers, the percentage is the same for both genders. Moreover, among students, there are more women than men who apply and receive research funds. It shows that the future of science in Poland is in the hands of women.



## From the first women physicists to members of the Russian Academy of Sciences

*Ermolaeva Elena*<sup>1</sup>, *Istomina Natalia*<sup>2</sup>, *Kotova Svetlana*<sup>3</sup>, *Kundikova Nataliya*<sup>4</sup>, *Nepeina Kseniia*<sup>5</sup>, *Polikarpova Nataliya*<sup>1</sup>

<sup>1</sup> *Physics Department, Moscow Lomonosov State University, Russia*

<sup>2</sup> *Department of Physical Sciences, Russian Academy of Sciences, Russia*

<sup>3</sup> *Samara branch of P.N.Lebedev Physical Institute, Russian Academy of Sciences, Russia*

<sup>4</sup> *Institute of Electrophysics, Ural Branch of Russian Academy of Sciences, Russia*

<sup>5</sup> *Laboratory of Deep Magnetotelluric Studies (LDMS), Divisions of the Research Station, Russian Academy of Sciences, Russia*

**The first women physicists.** Russian women did not have access to higher education and professional activity until 1918. The diplomas of women educated in foreign universities were hard to confirm in Russia. The Moscow women's higher courses (MHWC) were reopened in 1900. *Maria Chuprova* (b.1881) graduated from the phys-math Faculty of MHWC in 1904 and studied for two years in the W. Röntgen laboratory at the University of Munich. She worked in the first physical P. Lebedev laboratory in Moscow, and then at various Russian universities [1]. *Alexandra Glagoleva-Arkadieva* (1884-1945) graduated from the phys-math Faculty of MHWC in 1910 and received the position of assistant here. In 1913, she passed the exams to the State Commission at the Moscow University, and since 1920 she conducted scientific researches in the electromagnetism laboratory. She was the founder of the department of general physics for natural sciences faculties [2].

**The famous women physicists in Moscow Lomonosov University.** *Valentina Ivanovna Iveronova* (1908–1983) graduated from the phys-math faculty of Moscow State University (1929) and began to teach at the department of roentgen-structure analysis. Her doctoral dissertation was the first one on physics in the USSR, defended by a woman. Her fields of scientific interests were radiographic analysis, solid physics, physics of metals and alloys. *Rakobolskaya Irina Vyacheslavovna* (1919-2016) enrolled the physical faculty of Moscow University in 1938. She was Head of the Laboratory of Ultrahigh Energy Cosmic Radiation (1968-1991), and professor at department of cosmic rays and space physics since 1977 [2].

**Women corresponding member in Russian Academy of Science – Physics.** Three women were corresponding member in Russian Academy of Science in Physics, and only *Arefieva Irina* is alive. *Prozorova Lyudmila* (1928 - 2016) was a specialist in the field of low-dimensional magnetism, nonlinear spin dynamics of magnetically ordered crystals, magnetic resonance, antiferromagnetism, application of magnetic resonance methods in condensed matter physics. It detected negative nonlinear attenuation, propagation of spin wave packets, and magnon interaction. *Ryazhskaya Olga* (1941 - 2021) was one of the authors of a highly transparent liquid scintillator designed to detect neutrinos from collapses of stellar nuclei in our Galaxy. She supervised the design and construction of the hundred-ton Collapse detector in the Artemovsk salt mine, the LSD neutrino detectors and the 1000-ton LVD in Italy. *Arefieva Irina* is the author of the covariant field theory of the open superstring. She obtained estimates of the formation time of the quark-gluon plasma and the total multiplicity of the formed particles depending on the properties of colliding heavy ions within the holographic approach [3].

### References:

1. Elena Ermolaeva. (2023). At the turn of the century. *Soviet Physicist*, 3(162), pp. 48–54.
2. Encyclopedia of Moscow University. Faculty of Physics. In 2 vols. (2008). Moscow.
3. <https://www.ras.ru/>



## Women in physics in Senegal.

*Dia, Aichetou-Diop<sup>1</sup>, Boye, Ndeye Arame-Faye<sup>2</sup>*

<sup>1</sup>*Applied Sciences and Technology, University of Gaston Berger, Saint Louis, Senegal.*

<sup>2</sup>*Science and Technology, University of Cheikh Anta Diop, Dakar, Senegal.*

Senegal is populated by about 18 million people, with more than 50% of them women [1]. Traditionally, in Senegal, women's main role is to look after their husbands and children. Nowadays, in addition to that, they are represented in almost all fields of work, including physics. Indeed, as in all fields of science, women are underrepresented in physics, because of the illiteracy's problem. UNESCO shows that fewer than four out of 10 Senegalese women (39%) are considered literate compared with 62% of men [2]. Referring to [3], which described the situation mainly at the University of Cheikh Anta Diop in Dakar, the situation of women in physics in Senegal has been improved, even though there is still a need to tackle some issues. Therefore, the first question we raise is about the situation of women in physics (I) then, focusing on a case study conducted in the second largest University of Senegal, which is the University of Gaston Berger in Saint Louis, and after trying to highlight some recommendations for improving the situation of women in physics (II).

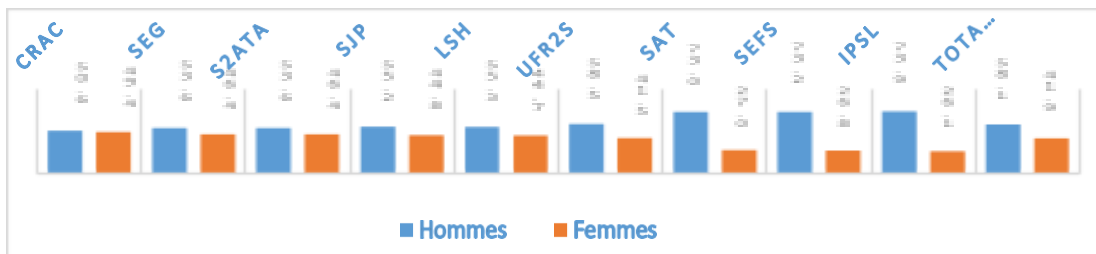
### (I) Women in Physics:

Although women face many obstacles in male-dominated scientific fields, they are making significant contributions and changing power dynamics to end their underestimation. Here are just a few of them: Ndeye Arame Boye Faye is a researcher and a full professor at the Faculty of Science and Technology at Cheikh Anta Diop University (UCAD) and holds a Ph.D. in Atomic Physics; Ndeye Maty Ndiaye is a doctor in engineering science and technology. Her research is aimed at solving the problem of access to energy, particularly in her country, Senegal.; Ms. Mané SECK recently defended, with flying colors, a doctoral thesis in Applied Physics on the subject of Materials and Electronic Devices.

Equality between men and women in physics will be difficult because women are underrepresented. It can be explained in two main reasons as follows: economically and traditionally [3]. The figure shows the different training units at the Gaston Berger University in Saint Louis in 2021-2022 academic year. It can be seen that the representation of girls in physics is lower than in the other fields. Physics is studied in SAT and IPSL, with 27% and 26.1% girls respectively in the first year. The percentage of girls decreases further at higher levels. At the Master's level, the representation of girls in physics is lower, at 21% in SAT and 23% in *IPSL*. At the P.H.D level, the representation of girls in physics is 5 for 34 males in SAT because *IPSL* doesn't yet doctorate. For Today, women no longer have any doubts about their ability to fit into courses where boys are more numerous. That's why there are less women in physics courses.

### (II) Some recommendations for improving the situation of women

Today, at the University Gaston Berger of Saint Louis, students are recruited as early as the first year of their bachelor's degree in Maths, Physics, and Computer Science. This increases the number of women researchers in physics. In 2001, when students studying mathematics or physics were separated, the percentage of girls in physics was 6%. Encourage girls from an early age to love physics. Give grants to girls who want to study physics What are the prospects for female physics students?



Source: Statistics on registered students 2021-2022. Direction de la Scolarité de l'Orientation et des Statistiques, Direction de la Communication et du Marketing.

### References:

- [1] Agence Nationale de la statistique et de la Démographie, 2023. <https://www.ansd.sn>
- [2] U. Hanemann (Ed.). Last update: 1 février 2018. Projet d'Alphabétisation des Jeunes Filles et Jeunes Femmes avec les Technologies de l'Information (PAJEF), Sénégal. UNESCO Institute for Lifelong Learning. (Accessed on: 1 June 2023, 11:03 CEST)
- [3] Boye-Faye, N.A, Thiandoum, C, Gueye-Ndiaye, F.K, 2013. Women in physics in Senegal, *AIP Conference Proceedings* 1517, 144–145. <https://doi.org/10.1063/1.4794261>



## Overview of the activities of the IUPAP group for women in physics in Serbia in the last three years

*Stojanović, Maja<sup>1</sup>, Mirjana Popović-Božić<sup>2</sup>, Tatjana Marković-Topalović<sup>3</sup>, Dragica Knežević<sup>4</sup>, Sanja Janičević<sup>4</sup>*

<sup>1</sup>*Department of Physics, Faculty of Sciences University of Novi Sad, Trg D. Obradovica 3, Serbia.*

<sup>2</sup>*Institute of Physics, University of Belgrade, Pregrevica 118, Serbia.*

<sup>3</sup>*High Medical School, Cara Dušana 9, Šabac, Serbia*

<sup>4</sup>*Department of Physics, Faculty of Science, University of Kragujevac, R. Domanovića 12, Serbia.*

The work will be divided into several parts related to activities and the problems we face regarding the number of future physics teachers in the period since the previous conference.

In 2021 Belgrade hosted the 11th International Conference of the Balkan Physical Union. The members of our team took active part as members of the International Scientific Committee, speakers and chairmen. In 2023 professor Mirjana Božić gave a notable lecture "Fairytale of electricity for Tesla clubs and STEAM education" at the conference "In the spirit of Tesla", which took place in the Hotel New Yorker.

Our team became richer for another doctor in Physics education, namely colleague Tatjana Markovic-Topalović successfully defended her PhD thesis. She became a team leader for Makers Lab - Room for creating and meetings, in High Medical School in Šabac, that was established in June the 14<sup>th</sup>.

We also take active part in working groups for changing standards, plans and programs in Physics education. In the previous period we participated in introducing the State Matura. This project was supported by the Ministry of Education of Serbia. The aim of the project was to introduce and prepare the final exams at the end of secondary education. We had representatives, in the focus groups at all universities and in the working group formed to prepare exam materials. State Matura supposed to start this school year, but was postponed due to a number of problems.

What worries us very much has been the small number of students who apply to physics studies, especially for teaching. Statistics for the previous three years will be given.

Branka Radulović is a project manager of ERASMUS+ project "Mentor training". The resulting publication [1] is the small but important step in the process of training and educating future teachers and in supporting novice teachers to retain their profession.

### References:

1. [https://www.mentra.ukf.sk/docs/MENTRA%20Eng\\_e-book%20after%20review.pdf](https://www.mentra.ukf.sk/docs/MENTRA%20Eng_e-book%20after%20review.pdf)

### Acknowledgements

The authors gratefully acknowledge the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Grant No. 451-03-47/2023-01/200125)





## Women in physics in Slovenia

*Remškar Maja<sup>1</sup>, Jurečič Vida<sup>1</sup>, Tkalec Uroš<sup>1,2</sup>, Šetina Barbara<sup>3</sup>, Conradi Marjetka<sup>4</sup>*

<sup>1</sup>*Solid State Physics Department, Jožef Stefan Institute, Jamova 39, 1000 Ljubljana, Slovenia.*

<sup>2</sup>*Institute of Biophysics, Faculty of Medicine, University of Ljubljana, Vrazov trg 2, 1000 Ljubljana, Slovenia.*

<sup>3</sup>*Vacuum science and optoelectronics, Institute of Metals and Technology, Lepi pot 11, 1000 Ljubljana, Slovenia.*

<sup>4</sup>*Physics and Chemistry of Materials, Institute of Metals and Technology, Lepi pot 11, 1000 Ljubljana, Slovenia.*

Women in Slovenia can study physics and astrophysics at Faculty for Mathematics and Physics, University in Ljubljana, and at School of Science, University in Nova Gorica, while natural sciences, mathematics and statistics at Faculty of Natural Sciences and Mathematics, University in Maribor, and at Faculty of Mathematics, Natural Sciences and Information Technologies, University of Primorska.

The Society of Mathematicians, Physicists and Astronomers of Slovenia includes members in all educational institutions and academia, national laboratories and industry. The women's committee was established in 2016 with the purpose to promote the study of mathematics, physics and astronomy among girls and women and to encourage women to pursue active careers. The proportion of female students has increased in recent decades, but on the other hand, there are hardly any full-time professors, as well as female heads of program groups and project leaders. We also advocate for preserving the historical memory of the achievements of female scientists, for equal opportunities and equal treatment of both sexes both in studies and in the career path and in obtaining research funds, for family-friendly scientific careers, and for the transparency of recruitment procedures in the academic world and the distribution of research funds.

Female physicists employed at the Jožef Stefan Institute, which is the main research institution in physics in the country, are involved in the European project Athena (Grant agreement No. 101006416): Implementing gender equality plans to unlock research potential of RPOs and RFOs in Europe. Gender equality report and Gender equality plan were prepared. The main identified obstacle in research career of women researchers is a postdoc stage abroad, which is necessary for promotion to advanced research position. Currently, this obstacle is discussed to be replaced with other achievements or/and postponed to later period, which does not overlap with time, when women have small children.



## Women in Physics in Spain

*Garcia-Martinez, Pascuala<sup>1</sup>, Ocal, Carmen<sup>2</sup>, Lopez-Diaz, Ana J.<sup>3</sup>, Martin, Alberto<sup>4</sup> and Estrade, Sonia<sup>5</sup>*

*<sup>1</sup>Dpt. Optica, Universitat de Valencia, Spain <sup>2</sup>Institut de Ciencia de Materials de Barcelona (ICMAB-CSIC) Spain. <sup>3</sup>EPEF-Campus Industrial de Ferrol, Universidade da Coruña, Spain*

*<sup>4</sup>Depto de Física Aplicada, Universidad de Granada, Spain. <sup>5</sup>Dept de Ingenieria Electronica y Biomedica. Universitat de Barcelona, Spain*

Spain's legal framework on gender equality in higher education, science and research is precise and comprehensive. The Organic Law for Effective Equality between Women and Men (3/2007) introduced gender equality as a basic principle for public action, applicable to universities and research centres. Also The Science, Technology and Innovation Law (LCTI 14/2011 and updated LCTI 17/2022) extended the mandate to adopt Gender Equality Plans (GEPs) and protocols to avoid sexual harassment, from universities to public research and funding organisations. In addition, gender perspective is integrated in the law in the sense of avoiding bias in selection and in evaluation processes where gender parity (40/60 %) in nominations to panels, advisory boards and committees must be accomplished. Gender dimension must be integrated in projects and there is a specific article in LCTI 17/2022 mention positive actions to women in science. Recent Organic University Law (2/2023) also emphasizes the promotion of scientific projects with a gender perspective as well as gender parity in research teams and mechanisms to facilitate the promotion of a higher number of women principal investigators.

In principle, according to all these laws and policies Spain is a country where gender equality is formally in the focus of both research and higher education. Since the last virtual ICWIP in 2021, the specialized Women in Physics group (GEMF) of the Spanish Royal Physics Society (RSEF) has celebrated the 20<sup>th</sup> anniversary of its creation, that means we have a long trajectory as working group and also as participant in ICWIP meetings. The celebration was on December 16<sup>th</sup> 2022 at the Instituto de Óptica "Daza de Valdés" (IO-CSIC). The GEMF was created during the Governing Board of the RSEF on December 12<sup>th</sup> 2002, being one of the pioneering scientific societies in the creation of specialised groups or working groups on the subject of "Women in Physics" in Spain. In the 2022 event we enjoyed an invited talk of Professor Dame Athene Donald, from University of Cambridge entitled «Celebrating progress: Ensuring it Continues» and a round table about "Gender Equality in Scientific Societies in the 21<sup>st</sup> Century". All events were recorded and are available in our [YouTube Channel](#) and our [GEMF website](#).

The GEMF organized different activities at Physics Biennial on July 2022, including a round table about "Promoting Gender Equality in Physics in Europe" with the participation of the GENERA project from UE and JUNO project from the Institute of Physics. As part of the Physics Biennial, the Women in Physics Symposium was held with the participation of 15 oral presentations and 2 posters. The GEMF Symposium aimed to discuss issues related to strategies for increasing the presence of women in physics, to make their achievements visible and to defend the interests and equal rights and opportunities of women physicists. We also have developed different webinars about interesting subjects regarding women in science. Recently we have launched a project of "GEMF Embassies" at the different Spanish universities where physics degrees are offered. The idea is to create synergies between physics faculties to foster communication on the different activities both in training and dissemination on topics related to gender and physics. It is also an opportunity to establish contacts at local level by sharing tools and resources to eliminate sexist stereotypes and biases in physics.



## **Women Physicists in Switzerland**

*Klauser, Christine<sup>1</sup>*

<sup>1</sup>*Paul Scherrer Institut, Forschungsstrasse 111, 5323 Villigen PSI, Switzerland.*

In Switzerland, the percentage of women among students and professors is low in Physics. Equal opportunity programmes specifically aimed at physicists are very few. The current situation including is described and examples of programmes and strategies in place are given.



## Developments of women in physics located in Taipei

Lu, Ting-Hua<sup>1</sup>, Chen, Mei-Hsin<sup>2</sup>, Chang, Ming-Chuan<sup>3</sup>, Chou, Yi-Chia<sup>4</sup>, Lin, Li-Hwai<sup>5</sup>, Jiang, Pei-Hsun<sup>1</sup>, Kuo, Chien-Cheng<sup>6</sup>, Lin, Ken-Huai<sup>3</sup>, Kao, Ying-Jer<sup>8</sup>

<sup>1</sup>*Department of Physics, National Taiwan Normal University, Taipei*

<sup>2</sup>*Department of Electro-Optical Engineering, National Taipei University of Technology, Taipei*

<sup>3</sup>*Department of Physics, Fu Jen Catholic University, Taipei*

<sup>4</sup>*Department of Materials Science and Engineering, National Taiwan University, Taipei*

<sup>5</sup>*Institute of Astronomy and Astrophysics, Academia Sinica, Taipei*

<sup>6</sup>*Department of Physics, National Sun Yat-sen University, Kaohsiung*

<sup>7</sup>*Institute of Physics, Academia Sinica, Taipei*

<sup>8</sup>*Department of Physics, National Taiwan University, Taipei*

In 1999, the Working Group for Women in Physics (WGWIP) in Taiwan was established as part of the Physical Society of Republic of China (PSROC), and it became a formal committee in 2003. Over the last two decades, the committee has been dedicated to promoting women in physics and keeping track of progress by monitoring statistics. The Ministry of Education (MOE) gathered data in 2021, revealing that about 16% of women graduated from physics departments with a Bachelor's degree, while 21% and 22% earned Master's and PhD degrees, respectively. From 2012 to 2021, the number of female faculty members has slightly increased, with the percentage of professors increasing from 5.7% to 8.4%, associate professors increasing from 12% to 14%, and assistant professors increasing from 15% to 16%. The average grant for female and male principle investigators (PIs) is roughly similar, at around 57 thousand US dollars per year. Policies such as extending the evaluation clock and providing assistant quotas for female PIs who have given birth or have young children have proven beneficial for women in physics. To narrow the gender gap, several suggestions have been put forth, including promoting the success and job satisfaction of women in physics, improving work/life balance, and providing sufficient funds and leadership positions for successful proposals. The committee hopes to foster a more supportive environment for all physicists through various initiatives.



## **The Netherlands: update on diversity and inclusion**

*De Graaf, Noortje<sup>1</sup>, Blom, Saskia<sup>1</sup>*

*<sup>1</sup>Netherlands' Physical Society (NNV), PO Box 41882, 1009 DB Amsterdam, The Netherlands.*

In the Netherlands, we are working to increase diversity and inclusiveness within the physics community. The field of physics is not very diverse yet, not in terms of gender, but not in terms of skin color too. It is also not always easy for children from less privileged families to progress in education. As Netherlands' Physical Society (NNV), we believe that a broadly composed physics community is important, not only to offer opportunities to all kinds of people, but also because richly composed teams achieve more in research. For these reasons, we do not only focus on gender in our policy and activities, but also on e.g. physical capacity, ethnicity, neurodiversity.

As a society, we have taken several initiatives to achieve the goal of a broad community, some examples:

- Annual guest lectures for secondary school students by female physicists.
- The Minerva Prize for very talented young women or non-binary people in physics (awarded together with the Dutch Physics Council).
- The biennial NNV Diversity Award, this award honours the physics institute judged most successful in realising an open diversity policy.
- A series of portraits of 'forgotten' female physicists in our magazine to bring them out of oblivion.
- As NNV, together with two universities, we have appointed two endowed professors of science communication (0.2 fte each). These two professors (both physicists) are working enthusiastically to bring physics to the attention of broad sections of the population and thus arouse interest in the subject.
- At our annual congress, we have already organised a special diversity session several times in which an open discussion could take place and people could tell their story.
- And last but not least, our diversity working group has written our own DEI strategy plan in which, among other things, we draw attention to the content of textbooks.

In our poster we will elaborate on the various initiatives.



## Women in physics: Students and faculty members in Turkish higher education

*Didiř K rhasan, Nil fer<sup>1</sup>, K sem, řule<sup>1</sup>,  zmen, K bra<sup>2</sup>*

<sup>1</sup>Zonguldak B lent Ecevit University, Zonguldak, 67300, Turkey.

<sup>2</sup>Bařkent University, Ankara, 06790, Turkey.

In recent years, although there have been efforts to eliminate the gender gap in education, science, and the workforce worldwide, statistics indicate that inequality has not completely disappeared [1]. Previous research reported the lowest representation of women in physics among the other science majors, and many reasons for the gender gap in higher education and career, such as inadequate physics and mathematics preparation in high school, few women role models and mentors in physics, counternarratives about physics, motivational, socio-cognitive, socio-cultural, social-psychological factors, and family responsibilities [2-11]. The latest statistics show that the number of male and female students enrolled in primary and secondary schools is close, and the total number of women enrolled at universities is higher than that of men in Turkey [12-13]. This study focused on university-level physics majors and examined the status of women in physics over the last ten years in Turkey, employing information provided by the Council of Higher Education [13]. Women students in undergraduate and graduate-level physics programs were examined regarding the number of admitted, registered, and graduated students. In addition, for the same period, women faculty members in the undergraduate physics programs and the women teaching staff in graduate schools and research centers were analyzed. The percentage of female faculty members increased from 31% in 2013 to 32% in 2023, exceeding previous findings in Turkey of 30% in 2008 [14], 26% in 2005 [15], and 29% in 2001 [16]. In 2013-14, 37% of newly enrolled students in physics programs were women, and this percentage rose to 41% in the 2022-23 academic year. Between 2013 and 2022, the percentage of women in physics with bachelor's degrees varied between 50% to 42%, where it was a minimum of 38% in the 2017-18 academic year. The number of women obtaining a physics master's degree has fluctuated, with the highest number of graduates recorded in the 2018-19 academic year. However, following the COVID-19 pandemic, the percentage of graduates has remained below 50%. The percentage of women obtaining a doctoral degree in physics still lags the number of men by 41% in the 2021-22 academic year.

**Acknowledgment:** The authors thank the Turkish Academy of Sciences (T BA).

### References:

1. UN Women (2022). Progress on the sustainable development goals: The gender snapshot 2022. [https://www.unwomen.org/en/digital-library/publications/2022/09/progress-on-the-sustainable-development-goals-the-gender-snapshot-2022]
2. R. Ivie and C. L. Tesfaye, Women in physics: A tale of limits, *Physics Today* **65**(2), 47 (2012)
3. A. Menard and A. Uzun, Educating women for success in physics: Lessons from Turkey, *American Journal of Physics* **61**, 611 (1993)
4. L. McCullough, Women in physics: A review, *The Physics Teacher* **40**, 86 (2002)
5. M. Franklin, E. Brewe and A.R. Ponnock, Examining reasons undergraduate women join physics, *Physical Review Physics Education Research* **19**, 010110 (2023)
6. A. M. Kelly, Social cognitive perspective of gender disparities in undergraduate physics, *Physical Review Physics Education Research* **12**, 020116 (2016)
7. G. Potvin, Z. Hazari, R. Khatri, H. Cheng, T. B. Head, R. M. Lock, A. F. Kornahrens, K. S. Woodlee, R. E. Vieyra, B.A. Cunningham, L. Kramer and T. Hodapp, Examining the effect of counternarratives about physics on women's physics career intentions, *Physical Review Physics Education Research* **19**, 010126 (2023)
8. K. L. Lewis, J. G. Stout, S. J. Pollock, N. D. Finkelstein and T. A. Ito, Fitting in or opting out: A review of key social-psychological factors influencing a sense of belonging for women in physics, *Physical Review Physics Education Research* **12**, 020110 (2016)
9. S. Moshfeghyeganeh and Zahra Hazari, Effect of culture on women physicists' career choice: A comparison of Muslim majority countries and the West, *Physical Review Physics Education Research* **17**, 010114 (2021)
10. B. L. Whitten, S. R. Foster and M. L. Duncombe, What works for women in undergraduate physics? *Physics Today* **56**(9), 46 (2003)
11. Z. Er, řaziye Uęur and D. Kaya Aktař, Women in physics in Turkey, *AIP Conference Proceedings* **1517**, 158 (2013)
12. Republic of T rkiye Ministry of National Education (2022). National education statistics: Formal Education 2021/22. [https://sgb.meb.gov.tr/www/icerik\_goruntule.php?KNO=460]
13. Council of Higher Education (2023). Y ksek  retim bilgi y netim sistemi. [https://istatistik.yok.gov.tr/]
14. S. Uęur and O. Yargi, Women physicists in Turkey: 2002 to the present, *AIP Conference Proceedings* **1119**, 183 (2009)
15. S. Uęur, Women physicists in Turkey, *AIP Conference Proceedings* **795**, 169 (2005)
16. S. Uęur, E. Arik, A. Celikel and D. Kaya, Statistical distributions of women physicists in Turkey, *AIP Conference Proceedings* **628**, 231 (2002)



## Long-Range Planning for Diversity and Equity in Nuclear Science

*Laura McCullough<sup>1</sup>, Jessica Esquivel<sup>2</sup>, Alina Gearba<sup>3</sup>, Shreenanda Ghosh<sup>4</sup>, Stephanie Lyons<sup>5</sup>*

<sup>1</sup> *Department of Chemistry and Physics, University of Wisconsin, USA*

<sup>2</sup> *Particle Physics Division: Muon Department, Fermi National Accelerator Laboratory, USA*

<sup>3</sup> *United States Air Force Academy, USAFA, USA*

<sup>4</sup> *Department of Physics and Astronomy, John Hopkins University, USA*

<sup>5</sup> *Pacific Northwest National Laboratory, USA*

The representation of women in physics has been disappointingly steady for the past few years: approximately 20% of bachelors, masters, and doctoral degrees are awarded to women. In 2022 the US Nuclear Science Advisory Committee started its current long-range planning process. One significant change from previous years was the charge to “articulate how efforts to promote and sustain a diverse, equitable, and inclusive nuclear science workforce will be fully integrated into every aspect of the vision for the future of U.S. nuclear science.” A paper outlining issues and recommendations has been written, with the following topics: Current Diversity in Nuclear Science; Experiences of Underrepresented and Marginalized Groups in Nuclear Science; LGBTQ+ Experience in Nuclear Science; Financial Stress on Graduate Students and Postdocs; Outreach Initiatives to Strengthen and Diversify Nuclear Science; DEIB Initiatives in Nuclear Science; Harassment in Nuclear Science. Our poster will describe these topics.



## WOMEN IN PHYSICS IN YEMEN

*F.S. Thabet (Thabet, Fairoz)<sup>1</sup>, and R. Al-Yusufi (Al-Yusufi, Rasha)<sup>2</sup>*

<sup>1</sup>*Physics Department, Faculty of Science Taiz University, Taiz, Republic of Yemen*

<sup>2</sup>*Physics Department, Faculty of Science Sana'a University, Sana'a, Republic of Yemen*

In this paper, our objective was to investigate the current status of women in the field of physics within Yemeni universities. Our study focuses on analyzing the progress made by women in physics across various academic levels, including BSc, MSc/PhD students, and female faculty members. To gather comprehensive data, we collected information from the physics departments of four prominent public universities in Yemen (Taiz, Sana'a, Aden, and Ibb). The data collection spanned a period of the last three years, allowing us to assess trends and changes over time. The findings revealed that the political situation had adverse effects, discouraging many women from pursuing studies in physics. However, there were some positive developments observed. Notably, the percentage of female students enrolling in the physics BSc program showed an increase at Taiz and Sana'a universities during the investigation period, although it remained lower than previous findings. Analyzing the data further, we discovered that the average percentage of female students enrolled in the MSc program at Sana'a University stood at approximately 42% during the investigation period. Conversely, we observed a concerning trend at Taiz and Ibb universities, as almost no female students were enrolled in the physics MSc program throughout the investigation period. In the PhD level, we found that the percentage of women physicists pursuing a PhD degree experienced an increase solely at Sana'a University during the investigation period. This indicates a potential for growth and progress in the future. Despite offering scholarships to support women in qualifying for faculty positions, our study revealed a disheartening trend. Throughout the investigation period, there were very few women physicists in the academic sphere. This can be attributed to the strong preference among these students to seek better opportunities outside Yemen. Economic factors and limited prospects within the country were major contributors to this trend.





## **The current status for women in physics in Zambia**

*Nyirongo Racheal<sup>1</sup> Chama Tombozi Clemens<sup>2</sup>, Munkombwe Obedience<sup>3</sup>, Sawila Perseverance<sup>4</sup>*

*nyirongoracheal98@gmail.com, tomchama17@gmail.com, [obediencemunkom3@gmail.com](mailto:obediencemunkom3@gmail.com),  
perseverancesawila@gmail.com*

*<sup>1</sup>Physics Department, University of Zambia, Lusaka, Zambia.*

Since the university of Zambia's inception, it took 38 years for it to produce its first female physics graduate. In 1966, the first physics department in Zambia was established in Lusaka together with the University of Zambia. At the time, it was the only institution offering a physics degree. Today there are about 58 private universities and 6 public institutions from which a physics degree is offered, additionally the country recently registered its first Physics Society of Zambia (PSZ) in 2022 which is responsible for promoting the study of physics in Zambia, organize seminars, workshops and conferences to disseminate knowledge and exchange ideas among physicists, plus many more. As a result, there has been an increase in the number of physics graduates, including women, compared to the previous decade, when only two universities existed; the University of Zambia (UNZA) in Lusaka and Copperbelt University (CBU) in Kitwe which offered a physics degree. This paper looks at the current status of Zambian women in physics, the obstacles they face on their way to becoming physicists and the initiatives taken to make their career path easy as they advance in the field.



**8th IUPAP International Conference on Women in Physics**

**Women in Physics in Zimbabwe: Where are they now?**

*Matandirotya Electdom, EM<sup>1</sup>, Shonhiwa Chipso, CS<sup>2,a</sup>, Moyo Nomathemba, NM<sup>3</sup>, Mufute Patricia, PM<sup>4</sup>, Mabota Shamiso, SM<sup>5</sup> and Danga, Helga Tariro, HTD<sup>2</sup>*

*<sup>1</sup>University of Zimbabwe*

*<sup>2</sup>Bindura University of Science Education*

*<sup>3</sup>National University of Science and Technology*

*<sup>4</sup>Morgan Zintec College*

*<sup>5</sup>Midlands State University*

*<sup>a)</sup>Corresponding author: shonhiwac@buse.ac.zw*

The participation of women in physics in Zimbabwe remains low. In this paper we report on the female physicists alumina of state universities in Zimbabwe. Data for the past ten years, will be collected from five institutions of higher learning in the country that offer degrees in Physics and Physics education. The authors will present specifically on the whereabouts of the alumna that have graduated from the institutions from 2013 to 2023.

