

Equal opportunity in INFN

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The Istituto Nazionale di Fisica Nucleare (INFN) is an Italian public research organization devoted to the study of the fundamental constituents of matter and of their interactions. Its theoretical and experimental research activities are in the fields of sub-nuclear, nuclear and astroparticle physics. INFN employs 2500 staff (scientists, technicians and administrative staff) and about 4000 associate people. In the last 20 years, the gender parity has been monitored and affirmative actions have been proposed. Statistics and actions will be presented.

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1. Introduction

Gender equality in research and innovation continues to be an issue for the European Commission and requires the collaboration of Member States and Research Organizations. Specific actions are needed in the research sector to overcome the persisting gender gap, by pursuing the following objectives: gender equality in scientific careers, gender balance in decision making, and integration of the gender dimension into the content of research and innovation. As suggested by the European Commission [1] identifying and removing structural barriers are fundamental steps to enhance excellence, gender equality and efficiency in research and innovation.

In 1999 INFN appointed its first Equal Opportunity Committee, currently this is the “Comitato Unico di Garanzia” (CUG), i.e. the Guarantee Committee. This has the task to propose actions to ensure gender equality, contrast job harassment and improve well-being at work. It analyses sex disaggregated data, produces public annual reports to monitor the time evolution of gender gap, reviews procedures and practices to highlight gender inequalities and gender biases, proposes gender equality strategies and action plans.

Research activity at the INFN is carried out at two complementary types of facilities: the Divisions (Sezioni) and the four National Laboratories. Each of the 20 Divisions is located at a university physics department, providing a direct connection between the Institute and the academic world. Today the INFN is a community of about 6500 people: 2500 are INFN employees while about 4000 are associate personnel, mainly university personnel. About 25% of these people are PhD students or a post-doctoral researchs with a scholarship or a research grant.

2. INFN Statistics

It is well know as one of the pillars of the structural changes in research institutions is studying the organization by their gender distributions [1]. These analyses are fundamental to understand the real state of parity and to monitor in time the disparity and the real effects of affirmative actions. The data reported in the following refer only to the INFN employees and are updated to the 31-12-2021. They were analyzed by the INFN-CUG and are reported in “CUG annual report 2022” [2].

INFN employs 2000 people with permanent contract in the researcher, technologist, technician, and administrative profile and 162 people with a fixed-term contract (see Tab.1). Women represent about 26% of the INFN staff with a permanent contract and about 16% excluding administrative personnel, the only category where they are not underrepresented. Excluding administrative personnel, women represent only 12% of the personnel with a fixed-term contract. Over the last 20 years (see Fig.1), the fraction of female researchers within INFN registered a weak progress between 2002 and 2011 and has remained substantially unchanged thereafter. The fraction of female technologists shows an increase of about 5% in recent years. This is mainly connected to the stabilization process, that is a change from fixed-term contract to permanent, imposed by law after some years of fixed-term contract. In the last 20 years, while the fraction of female in the technician profile is stable at the low value of 6%, a decrease has been observed in the fraction of women of the administrative staff from 82% to 79%.

A large contribution to INFN activities is given by 334 postdoctoral researchers and 112 scholarship fellows, which are about 42% of the researcher and technologist personnel. Fraction of

Table 1: Sex distribution of INFN personnel for each category updated to 31-12-2021. First four lines refer to people with permanent contract.

Profile	Total	Male	Female	Fraction female (%)
Researcher (permanent contract)	661	512	149	22
Technologist (permanent contract)	392	316	76	19
Technician (permanent contract)	619	582	37	6
Administrative (permanent contract)	328	68	260	79
Fix-term contract	162	108	54	33
Post-doc fellow	334	230	104	31
Scholarship fellow	112	71	41	37

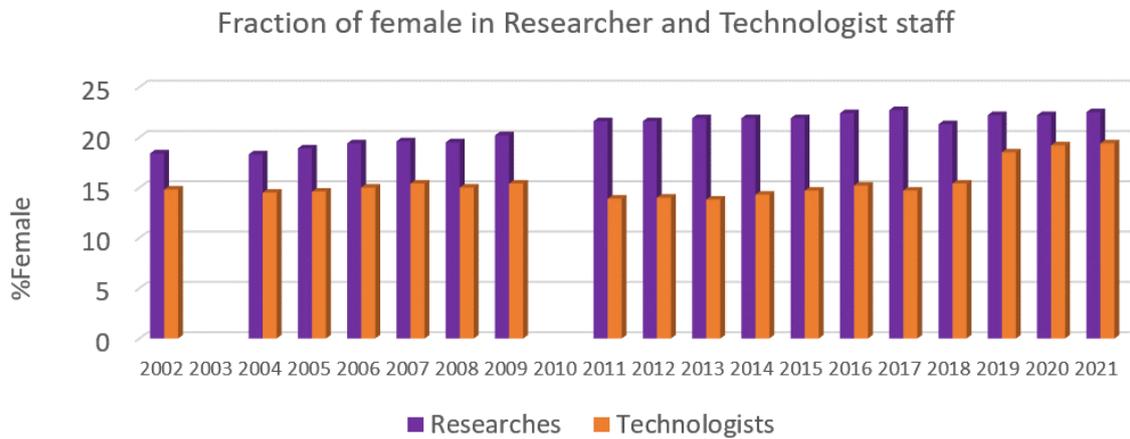


Figure 1: Fraction of INFN female researchers and technologists with permanent contract over the last 20 years.

women that benefit of these contracts are 31% and 37%, respectively (Tab. 1). About 50% of the scholarship fellow are older than 30 years and about 11% of post-doctoral research fellow is older than 40 years.

Vertical segregation is present in INFN: the fraction of women decreases at the highest career level (see Tab. 2). The INFN has only 21 women (19 researchers and 2 technologists) at the highest level in career (first level). As can be seen from Table 2, 18% of the male researchers have achieved the highest professional level while for women this percentage is limited to 13%. A larger discrepancy is observed for technologists: only 3% of the women employed as technologists (2 in total) is at the first level versus 14% of men, while a large fraction (71%) of female technologists is at the entry level (III level). Furthermore female researchers and technologists in the top level are older than their male colleagues and female researchers have a lower seniority in the top level while no woman has been hired at the highest level of technologist profile in the last 14 years. In summary, the probability to achieve the highest professional level is still higher for a man than

Table 2: The number and the fraction of employees in each professional level separately for sex are reported for the Researcher and Technologist profile. In parentheses the fraction of men and women in the level is reported.

Profile	Researcher				Technologist			
	Level	M	M/M _{TOT}	F	F/F _{TOT}	M	M/M _{TOT}	F
I	94(83%)	18%	19(17%)	13%	43(96%)	14%	2(4%)	3%
II	195(77%)	38%	57(23%)	38%	97(83%)	31%	20(17%)	26%
III	223(75%)	44%	73(25%)	49%	176(76%)	56%	54(24%)	71%
Total	512		149		316		76	

for a woman, and a woman achieves this goal later than a man. It is worth mentioning that in recent recruitment procedure for top level technologist enrollment, 5 women and 25 men have been upgraded, improving in 2022 the fraction of female technologist at the first level.

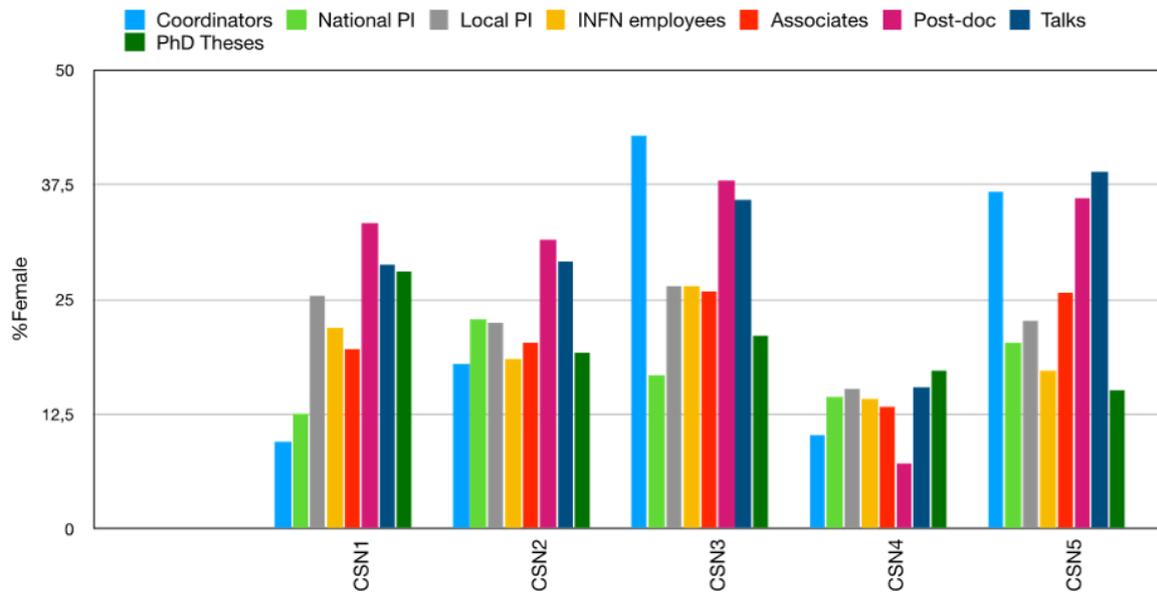


Figure 2: For the 5 INFN National Scientific Committees histograms of the fraction of female that cover a role in the Committees: coordinator (light blue bar), national principal investigator (green bar), local principal investigator (gray bar) and among the users: INFN researchers and technologists (yellow), INFN associate personnel with a permanent position (red bar), post-docs (purple bar). Fraction of talks given by a female speaker (blue bar) and of PhD thesis written by a woman (dark green bar) are also reported. The data refers to 31-12-2020.

2.1 Women participation in the National Scientific Committees (CSN)

INFN research activity is organized into five scientific lines (sub-nuclear, astroparticle, nuclear, theoretical, technological), for each of which a National Scientific Commission is set up. Women

are fully contributing to the scientific life of INFN as well as fully covering scientific responsibilities. This is shown in the distributions reported in Fig. 2. The participation of the women in the five National Scientific Committees is not uniform across the different lines: women are well represented in CSN1, CNS2, CNS3, and CSN5, but not in CSN4 devoted to theoretical physics. It is worth to note that while the fraction of female post-doctorals is $>30\%$ ($30\% - 37\%$) in all the National Scientific Committee, in CSN4 it is lower than 10% . The number of women covering scientific responsibilities, as convener or local and national team leader, is larger or at least equal to their fraction in the different committees. In the last few years the fraction of female coordinators is increased for CSN3 and CSN5, reaching 40% for the nuclear physics committee (CSN3). On the contrary, a decrease is observed for the other committees in particular for the sub-nuclear committee (CSN1) where the fraction of female coordinators reaches the lowest of all the committees (10%). The scientific production of women, estimated by the number of presentations at conference, is relevant, with a percentage of talk given by female speakers larger or at least equal to their fraction in the committee. As shown in Fig. 2 a large percentage of INFN theses is done by female students.

3. INFN actions for gender equality

Since 2002 INFN has approved and implemented Affirmative Action Plans (Piano Triennale di Azioni Positive, PTAP) proposed by the Guarantee Committee. In April 2022 INFN has approved its first Gender Equality Plan [4] which incorporates the current Affirmative Action Plan and all the affirmative actions carried out in INFN. The 6th Affirmative Action Plan (PTAP) [3], approved in 2019, has the following general objectives: increasing transparency in decision-making processes and in the flow of information, removing unconscious bias from the institutional procedures, promoting excellence through diversity, improving research through the integration of the gender perspective, enhancing the human resources in the working environment. The PTAP is articulated in four intervention areas: 1) ensuring basic components for structural changes; 2) internal training and outreach; 3) support maternity, ensuring parity and equal opportunity in recruitment and selection procedures, in nominations of decisional bodies, at every professional position and level; 4) adapt human-resources management and working climate to the needs of people in their everyday life.

Fostering equality in scientific careers is one of the EU objectives for gender equality in research while a differential access to managerial positions creates and supports inequality. This means that in recruiting and career progression the probability of success should be independent from the sex of the candidates. Since 2020 this goal has been introduced in the INFN Organization Performance Plan. To this purpose, the probability of success by sex in public competitions for recruiting and career progression in INFN is regularly monitored and the INFN-CUG has prepared a brochure, to be distributed to all the components of each INFN competition selection panel, illustrating the influence of unconscious biases in selective decisions.

Another important objective is ensuring gender balance in decision-making bodies: the INFN Performance Plan 2021-2023, poses the goal that no more than 70% of the positions in scientific bodies as commissions or committees, should be covered by men. INFN has reached in 2021 the intermediate goal of less than 75% of positions covered by men.

Since 2003 INFN adopted a specific Code of Conduct to prevent job harassment and in general behaviors against human dignity. An external figure, the Confidential Counselor (consigliera di

Fiducia), ensures the application of this Code. In addition, in 2015, a Code of Ethics, for all INFN people, and a Watchdog Committee of such Code were also established.

INFN-CUG has recently prepared and distributed to the personnel, a brochure illustrating how to access to the benefits, offered by the Italian Government and by INFN in particular, in support of motherhood. Example of specific INFN resources are: a medical insurance which covers expenses connected to pregnancy and childbirth (benefit extended to post-doctoral research and scholarship fellow), the integration of salary for post-doctoral researchers in maternity leave, economic support for nursery school, kindergarten or baby sitting expenses and school fees.

In order to encourage the career of women in theoretical physics (where, as mentioned above, women are largely under-represented) the National Award "Milla Baldo Ceolin", reserved to the 10 best master's degree theses presented by women, was established in July 2020.

Moreover to improve work-life compatibility for its employees, INFN adopted a flexible working time model, implementing all available instruments such as teleworking, part-time and smart-working. Last but not least, INFN-CUG organises annually courses on equal opportunity and parity in research, and against discrimination and harassment.

4. Conclusion

In the last 20 years only small improvements have been registered in INFN on the presence of female scientists. Female researchers and technologists are largely underrepresented (about 20%) even if the fraction of female post-doctoral students in the same period was larger than 30%. Crystal ceiling continue to be present in INFN: 1 out of 5 male researchers arrive to the highest INFN level while just over 1 out of 7 women reach the head positions. The technologists' career growth is worse considering that only 1 out of 33 women become manager, compared to 1 out of 6 men. Fostering equality in scientific careers is one of the EU objectives for gender equality in research. INFN has put in place several strategies, most inspired by the CUG, to pursue this goal. However only structural changes as ensuring parity and equal opportunity in recruitment and selection procedures seem to be able to give significative improvement in the gender balance.

References

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- [2] INFN-CUG, "CUG annual report 2022", INFN, 2022, https://web.infn.it/CUG/index.php?option=com_content&view=category&id=15&Itemid=135&lang=it
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