
WOMEN AND NUCLEAR PHYSICS RESEARCH IN ITALY

*R. Alba, P. Cenci, P. Fabbri, L. Fioretti, A. Ghiselli, D. Muscolino, P. Nicoli, D. Rizzi,
P. Rufini, G. Ruggieri, M.L. Paciello, P. Spolaore, L. Ubaldini*

Comitato per le Pari Opportunità dell'Istituto Nazionale di Fisica Nucleare (Italy)

Presented at Gender and Power in the New Europe, the 5th European Feminist Research
Conference

August 20-24, 2003 Lund University, Sweden

Abstract

The "Istituto Nazionale di Fisica Nucleare" (INFN or "National Institute for Nuclear Physics") in Italy is a Government funded public research institution. With an annual budget of about 300 million Euro, INFN funds fundamental research in nuclear, subnuclear and astroparticle physics, as well as university faculty for research in the same fields. INFN employs researchers, technologists, technicians and administrative staff.

Women are about 23% of all personnel. In the scientific and technical positions women are always less than 20%. This percentage becomes fewer and fewer in the highest research positions. The presence of women in governing bodies, or in general in positions of power in physics, is even more discouraging. At present only one woman is member of the Executive and Management Boards of INFN. Not a single woman is present among the Directors of National Laboratories and Sections of the Institute. Among administrative staff, despite the fact that lower level positions are mostly occupied by women, the highest levels are only occupied by men.

A public debate on this situation has started only very recently, mostly thanks to the concurrent actions at European level, to the publication of official data, and to the creation of Equal Opportunity Committees (Comitati per le Pari Opportunità, CPOs). CPOs must exist by law at Universities and public Research Institutions in Italy. Actions are undertaken to improve the working conditions, in order to remove or reduce possible obstacles to a true equal opportunities practice.

A picture of gender situation in nuclear physics in Italy is presented based on the data of INFN personnel analyzed in the framework of the activity of the INFN Equal Opportunity Committee.

Introduction

Despite the fact that women enjoy equal access, in principle, to education, it is clear that individual gender plays a considerable role in choices made in schools and universities. In the most developed industrial Countries the educational level of women and men has presently reached a substantial equality, on average. In particular, women are the majority of undergraduate in most western countries. However, there are differences if one looks at the single areas of study. In the scientific subjects, for instance, women are found in quite low proportions in some disciplines, among which physics and engineering, while they are still the majority in biological and medicine sciences. In addition to this horizontal gender segregation there is still a clear vertical segregation, since women remain a very small quantity at the top of any academic hierarchy, even in subjects where they constitute the majority of undergraduate students.

During the last 10 years women in Italy succeeded to be the majority of the graduate population (55.6% in 2001, with highest percentages still in Humanities, Arts and Law degrees). Recent data from the Ministry of Education, University and Research [1] show that 32% of the degrees in physics were awarded to women in the years 2001 and 2000 and 35% in the year 1999. In spite of being as successful as their male colleagues in their studies, young female physicists have less chances of being hired in physics research and university teaching positions. Among the university professors and lecturers with permanent positions in the Italian physics faculties the percentage of women was 15.6% at the end of 2001. In the INFN ("Istituto Nazionale di Fisica Nucleare", or "National Institute for Nuclear Physics"), a Government funded public research institution for nuclear, subnuclear and astroparticle physics, with an annual budget of about 300 Million Euro, at the end of 2002 only 18.1% of the researchers employed with permanent positions were women. Similar situations are also found in other Research Organizations in Italy [2, 3].

If the probability for a female physicist of entering the Italian national research system is already much lower than for a male physicist, the next step is even more difficult: the career development is significantly more difficult for a woman, as shown by the decreasing number of female employees that are found at the increasing levels of the hierarchy.

The situation of women physicists and, more generally, of all women employed in the INFN has been studied by the INFN Equal Opportunities Committee (CPO - Comitato Pari Opportunità). The work done so far by this Committee is summarized in two reports [4, 5], which can be found in the web site: <http://www.infn.it/cpo/>.

In Section 1 the main facts concerning the work and career opportunities of women and men in the INFN are described. The observations are based on the analysis carried out by the INFN CPO using the information provided by the INFN administration in 2002. Section 2 contains a preliminary discussion of the initiatives undertaken to improve the working conditions, in order to remove or reduce possible obstacles to a true equal opportunity practice. Conclusive remarks are given in section 3.

1. The women of INFN.

The INFN personnel include researchers, technologists, technicians, administrative staff and managers. In addition, a consistent number of personnel units from the Italian universities collaborate with INFN with special association agreements; among these, a relevant number of professors, lecturers and technicians participate in the INFN activities with the same rights of the INFN staff. In particular, they have electorship rights related to the definition of management bodies. The percentage of women in the various positions in INFN is shown in table 1.

Table 1. Distribution of INFN personnel and full-rights associated personnel.

	Total	Women	% Women
Researchers	567	104	18.34
Technologists	228	34	14.91
Technicians	744	50	6.72
Administrative Staff	270	222	82.22
Administrative Top Executive	4	0	0.00
<i>Total INFN</i>	<i>1'813</i>	<i>410</i>	<i>22.61</i>
Associated Univ. Researchers	948	113	11.92
Associated Univ. Technicians	142	16	11.27
<i>Total from Univ.</i>	<i>1'090</i>	<i>129</i>	<i>11.83</i>

The highest percentage of women is found in the administration section; without this contribution the total percentage of women would have been of only 12.2%. The minimum percentage is among the technicians and administrative top executive staff.

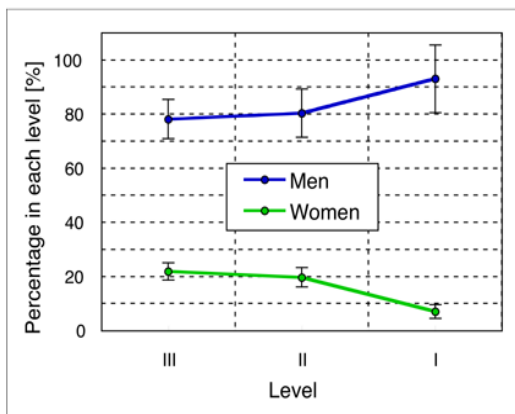
The career development shows the typical gender differentiation, with women occupying a greater percentage of the lower levels. Figure 1 shows the situation for INFN researchers and administrative staff. The plots evidence the decrease of the female presence at the highest levels of the careers ("scissors" behavior). The trend for the personnel of the other categories is less clear, also due to the small numbers, but does not contradict this observation.

Other indicators of the career development include the participation in committees and commissions, the involvement in the management of the Institute, and the entrustment with responsibility tasks.

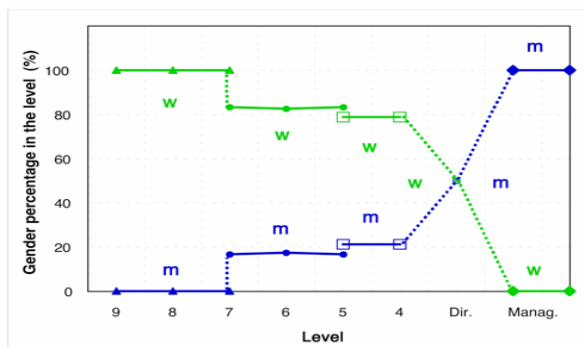
INFN is managed, at the highest levels, by a Management Board (Board of Directors) which includes the INFN President, the members of the Executive Board, all the INFN Directors, representatives from INFN research staff and technological, technical and administrative staff, representatives from Ministries and from other Italian research organizations. In these highest positions the first woman has been recently nominated as a representative of a Ministry. No woman from the INFN personnel, both staff and associate, is present. The lack of female managers is especially remarkable in the area of the administration, where the number of women employed largely exceeds the number of men (cf. 82.9% of women mentioned above).

Fig.1. Percentage of women in the INFN research and administrative staffs.

Researchers - Staff - 2002				
Level	Total	Men	Women	% Women
I	115	107	8	7.0
II	183	147	36	19.7
III	266	208	58	21.8
Total	564	462	102	18.1



MANAGERS				
Level	Total	Men	Women	% Women
I	1	1	0	0.0
II	3	3	0	0.0
Total	4	4	0	0.0
ADMINISTRATIVE STAFF				
DIRECTORS				
Total	4	2	2	50.0
OFFICIALS				
Level	Total	Men	Women	% Women
IV	33	7	26	78.8
V	33	7	26	78.8
COLLABORATORS				
Level	Total	Men	Women	% Women
V	36	6	30	83.3
VI	46	8	38	82.6
VII	108	18	90	83.3
OPERATORS				
Level	Total	Men	Women	% Women
VII	2	0	2	100.0
VIII	4	0	4	100.0
IX	4	0	4	100.0
Tot. ADMIN.	270	48	222	82.2



The percentages of women in the principal INFN management and consultative bodies are shown in table 2.

Table 2. Percentage of women in various INFN management and consultative bodies.

	Total	Women	% Women
APPOINTED BODIES			
President and Executive Board	5	0	0
Management Board (includes Pres. and Exec. Board) *	35	0	0
Scientific and technical commissions (computing, training,...)	60	9	15.0
Social, cultural and assistance Commissions, plus C.P.O.	73	30	41.1
ELECTIVE BODIES			
National Scientific Commissions	108	20	18.5
Personnel representatives	111	20	18.0

* Late in 2002 one woman has been appointed by the Italian Government as a representative of a Ministry.

In other management bodies and consultative Committees, appointed by the INFN President and by the Management Board, the female presence sums to a total of 15% for bodies of scientific and technical character and 41% for those of social and general character. These last organisms have obviously a relatively small power within the management of the Institute, as compared with scientific and technical committees.

The scientific plans of INFN are discussed within five National Scientific Committees covering the different areas of the activity of the Institute. These Committees have the responsibility of funding the various experiments and projects of INFN and monitoring the research activity and achievements. The members of these Committees are representatives of the INFN operational units, distributed geographically all over Italy. They are chosen by and within the research personnel by elections held in each unit. The total women percentage in these Commissions reaches 18.5%, a figure significantly higher than the percentage of female researchers: in fact the 18.3% of INFN female researchers combined with the 11.9% of associated university colleagues gives a 14.3% of women in the research body.

In spite of the acknowledgement of the value of female researchers resulting from the election of a relatively high percentage of women as members of the Scientific Committees, the appointment of women for responsibility tasks implying monetary grants is limited to a low 8.3% of the available positions (the members of the Scientific Committees are not acknowledged any money for the service). Table 3 shows the number of rewarded responsibility tasks and relative percentage of women, for various roles of the personnel. The task percentages are compared with the percentage of women present in the particular role.

Table 3. Rewarded responsibility tasks. The tasks entrusted to women are compared with the female presence in each role of the personnel.

	Total N. tasks	N. tasks to W.	% tasks to W.	% INFN Women
Researchers	24	2	8.3	18.3
Technologists	76	10	13.2	14.9
Technicians - Specialists	91	6	6.6	6.7
Technicians	7	1	14.3	7.1
Administrative Directors	2	1	50.0	50.0
Administrative Officials	36	25	69.4	78.8
Administrative Staff	27	22	81.5	83.2
Total	263	67	25.5	

An important aspect of the management of the Institute is the hiring and promotion of the personnel. This activity is performed via open or internal competitions, directed by special Commissions appointed by the INFN Management Board. By law, at least one third of the members of these Commissions should be women, unless it proves impossible to fill the reserved fraction with suitable members of female sex. In practice, this has been achieved only recently in

INFN panels for hiring and promotion of physics personnel. Remarkable improvements have been observed also thanks to INFN CPO which, in its reports, brought this point to the attention of the management. The application of this rule also to the case of Commissions for personnel recruitment for temporary positions, which is actually not strictly required by law, is proposed by the CPO, consistently with the concept that an equal opportunity policy must apply to all of the phases of the professional curriculum. Young women wishing to initiate a research career should be supported with the same instruments used to realize the equal opportunity practice for regular staffs.

2. The actions

Both cultural and organizational actions are needed to rule out difficulties in career development, disproportionate gender distribution in leading administrative and research positions, and to encourage the young women to undertake and pursue scientific and technical professions.

A public debate on these arguments has started only very recently, mostly thanks to the concurrent actions at European level and internationally, to the publication of official data, and to the creation of Equal Opportunity Panels. At present, most of the biggest research organizations and funding agencies adopted Equal Opportunities Policy.

The European Union promoted an explicit Equal Opportunity Policy [6], based on the *gender mainstreaming* strategy, known also as *mainstreaming gender perspectives*. Gender mainstreaming is “the process of assessing the implications for women and man of any planned action including legislation, policies, programmes, in any areas and at all level” [7]. Its ultimate goal is to achieve gender equality.

European Union has taken the lead on *gender mainstreaming*. In December 1999, the Women and Science Sector of the European Commission Research Directorate constituted the Helsinki working group and produced the first ETAN report on the percentage of women in the scientific professions in Europe [8]. Based on the recommendations of the ETAN report, the 6th Framework Programme (FP) foresees an increasing integration of gender dimension at all level of implementations. The European Commission has just published two calls for tender in the following areas: the continued development of work on statistics and indicators, a feasibility study on the European Platform of Women Scientists, the development of a strategic database "Women in the Framework Program" and a qualitative analysis of women's participation in the 5th FP. Studies on gender impact on planned initiatives and activities and a system of gender watch will be the key points of the mainstreaming approach.

The efforts made by the European Union in this particular field demonstrate that women can contribute to the scientific research in all countries within a framework where their capabilities are fully recognised and gender differences exploited.

Italian law requires *Affirmative Action Plans* to be approved and deployed by Public Organizations. In 2001 INFN adopted its own *Three-annual Affirmative Action Plan (2002-*

2004), based on an Equal Opportunity Programme proposed by the INFN CPO (INFN Board of Director Act n.7485, 20/12/2001). This programme is based on the systematic integration of gender equality into all policies and programmes of the Institute, according to the *gender mainstreaming* strategy.

The INFN Equal Opportunity Programme, according to the approved Affirmative Action Plan [5], and the activity of the INFN CPO as well, can be grouped into the following main categories.

2.1 Statistical information

Sex-disaggregated statistics are important tools in the research area of gender studies, with the purpose of investigating and creating a better understanding of the complexities of direct, indirect and institutional discriminations.

The kind of statistical information of interest is a subject of discussion. The aim is to identify, measure and monitor possible discriminations that produce horizontal and vertical segregation, discriminations with respect to the acquisition of responsibility, to the financial support, to the career evolution, to the promotion of a favourable work-environment.

The INFN is committed to develop and maintain a gender-disaggregated data-base containing the full information relative to the personnel. Such data-base can also be used to promote the public awareness of female competence in order to facilitate the enlargement of working opportunities for women. The publication of relevant statistics in web-sites would contribute to public accountability.

2.2 Awareness

An increased awareness has to be gradually achieved over the years. Important means are the publication of the Equal Opportunity policy in the form of leaflets, articles in journals and reports, organization of conferences and workshops on specific topics, sustained contacts with other organizations and external bodies.

In this area many activities have already been pursued by the INFN CPO since its nomination: seminars, training courses for INFN Personnel, presentations to the INFN Management Board, contributions to the annual Weeks on Science and Technology organized by MIUR (Ministry of Education, University and Research), contribution to national working groups, organization of a conference in collaboration with CNR about "*Equal Opportunities in Research Institutions*" (2002), participation and contribution to international conferences.

Attention is also given to specific actions proposed to ensure an increased involvement of women in training courses. Relevant to the career development are especially the leadership training courses: significant results have been obtained with similar actions in other scientific organizations, like the CERN International Laboratory, in Switzerland, where a definite trend to increase the number of female supervisors has been noticed soon after the participation of women to specific training courses [9].

As an important investment for the future, the spreading of a correct information in the educational institutions of all levels and the encouragement of the new generations toward a gender equality mentality should not be forgotten.

A diffused knowledge and precise specification of the results and achievements obtained by women in the past years is important to provide reference models to the young generations and to dismantle unfair stereotypes.

2.3 Transparency in the management.

An internal policy of clearness concerning the INFN plans, strategies, structure and personnel is pursued. The access to useful information at useful times could be, in some instances, a privilege for a restricted number of persons, but the modern computer science tools offer nowadays an easy mean of spreading the information to all of the potentially interested people.

An easy access to some official data, disaggregated by gender, concerning staff and associate members and both temporary and permanent positions, will be achieved thanks to a new database which will be published in the official INFN Internet web site.

Specific web pages should be dedicated to publish gender-disaggregated lists of charges, responsibility roles, memberships in all Commissions, Committees, working groups, co-ordination tasks, etc., at national and local levels, assigned by nomination or election, with special attention to positions that imply a monetary grant. The lists should include the full identification of the persons, with gender indication, the nomination/election time and expiration time and other possibly useful data, in observance of the privacy law. The diffused knowledge of the responsibility structure and of its dynamical development would facilitate the verification and public awareness of the gender involvement and the finding out of possible anomalies, like, e.g., the concentration of an excess of responsibilities on one single person.

Every time a specific Commission is formed to hire or promote personnel, or to define the admittance to training courses, or for any other activity which implies individual "applications", at any level, the public data on the process should be published in real time on specific web pages. Useful information includes the identification of the Commission Members and the gender-specific list of applicants and winners, besides the obvious details concerning the subject of the activity and the application procedure. In particular, concerning the training courses, the percentage of admitted female personnel should mirror the percentage of female applications.

To ensure the highest quality of the personnel selection procedure is a fundamental point. High quality selection requires open, transparent rules, proper advertising, awareness of gender-equality issues among the Commission members, proper gender balance of the Commission members, high quality selection of the Commission members themselves, monitoring the application and success rates by gender.

The creation of a database to collect curricula and qualifications of INFN personnel, a "*Database of Competencies*", spontaneously filled in by personnel members, should be helpful to evaluate

competencies of staff and associate personnel and should be taken into account to reduce gender gap between position assignment and awards granted compared to eligible staff.

2.4 Work to home-life balance

Treating the employee as a whole person implies taking his/her family and other aspects of extra-work life into account in the organization of the work. In particular for women, a rigid link between the age and some position or promotion opportunities, established on the basis of highly competitive standards, is often unfair considering that the requirements of family life may be especially demanding for a woman in the initial stages of her career. The possibility of slowing down one's activity for a few years and then returning to full activity with reasonable working conditions and perspectives is an important option especially (but not only) for women. Such a scenario implies that special policies are put in place for those who have short-term extra-work needs (particularly for maternity and child-care needs) and those who wish to return to the career after a break or a period of reduced activity.

Proposals concerning reconciliation between personal and professional life include:

- part-time work, working from home and working time flexibility;
- availability of child-minding and nursery facilities conveniently located;
- special economical support for child care also in case of short term contracts;
- investigation of specific gender diseases to be taken into account in the periodic medical checks foreseen for the personnel;
- developing career-break schemes and policies to accommodate the needs of employees returning after a career break.

Attention is also given to the awareness in this field. The INFN CPO organizes a specific training course for INFN Personnel on "Work to Home-Life Balance", to be held at the end of year 2003.

2.5 Work Environment

Threatening the personal respect and dignity of a person can have the worst consequences. Even minor and indirect attacks, continued along the time, can affect the ability of a person of conducting a normal working activity and a normal life. If the sensitivity level and the reaction capabilities strongly depend on the individual personality, there are, however, well identified misbehaviours and true crimes that deserve the highest attention. There should be, in the work environment, the widest and deepest awareness that such behaviours are unacceptable and perpetrators should be sanctioned up to the termination of the contract.

It is a good practice to adopt a specific regulation code to govern complaints of harassment and mobbing. Depending on the seriousness of the case, possible problems can be resolved by informal mediation, mediation with an administrative record or disciplinary actions. The code is to be given the maximum advertising, in order to explain the established tools and support and to spread the awareness on the subject. The INFN CPO has submitted to the INFN management a proposal for a regulation code [4]. A final version is now close to the formal approval.

3. Conclusions

The work carried out so far by the Committee for Equal Opportunities of the National Institute of Nuclear Physics in Italy gave evidence of some anomalies in the career development and responsibility share of the women of the Institute.

The proposals of the Committee and the actions undertaken in collaboration with the Institute to correct a situation that tends to margin and discriminate the women touches the areas of cultural awareness, statistical analysis and information, fairness of the administration and managing, work environment and harmonization between the work and private life.

It is not excessive to affirm that gender equality principles and their practical applications are a fundamental issue for the future of the humanity. It is obviously a matter of justice and fundamental rights, but it is also a need for the evolution and prosperity of the people.

Talking about science, one should remember that the wealth and quality of life do depend to a great extent on the development of science and technology. This has always been true, but is especially evident and real nowadays. With the fast happening of changes and developments in the modern world, it is no longer tolerable to sacrifice the large potential contribution of female intelligence and ability. Even more so, after the evidence that a large fraction of women are ready and willing to pursue scientific careers and that they demonstrated the inconsistency of past stereotypes.

References

- [1] Ministero dell' Istruzione dell'Università e della Ricerca – Ufficio di Statistica – <http://www.miur.it/ustat/>
- [2] Consiglio Nazionale delle Ricerche: Relazione di attività del CPO del CNR – Anno 2000 e Anno 2001
- [3] Istituto Superiore di Sanità: Personale femminile e carriere delle ricercatrici dell'ISS (2002)
- [4] INFN/AM-02-01 (11/11/2002)
- [5] INFN/AM-01/01 (24/05/2001)
- [6] EU-Council Resolution on Women and Science, n.8565/99 LIMITE RECH 71, adopted by the Research Council on 20 may, 1999.
- [7] ECOSOC Agreed Conclusions (E/1997/100)
- [8] EU Commission (2000), Science Policies in the European Union, ETAN (European Technology Assessment Network) Report on Women and Science: promote excellence through mainstreaming gender equality, Office for Official Publications of the European Communities, L-2985 Luxembourg
- [9] CERN (European Organization for Nuclear Research) – Equal Opportunity Panel Reports - <http://humanresources.web.cern.ch/HumanResources/external/eo/> :