

What you should know about women and physics



**Gender equality at
the Department of Physics**

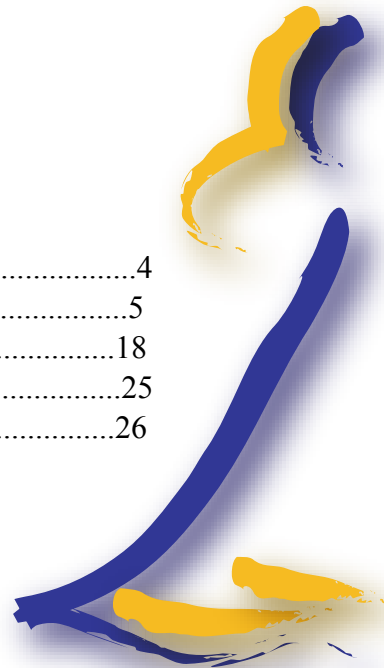
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Prologue




Natural sciences and technology, especially physics, are the most male-dominated fields also in Finland. Only 8% of the professors in these fields are women. The lack of female physicists has been widely noted by, for example, the Ministry of Education and the University of Helsinki. Projects to improve the gender balance have already been directed to schools and young people in general, and here we wish to make an effort to improve the gender equality at the Department of Physics.

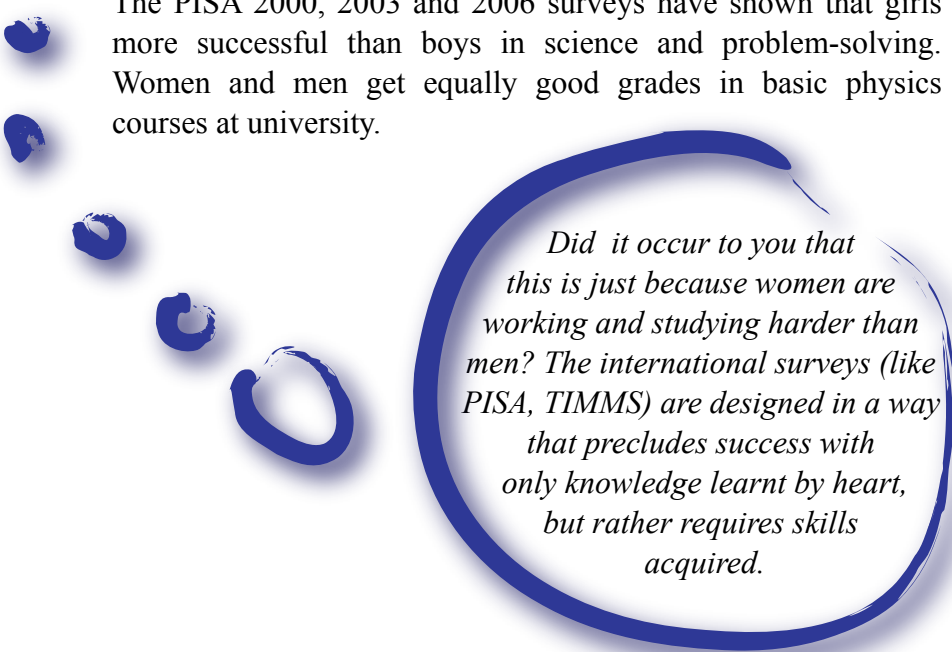
This leaflet brings up problems in equality between women and men among physicists. The approach taken is a critical treatment of often repeated arguments related to a female physicist. These arguments will be studied also with the help of research material.

At the end of this booklet are examples of real-life situations where each of us can support gender equality.

Arguments related to female physicists

 **Argument 1: The small number of female physicists results from natural differences in abilities and interests of women and men**

The PISA 2000, 2003 and 2006 surveys have shown that girls more successful than boys in science and problem-solving. Women and men get equally good grades in basic physics courses at university.



Did it occur to you that this is just because women are working and studying harder than men? The international surveys (like PISA, TIMMS) are designed in a way that precludes success with only knowledge learnt by heart, but rather requires skills acquired.

If we will consider as "natural" the way things have been in history, women should not be humanists or even doctors. During the 900-year history of the university itself, women have been involved only in the last two centuries.

What does "natural" actually mean? Is it equally "natural" for women just to stay at home? Are women naturally "nursing humanists"?

Why should the fraction of women in the Department of Physics be larger?

Scientific quality viewpoint:

- the best talents should be put to use regardless of gender.

Scientific diversity viewpoint:

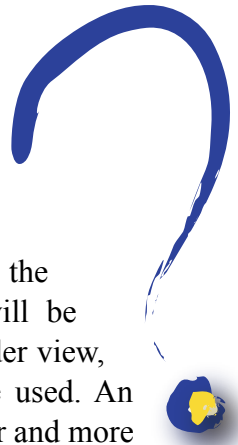
- with a variety of different kinds of people in the scientific community, scientific questions will be phrased and interpretations made with a broader view, and more versatile research methods will be used. An equal work community can thus produce better and more innovative science than a community with strict gender roles.

Human rights viewpoint:

- everyone has a right to realize their talent

Social viewpoint:

- a larger fraction of women in research and teaching personnel would make the student and work communities at the Department of Physics more versatile and thus more attractive to young students – and women.



Argument 2: The situation will get better as a matter of course as generations change

Statistics show that this is not the case. Although the fraction of women in undergraduate, masters' and doctoral students increases, it does not automatically lead to an increase in the number of women at the highest positions in the academic hierarchy. The fraction of women increases very slowly without external support measures, and if the support measures are stopped, progress ceases – at least as long as the gender distribution is unbalanced.

The fraction of women amongst professors is not as large as was the fraction of women amongst students when the present-day professors were completing their studies.

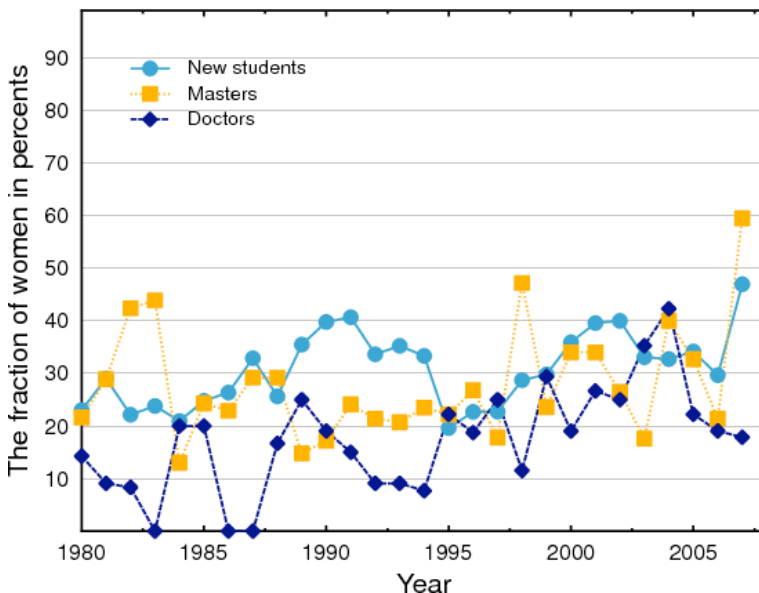


Fig. 1. The development of the fraction of women in physical sciences.

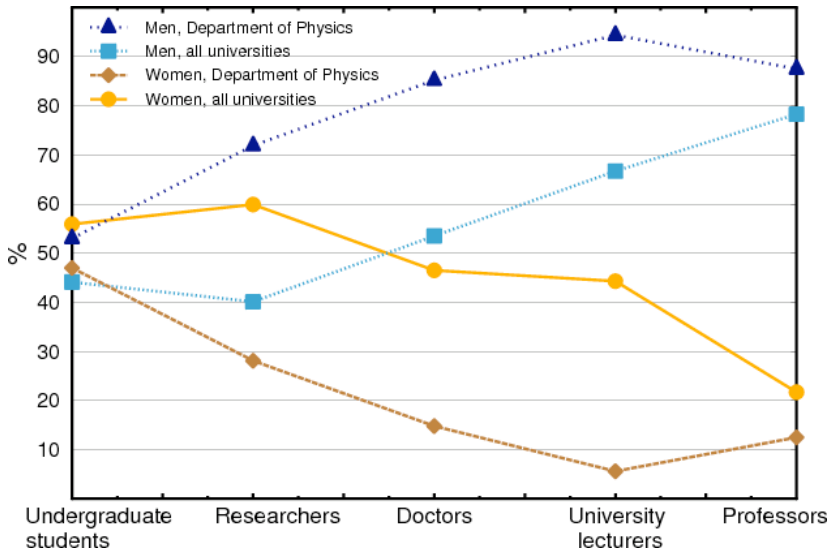



Fig. 2. “The Gender Scissors” in physical sciences at the University of Helsinki and in the Finnish Universities (all fields): the fraction of women at different stages of the academic hierarchy.

 **Argument 3: The small number of female physicists is natural, because only women can give birth and breastfeed babies. The long maternity leaves in Finland make the problem even worse.**

Most of the female physicists leave the Department of Physics well before they even think about starting a family – motherhood alone thus does not explain the current situation. Combining work and family life must be possible for both men and women. One aspect causing inequality might be the assumption of men not using their paternity leaves. Only four months of the parental leave (often simply called maternity leave) needs to be used by the mother, the remaining six months can be used by either of the parents. Either of the parents can stay home until the child is three years old.

Half a year or a year away from work might feel like a long time when your own career is rushing forward, but in the long run it is a short time in a whole career – and it can help to develop a fresh point of view at work.



**Argument 4: Men simply fulfil the criteria of a good scientist more often than women.**

The criteria of a “good scientist” are formed in the predominant conditions, where a male scientist is the norm. Is our picture of a good physicist and scientist objective and fair? Do “neutral criteria” describe “masculine” characteristics, which, after all, do not have anything to do with the quality of a good scientist?

In fact a woman fulfils some of the following criteria of a good scientist more often than a man: a good scientist is full of ideas, persistent, social and analytical. Good science is more often a result of teamwork, and teamwork is furthered by the social skills of the worker and an open atmosphere.

 **Argument 5a: I have never discriminated against women.**

It is not enough that one does not do any harm – one has to actively do good (see argument 2). It is true that wilful discrimination and sexual harassment happen rarely at the Department of Physics. However, it is important to remember that if a male colleague “pats” a female colleague “fatherly” or “comradely”, the object of the patting can experience it oppressively, even though the purpose would be different.

“The only thing necessary for the triumph of evil is for good men to do nothing.”

[John Bartlett 1968]

 **Argument 5b: It is not fair to support women at men’s expense through “positive discrimination” when filling positions and awarding research grants.**

It has been shown that the situation does not improve just by recognising the problems. To make a real change concrete actions are also required. During the transition period to gender equality some special arrangements are needed.

**Argument 5c: Women need more support than men.**

Women need *different* support than men do. Men often get support from the existing system and culture. The support system has developed in a culture dominated by masculine tradition.

 **Argument 6a: If women do not get along in the current system, it is women's problem. Women are a problem.**


In many other fields it has been understood that the definition of “normal” has emerged unilaterally from the male point of view. In an equal community men and women together define the rules. Why would physics be an exception? “This is how it has always worked” cannot be an obstacle for achieving gender equality.


 **Argument 6b: Once again, men are guilty.**

No one is accused, or everybody is. Women also carry attitudes and procedures against equality. Conventions are often subconscious, so they are difficult to observe in one's own or someone else's behaviour. Becoming aware is the first step. After that also concrete actions are needed.

 **Argument 7: The instructions about equality are ridiculous and not relevant for our field.**

The official instructions about gender equality are universally applicable, carefully thought and formulated – and most likely also suitable for physics. We just have to understand what the universal text means in our case.

 Talking about equality usually often feels threatening and leads to defence reactions, for example laughing. Even in an official administration the equality issues are almost the only ones that are laughed at; this concerns, for example, faculty councils [The report of equality work in the University of Helsinki 2004-2006].

 **Argument 8: “I have noticed that there are often problems with one particular person (who happens to be a woman). However, this is an individual case and her personality is the reason for the problems.**

Statistics are comprised of individual cases. If a woman faces problems which are statically typical for women, it's probably because the working culture is “gendered”. These problems are difficult to recognize without understanding the background of gender equality issues.


- *I feel an outsider in our working society.*
 - *It must be because of your childhood traumas rather than the working society; prevalent customs must not be changed because of one person.*
- *So, I'm not suitable for this career.*
 - *No, this probably relates to the working culture. According to the statistics, women often feel like outsiders among physicists.*



Argument 9: Why should we improve women's position? In Finland women are doing much better in science than in many other countries. What about starving children in Africa or the position of foreigners in Finland?"

Gender quality issues must be solved, even if they are not the only problems in the world. About 50 % of the people are women, so this issue concerns a significant part of mankind, also in western countries. Actually, Finland is only just above the European average level in equality issues, despite the long history of women's right to vote [Vanhala 2002]. If some people do not feel good in a community, the situation must be changed.

"Injustice anywhere is a threat to justice everywhere."
[Martin Luther King Jr 1963]

 **Argument 10: The reasons for the shortage of female physicists lie in the society, especially in the school systems, and we at the Department of Physics cannot do anything about it.**

Let us start from issues we can influence, namely how women experience studying physics and working at the Department of Physics. The first goal is that the 30 % proportion of female students would be maintained throughout the academic hierarchy, even at the highest levels, whereas now the proportion collapses in the post-doc phase.

Teachers and other female physicists educated at the Department are visible in the society, and that will change the general situation little by little, and thus the amount of female students will eventually rise.

Practical examples on equality matters

➤ **We will arrange a sauna evening and everyone is welcome. Women will even have their own sauna turn.**

It is not enough that women have a sauna turn of their own, because there women rub elbows only with each other, and will not get to know professors (if they are all men), or the rest of the group better. Perhaps they get to chat to no one, if there is only one woman at the event. Pay attention to what kind of activities are arranged on recreational occasions at the Department and student activities.

It would be best if the activities would not split people along the gender separation line – a good rule of thumb is that any event involving sauna risks gender inequality.

➤ **The lecture examples are completely gender neutral.**



“You boys have fixed cars and know that...”

Is the example directed only at boys? If so, why? Is it assumed that all women (and men) interested in physics are also interested in automotive technology. Women are not necessarily interested in cleaning utensils or sewing machine

physics. The examples used should be diverse and interesting to as many people as possible.

Come up with a carless alternative as a basic mechanics course example!

 **But there is Marie Curie as a female role model.**

The personal role model most physicists have is a synthesis of many people, so one role model is not enough and does not suit all women.

Equality has been achieved when each student at the Department has someone in the staff whose life he or she would want to model her/his life after – one sole female researcher is not enough, but neither are five female childless researchers, for example [Holmes *et al.* 2008].


 **Is it more suitable for a credible researcher to talk about cars, the army, and computer games, instead of fashion, knitting, or breast-feeding?**

It is quite common that traditionally feminine topics are perceived as nonsense. Why?

 **Only people with no sense of humour are upset by blonde-, tit- or stripper-jokes.**


By saying "I hope you girls don't mind me telling dirty jokes" the listeners are forced to accept a certain role. Would you laugh

if the mental and physical attributes of men were evaluated in the same way as women are often publicly judged? Sex related issues do not belong to the workplace discussions, they can make people feel very uncomfortable.

 **A list of publications is an impartial and objective measure of academic merit and has nothing to do with gender.**

What type and size of effort is required to be included in the author list of an article? Does your group have clear and impartial procedures for deciding who is included in an author list, and who is left out? Is everybody aware of these procedures? Do gender biased networks play a significant role?

When a group participating in research is being assembled, does gender play a role in determining who feels like a suitable measurement scientist, modeler or programmer?

 **I chose "Pekka" for a task which will develop international contacts because he is so lively and outspoken, and I don't want a shy or quiet person for the job. "Leena" did not seem to have enough ambition.**

Self-confident women often act in a different manner from self-confident men. According to the social code, it is unsuitable for women to brag or boss people around in the work environment. Because of this, women may often seem more insecure than they really are. Do your actions have a gender emphasis: who is

sent to conferences, and who is introduced to acquaintances at conferences? Who is invited to occasions and gatherings that advance their career? Does "Leena's" behaviour reflect how she has been treated and trusted (or not)?

Women fuss about the clothes they wear to conferences.

Men can manage in a suit in almost any situation, while women often don't know what they should wear when they are giving a talk at a conference or attending an evening gathering of the workplace.



There is no formal etiquette for female dressing, but women's choice of clothing often attracts attention: they are easily either too sexily or too badly dressed. Unlike the male suit, there is no "zero signal" choice of clothing for women. The clothing a woman wears affects how her speech or presentation is received.

Does the attachment mechanism of a conference name tag work with anything else than a suit jacket?

➤ **Would it not be best if you, Leena, took care of these small practical issues? You are so efficient and thorough.**

So-called secretary duties tend to be assigned to female members of a research group, since they fulfil the tasks dutifully and efficiently.

Could it be so that “Pekka” is rewarded for his disobedience and for neglecting his tasks by being allowed to focus on his research and by being relieved of the extra work?

➤ **We all play by the same rules; we all know these rules**

Women in physics often feel left out and feel that decisions are made using rules that they do not know. Where are these rules published and where are the decisions made: in organised meetings or outside of them? Are men and women equally represented in these situations? Are the rules some kind of silent knowledge that is transferred via friendship networks?

➤ **We are all physicists and we all speak the same language**

Male and female communication cultures usually differ from each other. It is not fair if the male culture is taken as the norm and women are forced to adapt; both should try to make compromises.

ABCQ

Possible differences in men's and women's expressions:

- Self promotion

Women typically underestimate and men typically overestimate their knowledge and abilities.

- Direct and indirect orders

“It’s hot here, isn’t it?” / “The window should be opened.” / “Open the window!”

“There is no list of the students” / “It might be a good idea to make a list of the students” / “Make a list of the students!”

None of the examples listed above is necessarily the “right” way to express an order. An indirect order might not be understood as an order; a direct order could be understood as wilful and needless bossing.

- The asking threshold

Is the person asking the most questions in lectures or meetings the most competent or the least competent? What about asking many questions of your supervisor, compared to persevering alone?

- Toning down a message

A supervisor with similar corrections in mind can say either

"This report is very good, only few corrections have to be done."

- The risk is that the student only hears that "this is good" and does not take the requested corrections seriously.

or

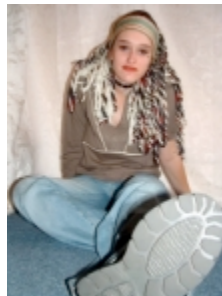
"This report still requires a lot of work."

- The risk is that the student may feel frustrated and postpone corrections because she/he hears that "this is unacceptably poor".

Final statement

Women have to be appreciated as women. Equality does not mean similarity. Women should not have to be "men" to become accepted by the community. Not every woman aspires to be "a great lad".

Do these women look like researchers?





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