Outcome of the GENERA interview series

previous

6. Reasons for domination of men in physics and existing barriers to women's success

The awareness of the gender discrimination and the knowledge on its determinants is considered as an important step towards gender equality change. In our study we asked physicists about the causes of men's domination in physics as well about the barriers that women may face in their career. It is important to underline that the concept of “domination” relates for some respondents not only to quantitative overrepresentation of men in the field, nor to their dominant presence in the governing or decision-making bodies. It is understood as a symbolic domination of which we will write below - the symbolic figure of a scientist being a man, and the masculine culture of physics within which some women feel isolated or unwelcome. Also important to add, that for a few respondents the numeric gender imbalance was not striking or not existing - Romania is an example of the post-socialist country where percentage of women is noticed to relatively high, similarly some fields witness more women presence:

- *At Xxx [name of an institution] gender situation is not so unbalanced, we have 43% women researchers. 81_M_L*
- *I don't think there is a male domination in physics research because I've always worked with women since 15 - 16 years. That's not my opinion. I think difficulties are not link to gender, theoretically you succeed if you are competent. In practice it doesn't happen because there are a lot of variables which are not linked to gender. In Italy, it depends from the power of your boss, or other factors. 39_F*

Growing awareness of gender imbalance in physics

Among the processes that have been indicated most frequently as causing gender imbalance are: firstly, cultural stereotypes around abilities of women and men to pursue scientific career and secondly the difficulty of reconciling family and work and social expectations towards women's roles in family. These processes are not specific to physics, nor even to STEM.

We observe rather perfunctory attention paid to the topic by many interviewees, but also difficulty to disentangle the actual causes of this situation. There is a share of the respondents that admitted that they never gave a theme much attention, and that simply they do not have a ready answer as this is not their field of expertise:

- *I do not know why this happens. Maybe the priorities are different. I do not know, I have no idea. 24_F*

Declared lack of knowledge about the causes of gender imbalance in physics did not necessarily paired with assumption that topic is not important to deal with - in some cases respondents sounded rather hopeless that the issue still pervade scientific world:

- *I don't have a clue about why it's like that. I have two girls, they are very brilliant in mathematics or physics, they are really interested in science. I don't know where the break comes from, why so few women go for physics. It was already like this in my time, when I did my studies, we didn't have more than 2 or 3 women in PhD level. I'm still asking myself why, and why it didn't change. 35_M*

On the other end are located those who have gone through much reflection concerning their own trajectories in physics (particularly females) and the situation of female researchers. Moreover, they attempt to undertake actions (individual or systemic) in order to tackle the witnessed gender inequality or discrimination. These attitudes will be presented in this chapter.

These diverse positions nevertheless illustrate the important switch within discussion around the gender imbalance in physics from “the problem of women with physics” to the “problem of physics with women” (Götschel 2011)- thus, the community starts to express the concern over female low representation or even absence[1)]. Particular activity is seen in Gender Equality Plan, and in around 36% of research performing organizations existed gender equality plans (EC 2015: 6; see as well chapter “Evaluation of institutions in fostering gender equality”).

Nevertheless, the voice that this topic is not of immediate worry for physics as a field, or that this is just how it is, is also present. Below there are three positions which assume a rather passive or negative attitude towards the implementation of measures to tackle gender imbalance:

**Argument 1: Science is gender neutral with objective evaluation procedures. **The respondents, more often men, stress the importance of rational evaluation and the ultimate importance of competence, knowledge, achievements and excellence on the career development and advancement. Gender is not considered an important criterion for evaluation and not seen as an important characteristic conditioning success.

- *I'm not sure it's really pertinent. My theory is that when you have your PhD, at least in this laboratory, you don't have to prove your value and you don't have problem because of your gender. It's a proof of excellence, you don't need something else. 33_M*
- *In the physics I'm doing, high energy physics, it's really competence which counts, even not character. Of course you can have competition, but in a big collaboration it's very bad seen if you try to show misbehavior. The fight is only on scientific topics. 35_M*
- *Sure men and women show different attitudes in carrying out duties, but that does not affect personal knowledge; what really matters is to have a high level of knowledge to solve your duties. 41_F*

**Argument 2: This is not a problem, as in other field there is dominance as well (of men or women). **The passive approach to the problem is based on the observation of a general tendency for men to dominate in academia (e.g. in Italy), or through juxtaposing physics to fields that face opposite situation - this “justifies” the dominance as a phenomenon.

- *[In physics men dominate when it comes to numbers. What are the causes of this?] I would turn around this question, does it have to be equal? For example, the situation where you have dominance of women in sociology, and then dominance of men in physics, should this bother us? 72_M*

- *It is a general problem that concerns all fields, not only physics 48_F*

Argument 3: Women just do not want to be physicists. The position assumes that each person makes a free choice on their profession, according to one's predispositions or interests, and that simply female students choose other fields. The lack of willingness to study physics is also witnessed by numbers of those who apply to study this discipline. A simple fact of students being more often male is causing the imbalance within staff.

- // [Gender imbalance] results from the fact that (…) there are different predispositions to some activities, there are more preschool female teachers and more female nurses. (…) If a woman feels that she wants to be a physicist there is no problem to be one. (…) this comes from the specificity of the profession. This is in the whole worlds and I am not sure if you can artificially change it, as it is deep in a person what they want to do in life. I just think fewer women want to have this profession. 69_M//
- *From my point of view, when you look in the master studies, the percentage is probably 80% men? When you see the university is distributed like that, it's propagated after in all careers. The first question is "why are there so many men in the physics studies?". I'm not sure of my theory, but the asymmetry in women/men presence in laboratories is a direct consequence of the studies imbalance. 33_M*

External determinants: Impact of the socio-cultural context

The most commonly mentioned **reasons for male domination in physics are located **//**outside**//** the field** as such - there are embedded in cultural and historical context and relate to cultural norms and values. First of all, the respondents relate gender imbalance to the **processes of socialization and reproduction of gender stereotypes **in youth** **- these concern perception of girls' and boys' talents and predispositions to scientific work. Girls in their early years are "communicated" that science is not for them, and that boys are those who have "natural" talent for mathematics and "innate" technical skills. As our respondents indicate, these processes are mostly perpetuated through educational system (schools) and family, and they result in girls' low self-esteem in relation to mathematics, potentially and in practice, impacting their educational choices. Sometimes those cultural norms are so strong that they are treated as an objective difference, nevertheless most of the interviewees underlined the meaning of socialization, learning and internalizing stereotypes by children:

- *The problem comes from an idea that is implemented in children's brains very soon. Science is a boy's thing, not a girl's thing. It's terribly wrong, but it's a very common idea. 38_F_L*
- *We see that our society has certain expectations for girls and boys, that they're different. 13_F_L*
- *From the very beginning, from preschool education girls are rather perceived as beautiful than smart.(…) I know there are some occupations that are perceived as male or female, but I think that if a girl has a need to become a scientist, like it was in my case, then why not? No, it is not unnatural. If this need exists then it is natural. Every girl in the world should know that she can be smart and that it is not something unnatural. 55_F*
- *It's an ancient mentality that if you're a boy you might be smarter and had better technical skills than a girl does. 82_M*
- *The […] society looks at women as not so talented to get important roles in institutions, that's*

not true. This is because [our] culture. 45_M_L

In the early years when a young girl decides to be a student of physics, or even to engage more deeply in the subject in school, the **missing female role models** are a problem. This lack leads young girls to questioning their vocation to be a physicist (on positive impact of role models see chapter “Mentorship”):

- //When I was in high school, I hesitated between physics and history of art. The fact there was no famous female physicists made me think for a long time it was not a career for me. It is a vicious circle: since there are no examples of women known for this field, especially in leading positions, women imagine that it is a very masculine or even macho environment and refrain from engaging in it. 38_F_L //
- *If I have had a more tangible direct role model back at school that would have helped me making the decision maybe earlier, than I did. 15_F*

Secondly, the **cultural expectations towards women's role within family** are of critical importance - many respondents underlined the constraints resulting from the social expectations towards women engagement in family life, with her professional career being of secondary importance. These social expectations have further serious implications. One of the most often mentioned consequences is **a priority of a male partner career** over female partner' one.

- *You can see that some of the bias sets in at very young ages in terms of what girls expect of themselves and what others expect of them. That might be a longer term problem. Overall historically physics is seen as a male career and society expects women to be home to take care of the kids which are an overall problem for women balancing a career and a personal life. 04_F_L*
- *At some point you have to choose between personal career or keeping your relationship, your family life. Maybe girls are more willing to decide for the relationship and the guys for their career. If a guy pursues his career and his girl follows him, the society accepts it completely, he doesn't have any questions. In the other hand, you have a lot of people surprised and even shocked. It's not considered like normal. 37_F*
- *I actually think it mostly has to do with how we all have prejudices about what men and women should do and how they should lead their life's, who should be responsible for family. I think it's both that men have prejudices but also women hold back themselves and decide not to follow a career in natural sciences. 16_F_L*

The internalization of existing stereotypes of both women's lower capacities to pursue scientific career or concerning their primarily role as a mother can have diverse implications, which have been observed by the interviewees. First of all it may impact a choice of the career, but even if already in the field it may result in low self-esteem and doubts about one's capacities to pursue the career in physics, which can even cause women give up on the career in natural sciences. This was witnessed also in our study, as described in the part :“Career path...”, women more often voiced doubts about their talents and predispositions (this phenomenon is also known as impostor syndrome).

- *The older the previous generations were less likely to be welcoming to women and see them as peers. Since I have been here I've seen less of it but in high school my physics teacher was convinced women couldn't do physics. Perhaps its [the effect comes from] internalized ideas that women have on their own abilities fed to them by society. 04_F_L*
- *Eh, well. Maybe it´s a, well, there are multi-culture reasons probably and most of them are*

probably obvious but eh, obvious probably for many of us. But it´s not clear how to fix this. So, well, you should probably start at schools. Because we need to give women already since there are very little, so very young, the confidence with the topics which are related to physics. So, they have to feel that they are also competent or that they can be competitor on this field. They have to find the confidence with themselves on this topic and these, I think, can be really done by bringing simple experiments to school. 21_F_L

- *Men and women are equally motivated, the problem is more social. Sometimes women put them self-limits and obstacles believing to be minus than a man in terms motivation, capacity, skills. 41_F*

As showed above the “responsibility” for the imbalance is assigned to cultural context and early processes of socialization outside academic world, and many respondents indicated that the **barriers for women to realize their careers are not within institution**. This statement matched with the assurance on the fairness of the represented institution or even science as such, non-existence of discrimination, and the existence of adequate laws and regulations to prohibit that to happen.

- *Men are not privileged, more than women, by any laws or regulations. 81_M_L*
- *[Do you think that women encounter problems in realization of their career in physics?] We would need to analyze specific issues, as in general I do not see such problems. In our institution this is really an open profession, here we actually look at the potential of one's abilities. If someone is able to organize one's research work and has some successes. The matters of gender are of secondary importance. [What about women having children?]So, my statement was of general character, but if we look into specific themes, there might be problems. What you have just mentioned, can if fact pushed women from a normal path, stop her or even push away from the path. 69_M*
- *I don't think that there is an institution barrier which is higher for women. 16_F_L*
- *I don't think really that there is an active discrimination anymore nowadays. (...) Maybe self-esteem it was hinders you but not the research job or the administrative. 15_F*

While, most of the respondents hold the opinions about the socio-cultural context impact on the situation, some pinpointed **objective differences between genders, their preferences or predispositions** - they mention abstract or logical thinking that is easier for men, level of aggression, level of sociality, nonetheless they are not necessarily innate. Interestingly, even if sometimes admitting to some differences they could not be sure that they would have an impact on the career in physics.

- *Apparently men think more logically, I don't know if it is so, I'm not knowledgeable about this, and women are more 'dispersed', but does it cause troubles in physics? I don't know. 53_F_L*
- *I would say that usually a woman is less stimulated in doing such kind of things, she is less competitive for nature. 40_F*
- *And you can see that, for example when you give them the kit with components, it´s typically male, ehm, immediately touching all the components, starting to build things, do the experiment. While the typical attitude of a female is to, I mean, to do more careful, she has to realized and believe, she can do something and she, eh, she has to find the confidence to start with. But at the end the results they achieve and the experience, are better for the female comparison they made themselves, precision (laughs) and the way they decided to do the experiment and so. 21_F_L*

Internal determinants: Androcentric vision of a scientist and growing importance of structural conditions

Second block of determinants of gender imbalance is related to the functioning of the field and its specificity. These arguments were less often mentioned by our respondents and included reflection over the specific features of the field that could potentially deter women from entering it. Some respondents listed the features of very style of working, stressing lonely character of theoretical work, the need to sacrifice for science or the necessity of enormous dedication to it. This vision of a scientist who is fully dedicated to science is androcentric thus not allowing for other engagements than scientific work - in this context family is a deterrent factor, that coincides with main duty of a scientist and the effects of such collision should be eliminated. This tale about “sacrifice to science” is seen in the interviews of both women and men, who underline the strenuous, often lonely, constant 24-hour brain work (see also chapter on “Work conditions…”):

- *This works like that, that a women is really ambitious and she can manage life in a way that her work is on the first place. 66_F*

At the same time, the **recent developments in the field** (or in academia in general), linked to work organization and structural conditions grow in importance. Three traits of the today's physicist career were underlined as potentially causing more challenges to women: precariousness, competitiveness, and demand for mobility. These challenges are believed to deter women from undertaking this career path - they are related though mostly to the experience of younger generation of physicists. These aspects of the scientific career are also challenging to the image of a scientist present in the above-described narrative of a person fully absorbed by the scientific problem - today the management of the career becomes additional duty of the scientist (see chapter on “Work conditions and environment”).

While these new demands are faced by both men and women, it is believed by respondents that women are less willing to work in these new conditions. Nonetheless, the analysis of other parts of interviews shows, they are in fact negatively evaluated by both genders. Here, when asking specifically for the obstacles to women career, they are believed to be more difficult to be tackled by women. In fact, these determinants appear even more as a challenge where matched with gender stereotypes concerning role of a wife or mother - **precariousness or mobility appear most problematic when gender and family norms hold as actual.**

**Precariousness: **Due to existing gender roles related to motherhood women seek more often than men stability in the career. As the period of family formation coincides with the time of unstable employment (usually, multiple post-docs with temporary contracts), this may be deterrent to women who would like to establish a family or already have one:

- *We, as women, have been taught we have to take care, to be cautious about future. Men are more taught to be adventurous, to take risk to succeed. I think it reflects in the career path: men are less stressed to have several temporary jobs when we concentrate on security. 37_F*
- *The second thing is - I already spoke about this, but I'll stress this - the process of obtaining a permanent position, especially in the West it is very difficult and it is associated with doing a number of post-docs, and this sometimes lasts, we are talking about 2, 3 post-docs three years each, this makes almost ten years. 10 years of very hard work before one can receive tenure. (…) there is also a strong competitiveness - 10 or 20 enter a race and at the end there is one. This is how this community looks like. 54_M_L*
- *Long precariousness that is why women choose university paths that lead to less remunerated*

jobs, but stable and with less mobility (one of my colleagues has chosen to be a teacher). 47_M

Demand for mobility: **Intensive mobility is more difficult for women who have children or who are caregivers in more general sense. (See more in the chapter on mobility) **

- *The method of working in physics may sometimes pose problems, for instance these multi-week measurement campaigns make it necessary to leave for four weeks and not see home. In our culture it will be much easier for a man than for a woman, because - if there is a choice - a woman more often looks after a child and a man goes hunting. 59_M_L*
- *You have to be competing and moving constantly in the period when people normally think about forming a family. In this phase many people give up, but they are mostly women 30_M*
- *You have to consider that in the chosen academic career you will be ask to travel a lot. To go to conferences, to workshops, to be in committees, and this is already something that normally men can do without issues for all his life. While a woman, for a woman is for a few years can be an issue. 21_F_L*

Competitiveness **was **mentioned as possibly deterring females from participation in the field. In fact, many female physicists in our study stressed the competitiveness as a part that they dislike about their work. On the other hand, there were critical voices underlining that competitiveness is not specific to physics and that it bothers both men and women.

- *(…) apart from cooperation there must be competition and (…) not a power struggle, but a fight for influence, to which men are believed to be foreordained and which is more (…) attractive for men than for women - maybe this is the reason and it activates more strongly in physics. 59_M_L*
- *I would not say that it was more difficult because I have lots of colleagues which succeed without discrimination, I would say that usually a woman is less stimulated in doing such kind of things, she is less competitive for nature. 40_F*
- //But I think physics in general is exhausting. Also for men as well. This constant competition. //07_F

There were also few comments concerning **female preference of scientific field where the knowledge is more easily applicable** to the external world over those fields that concentrate on basic research and theory. Some indicated as well that women like didactics and contact with students, which may deter them from undertaking work in research institutes that do not imply teaching duties. In the quote below it is interesting that the male respondents links the lack of choice of physics to the difficulties women may face in finding work - this is very symptomatic as the respondent immediately disclaims the possibility of scientific career of female graduates.

- *Physics is a bit for persons “with their heads in clouds”. Women are more practical. For example, my wife is a chemist, there are plenty of women in chemistry, they like didactics (…) and also chemistry gives wider opportunities, (…) you can deal with cosmetics, set up a business, this is a more pragmatic choice that allows to sustain a family. (…) so women a more grounded to the earth, they choose faculties more promising from such point of view… 68_M_L*

Between external and internal determinants - areas of challenges for women

The clash between cultural norms and internal organizational issues create difficult conditions for

women's career - cultural norms that work in favour of men when matched with new principles for work organization can have even more deterrent effect for women's career. For example, although reconciling work and private life was already difficult in a linear and predictable model of career due to career breaks, now it become even more difficult to pursue a career when having children with a demand to leave for a post doc to another country.

**"*Male club" - experiences of being in minority* **

The domination of men in physics has important consequences for the work environment and the women's well-being at work. Women who enter the field, have to face the fact that they will be among the few of their gender. Our respondents describe different moments when they realized that they are in minority e.g. they noticed that the committee is only consisting of old men, or that they are the only female members of the research team. Some of them feel that being in minority may be uncomfortable - "*you ask yourself if you are in the right place*", some underline that it may cause fear or discouragement. In one case the female researcher noticed that this even caused to her the crisis with her womanhood -women want to adjust so much to the field culture that they cease to wear dresses or make up (see chapter on "Female experiences of microagressions"):

- *Women feel frightened because of the surplus of males. 23_F*
- *I'd always have the impression the male club had this feeling of: we do understand [ourselves] better among us boys. 42_M*
- *When such a potential female professor of physics sees that she's one in 50, and there is no other female professor of physics, discouragement appears. 59_M_L*
- *It is difficult to be the first or among few ones. 49_F*

As our study shows the masculine model of scientist is reproduced in different ways, from the androcentric model of work, to organization of space, ways of joking or communicating. This causes as well the lack of understanding of the different challenges that women may face in their career e.g. linked to parenthood. This may have consequences for institutional change as most governing bodies are consisted of men.

- *Male model is not questioned, in trivial aspects, too. For example, at Xxx [one of the European physics institute] toilets are not divided according to gender. This is disturbing in such an international environment.) 49_F*
- *The community in physics consists mostly out of men and they are missing the female perspective and don´t understand the different needs and challenges from/for women in their career. 21_F_L*

Some of the male physicists were aware that the way they behave may be a cause of unconscious discrimination as the style of communicating between men or symbols they use may be obsolete to females. Others are more critical and underline misogyny and lack of respect of the male colleagues towards the female researchers.

- *I have never come across conscious discrimination, however there might happen unconscious discrimination, which comes from some habits and from the fact that physics has been for long dominated by men, and the fact alone that women constitute 10% in physics and men - 90%, this alone creates unbalance, because the men's world can be a bit different, is based on bit different rules (...), codes. 54_M_L*
- *When I speak to male colleagues I feel that they have low estimation of female colleagues.*

42_M

Female researchers in our study often talked about the consequences of being in a male dominated environment. The first group of consequences relates to discrimination, sexism and microagressions - these are discussed in a separate chapter “Physicists experiencing different treatment”. The second is linked to the notion of **gender bias.** It was noticed by the interviewees that women in physics need to **women need to “prove double” to receive similar evaluation** - there were voices in our sample indicating that for a women physicist to achieve success she must be much better than her male colleagues. Additionally, being a physicist means a contact process of proving that you are worth to be in the field.

- *I say it loudly, and definitely in physics, at least in our institution, but I think in the whole country, women needs to know much more than her male colleague to get a certain position or work. This is really true, I can say it from my experience. 70_F*
- *As a woman in physics you have to be really, really good to get the same status as a man. 29_M*
- // [Interviewer: Do you think you need to work harder…] Yes, yes. […to counter these prejudices?] Yes, of course. Definitively, but that is always the point. As a woman you always need to prove that you deserve it, you know. And a lot more than a man. 07_F//

Additional important consequence related to gender role and gender relations is the **delegation of low prestige (and time-consuming) tasks to women** e.g. taking notes during meetings, administrative tasks. Women are also often seen as teachers, and their engagement in didactics may cause lack of time to do research work.

- *I found Xxx [name of a scholarship] quite helpful. It really helped women to be one semester off teaching which they could concentrate on research towards the end of their PhD which can be useful. Female PhD students are asked more because they usually say yes. To have something specific which say you are not teaching that term helps counter act that. I realized at some point I had to protect my students because they are always asked. They are all small things but they take away from research. 01_F*
- *And this is the barrier that me, but also my female colleagues, we were delegated to different tasks, like assisting, and the male colleagues were progressing. And then I was burden with all the small things to do so my time at work was full and I had not time to sit and reflect on some physics theories. Even if you notice it, it is difficult to liberate yourself. 65_F*

Reconciliation of private life and work engagement

When the respondents are asked about the barriers to women success in physics, at the first place they underline the challenges women face with **reconciliation of family and work**. As noticed above the field is perceived as the one which demands sacrifice and presence in a workplace, mobility and dedication to publication, which can be difficult to realize when having care duties. On one hand respondents noticed how their careers or careers of their peers slowed down due to fact of having a child, on the other hand there is a realization that within the field there is a high number of those women who resigned from childbearing as it was difficult to reconcile with their career. While having family can have an impact also on male career (and as described e.g. in chapter on mobility it sometimes has), it is women who face social expectations linked to fulfillment of mother role. While respondents indicate that some institutional solutions can help in the management of family duties in the context of work (which will be further discussed in the chapter on Institutional aspects of gender equality), but they rather stressed the meaning of cultural expectations towards women and men in family, which are hard to change.

- *They are in a disadvantaged position with regard to their curriculum because of the career breaks. A woman's career is slower because of family duties. Mobility is more difficult. 46_F*
- *Physics loses its women after the PhD. Many female scientists decide to leave science at this point of the career. The women rather concentrate on the career of the (male) partner and/or become mothers. 19_M_L*
- *I think there are social barriers. If your mother or your mother-in-law gets ill, who cares of her? You or your husband? We still suffer - even young women - from these social mandates 28_F*
- *I think the difficulty that comes up in case of women is to create a family and face difficulties that on the one hand are to be goals that we want to achieve in a professional life, and on the other hand, a compromise between that purpose and the fact that we feel obliged to perform other functions and they are undoubtedly very important, (...). I think this collision is always very difficult and I am afraid that it is more difficult in the case of women than in the case of men. What it comes from? From the fact that on the one hand we have enormous demands for development in the profession, in science they are - I would say - exorbitant, especially when you are young, because that acceleration must be dynamic enough to reach as soon as possible until this independence, building your own team is already possible. And usually it is also related to the period when the ladies decide to have children, for example, would like to spend some time with their children, especially in the early years of their lives. So it affects the slowdown in a completely obvious way. This is completely natural. And it is undisputed. 58_F_L*

Interestingly even if the last respondent mentioned for a slowdown due to being mother to be "natural" and "undisputed", in many cases the slowdown was not welcome and also not considered within evaluation, for example in a case of a Spanish institution, career breaks are not considered in the selection boards that have to evaluate the scientific production of the candidates. So, on one hand, most physicists praise the role of mother, or even "privilege to give life", on the other hand the discipline does not accommodate it within its functioning - in fact also men are treated as they are family-less (also in the narrative around the career men rarely mentioned any private life events that had impact on their career, while many women did). On the contrary, in the new model of career most of the achievement should be gathered in the period of post-doc positions (after PhD), which coincides with time for family formation and reproduction - as described in the quote above, the expectation is for a dynamic and rapid advancement up to the moment of building independent research team. As stressed in the chapter on "Mobility...", these new positions are often linked with the demand for settling in a new country or even multiple countries - in a situation when a partner/husband does not want to migrate this becomes practically impossible to realize. The importance of after-PhD phase for retaining women in science is stressed by many respondents:

- *The crucial point for me was always the Post-Doc-Phase, always. So, there was no woman, no female doctoral candidate in my group who stayed in science after her PhD. [...] I had really, really good female doctoral candidates and I really intensely supported them to stay because they were really excellent. [...] On the one hand the reasons were always that the partner got a really good job in a well-respected institution. And they said I go with the partner, but I don't believe that I could get a job in the same institution. Then they check out if they become mothers or get a job somewhere else. 19_M_L*

Priority to male career in a double career couples

The cultural norms linked with family roles are playing an important role in the dual career couples experiences. It is admitted by the physicists that the priority for men career exists also in physics, and in the couples when both woman and man are scientists, it is a man who is more likely to continue.

- *I know in physics there are a lot of couples, and often the man is continuing academic career. I do not think stay at home with family it's a wish which came up from woman spontaneously, it is not her choice, I think it's always a man's choice. 43_F*
- *It's impossible for both of us to pursue our career. It's not fair, because one of us has to sacrifice for the other. 37_F*

The demand for mobility without accommodating the needs of double career couples causes a lot of challenges and results in long distant relationships. While such situation is not perceived as welcomed by the researchers, it usually forces one of the partners to resign from a career. Even in our interviews there was feeling of resignation by some of the respondents, they do not believe they can avoid this sacrifice:

- *It's the other side of the coin when you are working on the same subject. It's quite difficult because we are working in the same field, and to find two positions in the same place, quite in the same research field is really a problem. 33_M*
- *We will finish our PhD in few months and then we will have to decide what to do after. Of course the main problem will be to find a place to go together. In a logistic point of view, it's difficult to plan. What if we both find very interesting jobs, but not in the same place, not even in the same country? Currently, I still don't know how we will personally and professionally manage this problem. 36_F*
- *But at the moment I don't know what the next step is for me and he is very clear, so I mean. I also had a chance, I did a post-doc already, I chose where to go, we were long-distance for a year and maybe now it's his turn to get the chance to choose where we go. [I: Or you don't go together.] It's an option, but one we don't really want to have. From a sustainable relationship point of view living long-distance is not something we want to have. [I: How likely is it that you both find something that you want to do at the same location?] Both of us doing academia is almost impossible. Going into industry is possibly more likely, but that really depends on the cities. And the country. 10_F*

Summary: The vicious circle of male domination in physics

We summarize the arguments discussed in this chapter in the illustration X. The vicious circle of male domination in physics starts from the simple numerical domination of men in the discipline resulting from the historical processes. The establishment of the androcentric model in physics is further strengthen by the cultural norms towards women and men roles in the family, as well as the stereotypes linked to the predispositions of girls and boys towards science and research. These processes most strongly impact early socialization as well as educational choices of girls and boys. This is also reinforced by the lack of female role models.

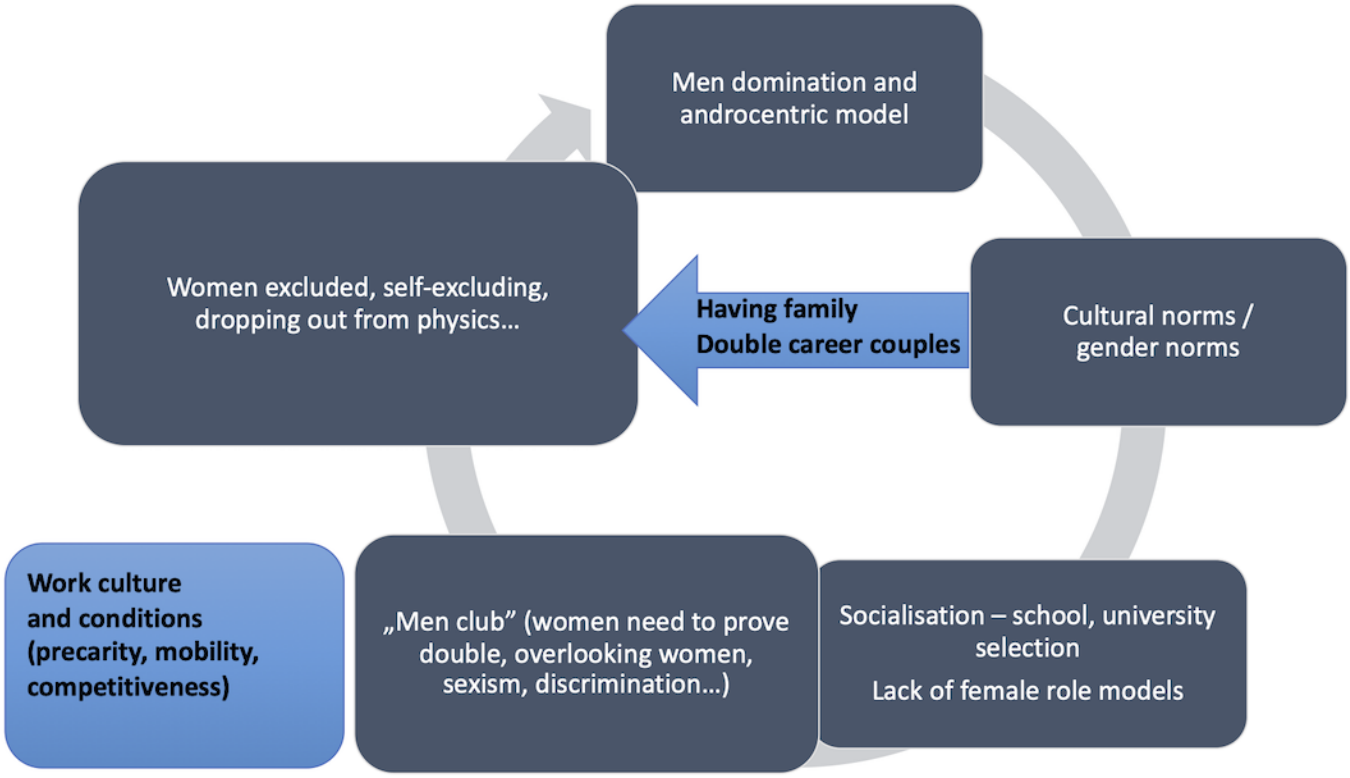


Figure 4. The vicious circle of male domination in physics

Source: Authors' elaboration.

When women enter the field (or university studies) they have to face the fact that they will be in minority and this bears certain consequences. The culture of physics is marked by the dominance of man, and the masculine model of scientist is reproduced in the androcentric model of work, to organization of space, ways of joking or communicating. This may result in experiences of overlooking women and other experiences of microagressions, sexism or even discrimination, as well as in gender bias. Additional set of factors) is linked to the organization of the field - work culture and conditions. Three factors are most relevant here: precariousness, competitiveness and demand of mobility. External and internal factors when clashing may create a difficult experience for women in physics - raising difficulties in reconciliation of private life with work, giving priority to male career, and necessity to deal with male dominance. All these may result in leaving science.

next

1)

We have to stress here that the interviewees were volunteers who expressed interest in the study participation, so possibly they are more interested in the theme as such.

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