

COMMISSION FEMMES ET ASTRONOMIE DE LA SF2A : SEXISM AND SEXUAL HARASSMENT FOR EUROPEAN PHYSICISTS

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Abstract. The Commission des Femmes en Astronomie performed a detailed analysis for the sub-population of European physicists of the recent international survey of sexism and sexual harassment in science, conducted by the polling institute IPSOS for the L'Oréal Foundation for Women in Sciences, with the help of the association *Femmes et Sciences*. This study confirms, similarly to the results obtained for the international sample, the ubiquitous nature of sexism and sexual harassment in European physics communities, with 88% of the women taking part in the study having been victim of sexism at least once in their career, and 54 % of sexual harassment. The survey clearly documents the impact of sexual misconducts on physical and mental health. We finally demonstrate the failure of the institutions to fight sexual violence, as only 5% of the victims seek help within their institution.

Keywords: Astronomy & Astrophysics, Gender inequalities, Sexism, Sexual harassment

1 Introduction

The Commission Femmes et Astronomie of the SF2A (Société Française d'Astronomie et d'Astrophysique of the French astronomical Society; hereafter CF2A) is an instance created in 2020 to address questions related to gender equality within the French astronomical community. The Commission has twelve members, of which five members are currently - or were at some point - also part of the SF2A Council: I. Vauglin, R.-M. Ouazzani*, C. Bot, S. Brau-Nogué, D. Briot*, L. Ciesla, N. Lagarde*, P. de Laverny, L. Leboulleux, N. Nesvadba, J. Malzac* and O. Venot*. The main goals of the Commission are to promote gender equality in Astronomy & Astrophysics in France, fight against sexual and gender-based violence, support gender-focused outreach actions, etc. In this scope, the commission conducted last year a study (Ouazzani et al. 2022) showing that, in a sub-set of 8 astronomy and astrophysics institutes, women represented around 25 % of the total staff for the year 2021. They also show that this number decreases with increasing level of responsibility or income.

Parallel to the work of the Commission, the polling institute IPSOS was contracted by the *Fondation L'Oréal* for Women in Science[†], in association to the Association *Femmes et Sciences*[‡] to conduct an international survey on sexism and sexual harassment in Sciences[§]. Following a large call for participation, opened between the 26th

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†<https://www.fondationloreal.com/fr>

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§<https://www.fondationloreal.com/fr/nos-programmes-pour-les-femmes-et-la-science/stillsearching>

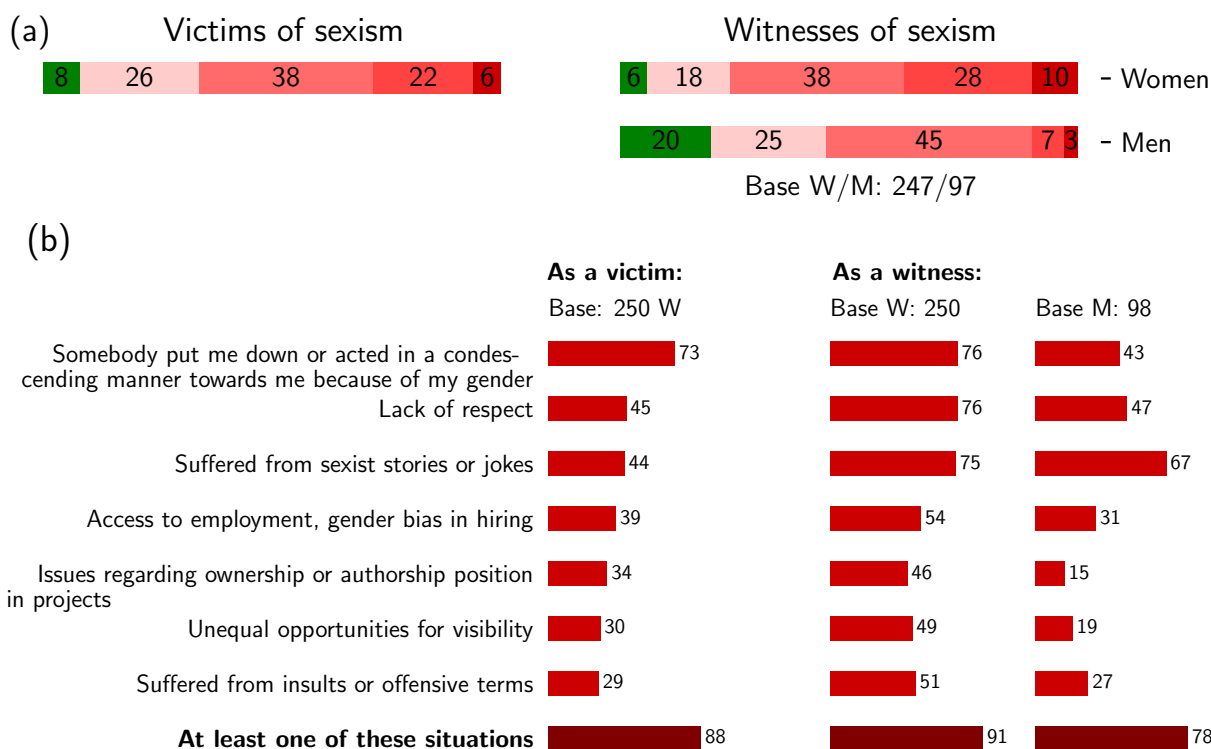


Figure 1. Row (a): Answer to the questions "Rate the extent to which each of the following statements is representative of your experience in your academic/research career. I have personally experienced situations of sexism" (left histogram) or "I have witnessed situations of sexism" (right histograms). Possible answers are "Never" (green), "At least once" (light pink), "On occasion" (pink), "Quite frequently" (light red), "Very frequently" (red). Numbers are percentage of the base number. **Row (b):** Answers to the question "Have you personally ever experienced [witnessed] any of the following situations in your career within academia/research? Think about all the situations you experienced, both online and offline.". Answers of the female victims (who "have personally experienced") are represented on first histogram. Answers from the female or male witnesses (who "have personally witnessed") are represented on the last two histograms. Number are percentage of the base of women or men.

of July and 16th of September 2022, they gathered answers from 5184 researchers (among which 76% of women) in 117 countries and over 50 institutions. The respondents include scientists with temporary or permanent position, students, and retired scientists, from 18 up to 70 years old. The vast majority of the respondents belong to a public academic institution (68% in the complete sample). Most of the scientists (80% for women and 85 % for men) consider that, overall, they are satisfied with their job. Yet, this study reveals the ubiquitous nature of sexism in science, as 84 % of women surveyed reported to have personally experience sexism in their carrier. This number remains similar on all continents, in all research fields. Half of the women interrogated in this study also reported to have been victims of sexual harassment with 2/3 regretting a negative impact on their career and around 70% denouncing the silence of their colleagues.

Starting from this data-set, the CF2A aimed at having a more precise look on the sexism and sexual harassment in the French astronomical community. Since the data-set does not give details about the sub-field of research, we did not have direct information on "astronomers", and therefore we chose to focus only on the physicists interviewed. Similarly, the sub-set of French physicists was too small, so we decided to extend the study to European physicists. This choice is also motivated by the fact that researchers in our community, especially young colleagues, regularly move from one country to another, in particular in Europe. Then, they may be concerned by the quality of working conditions in Europe. In the end, we have in our data-set 356 European physicists, among which 70% are women.

Section 2 of this proceeding is dedicated to sexism, and Sect. 3 to sexual harassment among European physicists. In Sect. 4 we investigate the impact of sexism and sexual harassment on the victims and their career. Finally, we discuss the limitation of the study and conclude in Sect. 5.

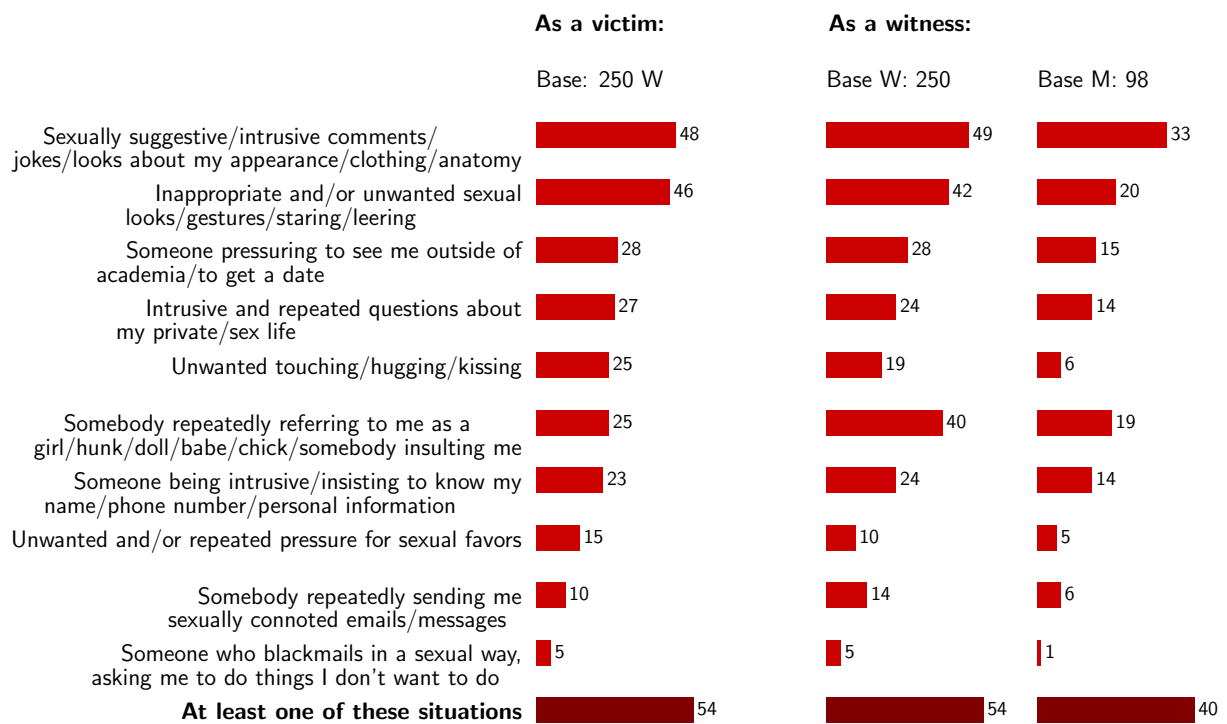


Figure 2. Answers to the question "Have you personally ever experienced [witnessed] any of the following situations in your career within academia/research?". Answers of the female victims (who "have personally experienced") are represented on first histogram. Answers from the female or male witnesses (who "have personally witnessed") are represented on the last two histograms. Number are percentage of the base of women or men.

2 Sexism

French law defines sexism as any conduct related to a person's sex, which has the purpose or the effect of violating their dignity or creating an intimidating, hostile, degrading, humiliating or offending environment (Article L1142-2-1, Code du travail & Article 6 bis, *loi de 1983**). Such conduct can be sexist jokes, insults regarding gender, unequal access to employment, etc. First, the pollsters have asked scientists in the sample to tell if and how often they had experienced or witnessed sexism. Answers are summarized in Fig 1, row (a). The first striking conclusion that emerges from these answers is that almost every women who answered faced sexism at some point in their scientific career, and around one third more than once. This number is similar to the world average recalled in introduction. The slight excess may not be statistically relevant as our sub-sample is much smaller than the total sample. In the men's responses, quite an important fraction have never witness sexism in their work environment, a number at odds with what women declare.

Then, pollsters asked whether respondents had personally experienced or witnessed precise situations among a list of seven that can be qualified as situations of sexism. The results for victims and witnesses are summarized in Fig. 1, row (b). Such a question aims at knowing if a situation of sexism is correctly identified by victims or witnesses. This is actually the case, because, in each cases (victim/witness, female/male), the percentage of respondents declaring that they never faced a sexism situation is similar to the percentage that never faced one of the precise situation listed in Fig. 1, row (b). As before, men tend to witness less sexism situation compare to women (~ 80% compare to ~ 90%). However, this numbers are very high and reveal quite an accurate sensitivity to sexism from men. It would be interesting to have some insight on the evolution of these numbers, in order to see if men become more and more aware of sexism.

Except for condescending acts that around 75% of victims experience, all other situations are experienced

*while the *code du travail* rules contracts in the private sector, it is the *loi de 1983, portant droits et obligations des fonctionnaires* which applies to public servants

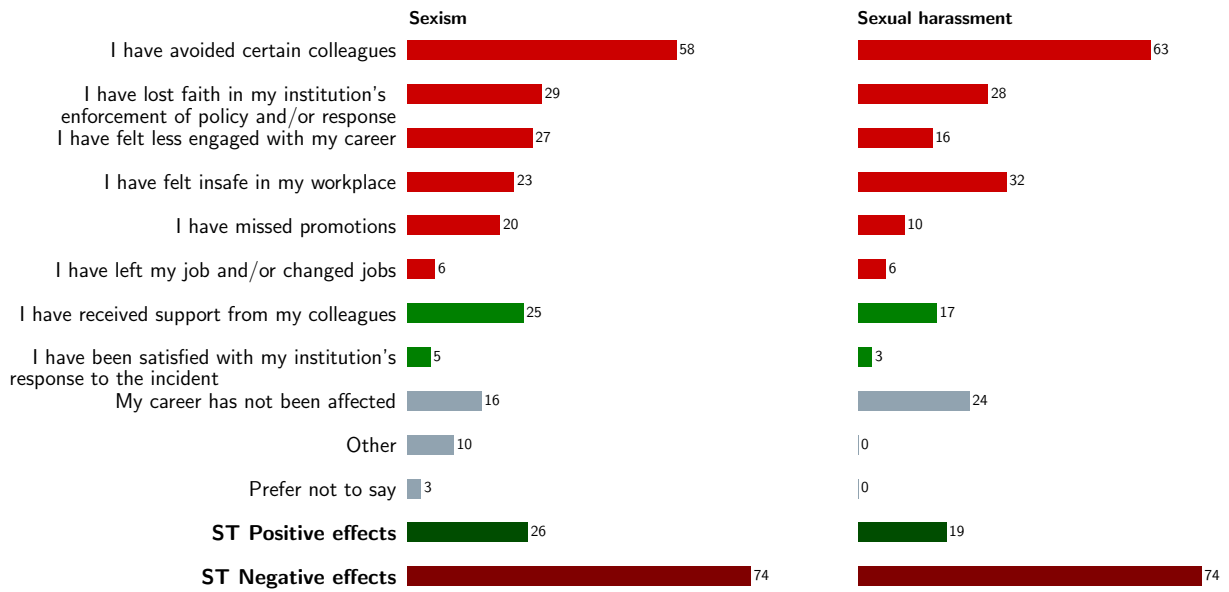


Figure 3. Answers to the question "About the situation(s) you experienced personally: How has it affected you/ your career?". Results for victims of sexism (resp. sexual harassment) are displayed in the left (resp. right) histogram. Red bars code for negative consequences, green bars for positive consequences, and grey for no effect.

in a very homogeneous way, and at a very high level ($> 30\%$). This homogeneity is also found with women who witness those situations, while men report much less issues with ownership or authorship and visibility opportunities. Women who experience sexism do not experience only one of these situations. Indeed 56% of the victims report that they have personally experience at least three situations listed in Fig. 1, row (b), and this number rises to 69 % percent among witnesses.

For half of the victims of sexism, the facts occurred at the beginning of their career, while only 5% have experience sexism only at the top of their career. 44% declare they have faced sexism all along their career. The victims have experience situations of sexism, for 47% less than 2 years ago, and for 71% less than 5 years ago. It stresses that, while the #metoo movement may have raised awareness on sexism, these situations still persist afterward.

3 Sexual harassment

The French legal definition of sexual harassment have been refined over time. First defined as repeated sexist behaviour (see above legal definition of sexism), it is now assimilated to the fact of using any form of serious pressure, even if not repeated, with the real or apparent aim of obtaining an act of a sexual nature, whether this is sought for the benefit of the perpetrator or for the benefit of a third party (Article L1153-1, Code du travail & Article 6 ter, *loi de 1983*). This definition is supplemented by the case law of the Orléans Court of Appeal, which characterizes the ambient or environmental sexual harassment, as a situation where "without being directly targeted, the victim is subjected to provocations and obscene or vulgar jokes which become unbearable for her (Orléans Court of Appeal, 2017).

In a symmetric way as they did for sexism, pollsters investigated perception of sexual harassment in science. 46% of European women physicists declare that they have been victims of sexual harassment, and 20% frequently. The situation is identically seen as female witness. Contrary to sexism, men strongly underestimate the occurrence of sexual harassment as only 27 % report having witnessed such conduct. When they are interrogated on precise situations, more women and men declare that they have experienced or witness situation of sexual harassment, as summarized in Fig. 2. Indeed, while 46% of women declared they had seen or faced sexual harassment when they are questioned on their perception, this number rises to 54% when they are asked to identify precise situations. Similarly, only 27% of men felt they had witnessed sexual harassment, while they are 40% when concrete situations are explicitly described. It reveals that a lot of work remains to be done on raising awareness of both women and men on sexual harassment.

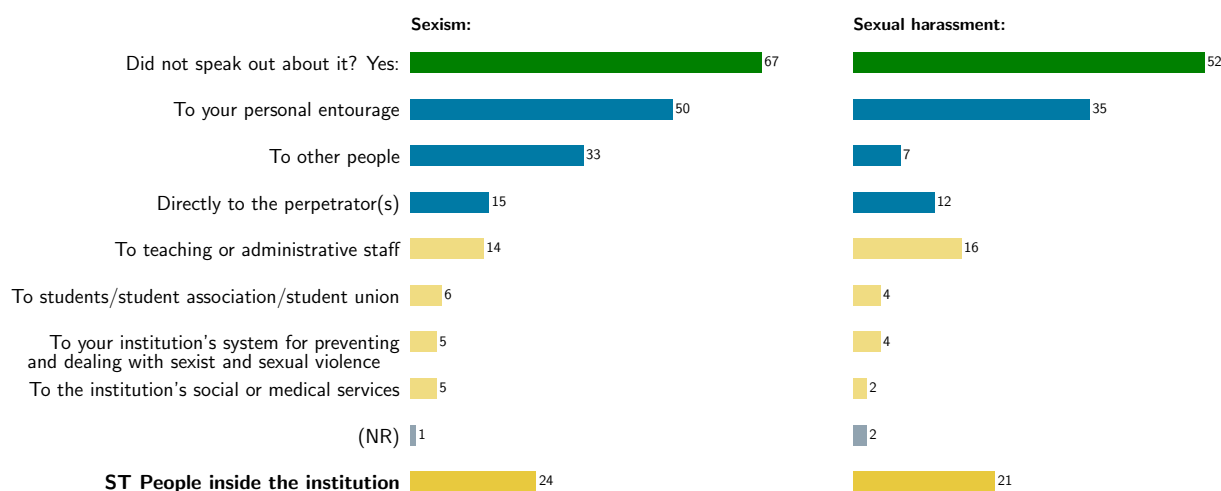


Figure 4. Answers to the question "To whom did you speak out about the incident you experienced (when it happened or later)". Results for victims of sexism (resp. sexual harassment) are displayed in the left (resp. right) histogram. Numbers are percentages of the victims who spoke. Blue bars code for people inside the institution and yellow bars code for people inside the entourage of the victim.

It appears that women in lower hierarchical positions experience sexual harassment at a higher rate, and this is more the case than for sexism. Among the victims, 74 % have been harassed at the beginning of their career, and this number is still to 14% when the victim obtains her first responsibilities. This is also stressed by the fact that only 27 % experience sexual harassment during their whole career, when they were 44% for sexism. Similarly to sexism, the #metoo movement did not end the culture of sexual harassment that pervades in the scientific community.

4 Consequences

After quantifying the occurrence of sexism and sexual harassment in the scientific community, pollsters focused on assessing what are the consequences on the victims and on the perpetrators.

Sexism and sexual harassment induce stress, anxiety and uneasiness. In some cases victims feels vulnerable, scared and physically threatened. This is not without effect on the career of the victims. These consequences, as perceived by the victims, are summarized in Fig. 3. We can see that both sexism and sexual harassment induce protective reaction from the victim, such as avoiding the perpetrator -or groups where hostile sexist environment develop-, or by leaving their job. Sexism and sexual harassment also lead to loss of motivation, victims feeling less involved in their work or in the progress of their career. Loss of motivation is more pronounced for victims of sexism than of sexual harassment. The survey also shows that exposure to sexism reduces more self-confidence than sexual harassment. The reason may be that when sexist conducts become more and more serious, the feeling of injustice outweighs powerlessness and prompts action.

Interrogating the impact of sexist behaviours on the career also shows that institutions have not succeeded yet in having their employees feel protected against sexist and sexual violence. Very few victims ($\sim 5\%$) are satisfied with the answer of their institution, and around 30 % have lost faith in its ability to enforce its own rules. This is also visible when the victims have been asked to tell to whom they spoke if they spoke. The answers are summarized in Fig. 4 and show that, among the victims who spoke, less than 1/4 spoke to someone in their institution and very few ($\sim 5\%$) to the listening unit, dedicated to fight sexist conducts. This reflects, either the fact that these units are poorly known, or they are thought to be inefficient. This question also reveals that the more serious the facts are, the less victim speak.

5 Discussion and conclusion

We re-investigated an international survey lead by the L'Oréal Foundation and the IPSOS polling institute, on sexism and sexual harassment in the scientific community, focusing on the category of European physicists.

This sub-sample is thought to be the one that corresponds the best to the French astronomers community, while keeping a large enough data-set that leads to statistically significant conclusions. This study reveals that sexism and sexual harassment may be seen as characteristics of the culture that pervades in scientific communities. Indeed, around 9 European women physicist out of 10 declare they have been victim of sexism at least once in their scientific career, and half have been victim of sexual harassment. Such conducts severely diminish the self-confidence of the victims, make them avoid certain colleagues and even make them feel physically threatened. Despite the legal obligation of employers to ensure the safety of their employees on their workplace, victims often feel they are left on their own to deal with the situation. Among the women who do speak out, only $\sim 24\%$ seek help inside the institution, while the other confide to their personal entourage or try to face directly the perpetrator.

This study and the original poll still suffer from some limitations. Despite its international aspect, 64% of the respondents are European, and 68% of them are French. Such imbalance may induce geographical or cultural biases in the assessment of sexism and sexual harassment in science. Such disparities can lead to very small sample when too many conditions are consider, which made us prefer the category "European physicist" (365 respondents) to the one of "French physicists" (204 respondents). However, these possible biases may not be too strong because, as soon as a subset is large enough, for all the questions of the poll answers are display a distribution consistent with the distribution obtain for the complete sample.

Since personal data are protected, we could not have access to the answers of each respondent individually, but only to aggregated results in the form of percentage of each answer, for each category. This prevented us from conducting the analysis further because we cannot investigate the correlations between different answers. For instance, around 10% of the women who spoke after having been victim of sexual harassment notice a negative impact on their professional journey. It would be very interesting to know if, for instance, these women are the one who spoke about the situation to the perpetrator. This cannot be done with the data we have at our disposal.

Finally, the survey has been conducted over the internet, and link to the poll was sent to 50 institutions in the world. This raises two problems. First, response to the poll is voluntary. The respondents may be more familiar with questions related to sexist and sexual violence, either because as witness, or as victims. Even if the respondents are only representative of 10% of the community -which is a very conservative assumption-, these results show that, it we take an institute composed of 100 members, around 9 of them have experienced sexism and 6 sexual harassment, and we, as a community, should not tolerate this. Secondly, some questions in the poll might have led to ambiguous answers from the respondents. To the question "how did speaking out impacted your professional journey" (possible answers: positively/negatively/no impact), many ($\sim 70\%$) say that it had no impact. Does it mean that sexism or sexual harassment continued (which would be negative), or that it stopped but the victim was not ostracized nor supported by their colleagues (but then it is in contradiction with so many respondents reporting they have suffered from sexism or sexual harassment during their whole career) ? It would be interesting to extend this quantitative survey with a qualitative study based on semi-structured interviews. It would allow an in-depth study of the consequences of sexual misconducts, as well as the motivations for action or inaction, what kind of actions, etc.

Regardless of these caveats, this poll, by its extent and the details of its questions, is particularly important, demonstrating for the first time the extent of sexist and sexual violence in science, all over the world and in all fields. We thank the L'Oréal Foundation for tackling the subject, in order to raise awareness of it and for taking action to put an end to it. This survey sets a starting point for studying the evolution of the importance of sexism and sexual harassment in Science.

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