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De-Gendering STEM - Lessons Learned from an Ethnographic Case Study of a Physics Laboratory

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ABSTRACT

This paper presents an ethnographic case study of a physics laboratory[1] in Germany, which has the striking characteristic that, at the PhD and postdoc level, women outnumber men. While such a clustering of women in male-dominated fields may occur frequently in local settings, such an inversion in workplace gender balance has escaped the notice of gender studies in STEM. In Germany, the participation of women at all stages of the academic career in physics has increased since the turn of the 21st century, but on average women make up only 20–25% of physics students at the bachelor, master's, and PhD levels. It is concluded that this physics laboratory exemplifies an exceptional assemblage of norms and policies of gender equality, processes of recruitment, work organization and professional culture of physics that is inclusive for women and men with different biographical backgrounds. Prior investigations in gender studies have shown that the professional culture of physics is constituted by interwoven ways of "doing gender" while "doing physics". In contrast, this case study shows that "doing physics" and "doing gender" might become disentangled in this local setting. Therefore, this study contributes to challenge perspectives on gender and STEM research that seek to de-gender STEM fields.

KEYWORDS

Physics; science; sociology; gender studies; ethnography

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INTRODUCTION

Debates on how society might attain gender equality have been ongoing during the 20th century. These discussions led to manifold interventions and policies at local, national and international levels. However, gender equality in science, engineering and technology still remains to be reached – especially in Western industrialized countries. The gradually increasing participation of women in almost all STEM fields over the 20th and especially since the beginning of the 21st century may create the impression that the "glass ceiling" has cracked. However, that glass ceiling is not broken. It still inhibits women's full participation in STEM education and professions. Gender inequality persists. Research on gender and STEM seeks to understand the sources of this inequality. This research demonstrates that gendered socialization processes result in gender segregation. For example, gender researchers document how a young person is affected by the socializing agency of parents, schools and higher education as well as by that of peers and the media. During adulthood, the effects of socialization are investigated as manifested in gender segregation at the workplace and in work–life imbalances. Professional cultures, being durable over time and informal, are regarded in research on gender studies as having profound effects on the gendering of STEM fields. Therefore, professional cultures contribute to the glass ceiling that hinders individuals and groups from participating on equal terms in science and technology, as described above.

This paper addresses physics in Germany, where the participation of women at all stages of the academic career in physics has significantly increased during the 21st century. In 2012/13 women enrolled as first-year students of physics at a rate of 25% at the bachelor level; they obtained 22% of the bachelor's and 21% of the master's degrees in physics. Ten years earlier, women made up 15% of physics students at the bachelor's and the master's levels (Matzdorf & Düchs, 2013). Women constituted 20% of those gaining a PhD in physics from German institutions in 2012/13, double their proportion of the physics doctorates earned at the end of the 1990s. The most significant change took place at the level of professorships. Currently 9.4% of all professorships in physics are held by women in comparison to 2.7% in the year 2000 (Erlemann, 2014a & 2014b).

With the collaborative research project "genderDynamics. Professional Cultures and Research Organizations in Physics" (hereinafter briefly referred to as "genderDynamics"), we explore the effects on local settings of these recent and significant expansions in women's participation in physics in Germany. In the project we relate our findings to three perspectives: (1) policy-governed changes towards and ongoing discourses on gender equity in science and society; (2) the organizational types exhibited by the research communities under investigation; and (3) the local professional cultures of physics. This project employs "focused ethnography" (Knoblauch, 2001). Knoblauch argues that an ethnographical approach may be focused (1) with regard to short time periods of an ethnographic

investigation and (2) with regard to given problems and research questions. The project "genderDynamics" is organized into three sub-projects. Each sub-project investigates one organizational setting in physics for two time periods of several weeks: a) universities; b) new forms of research organization such as networks and clusters; and c) non-university research institutions. Possibilities for implementing gender-equality policies in higher education and research will be developed from the results of the overall project.

THE CASE

This paper presents the first results of one of the four ethnographic case studies undertaken within the sub-project of "genderDynamics" that investigates physics in the organizational setting of universities.[2] Ethnography puts the researcher in a position to observe daily practices that are involved in physics research and in the higher-education aspects of physics. Alongside observation, we conducted semi-structured, qualitative interviews.

At the beginning of the ethnographic fieldwork, one physics department member directed me towards a working group that was exceptional with regard to women's participation in physics. That group included a woman postdoctoral scholar and PhD candidates who were all women, and one third to one half of all students at the master's and bachelor level were women. In their external gender identities, the make-up of the core staff of the physics working group was unexceptional. The incoming principal professor, the retired senior professor who had established this working group, the technician and the senior researcher were all men. The sole administrator was a woman. What could have led to the relatively high participation of women at the master's and the PhD level in this physics group?

I chose to focus in this paper exclusively on observing and interviewing members of this physics working group. The current professor of this physics laboratory had been appointed fairly recently before I began with the fieldwork. He worked closely together with the former and then retired professor of the group. This senior professor was still present during the week and continued to work in the laboratory. The group's field of research in physics was close to chemistry. The new professor continued to work with the experimental equipment of the former professor and stayed in the same laboratories and office spaces. Also, the group stayed more or less within the same office spaces of the building and continued to use the same laboratories and seminar rooms as before.

In accordance with the overall collaborative research project "genderDynamics", I apply the following three perspectives to my ethnographic investigation of this physics working group: (1) policy-governed changes towards, and ongoing discourses on, gender equity in science and society; (2) different types of research organization; and (3) professional cultures of physics. I illustrate each of these three perspectives by way of examples which draw on insights, field observations and qualitative interview material from my ethnographic study.

BACKGROUND

In discussing the situation of women scientists in America, historian Margaret Rossiter (1982) stated that, historically, women "infiltrated" into "male" domains of science at the PhD level by means of "territorialization". Science was divided into territories suitable for "female" participation, and other territories that remained exclusively "male". The STEM fields viewed as suitable for women were associated with women's abilities and interests, as conventionally assigned by society. In effect, the gendered work segregation of the time was perpetuated by allowing women to participate in certain areas of science but not others. However, this situation did not hold true for all local contexts. Rossiter identified several historical settings within STEM disciplines where women congregated in fields deemed suitable only for men. It is well known for example that a group of women in astrophysics contributed to scientific research and knowledge at Harvard College Observatory at the turn of the 20th century (ibid.). Gender studies on science and technology have come to apply the term "clustering" to similar situations, where women aggregate together as an enclave within a traditionally male domain of science.

While there may be other examples of women clustering in a male-dominated scientific field, this kind of inversion in workplace gender balance has escaped the notice of gender studies in STEM. This paper aims at addressing that issue, through ethnographic examination of a physics working group that has an unusual high proportion of women.

METHODOLOGY

In ethnographical research, the researcher herself is the main "research instrument". Therefore, it is necessary to reflect on one's own positioning in the field of study. Having been trained as a physicist and sociologist, I view myself as a partially situated observer in the field under investigation (Haraway, 1988). My participant observation is shaped by multifaceted paradigms that are related to physics, to sociology and to gender studies.

My ethnographic work is founded on two theoretical positions that are defined in gender studies about how "gender" is understood. The first theoretical position is associated with the question: How is it possible to observe gender and not to reify presupposed gendered notions of what is being observed? In my efforts to engage with this question, I employ, as a heuristic instrument, the "Zero-Hypothesis" (Hagemann-White, 1988). This hypothesis states: "... there exists no necessary, naturally prescribed dualistic genderings, but exclusively different cultural constructions of gender."[3] "The Zero-Hypothesis" pertains closely to current debates on intersectional[4] gender studies that view the assignment of "gender" to a person or a group as being a result of multiple entanglements of categories of social inequality, including race, class, nationality, age, or sexuality. This second theoretical position that I adopt here from gender studies defines "gender" consequently as a highly situated attribute: "Gender [is] conceptualized as a situated attribute [...] within [...] the pattern of recurring links" (DeLanda, 2006, cited by Puar, 2012). Conventionally, "gender" is treated as a category that is predetermined by society at the time of birth and over the life course of a person.

By contrast, I apply an understanding of "gender" as situated in the local instances of a given setting. Under this view, the attribute of "gender" highlights contingent connections in social settings instead of being viewed as a stable or inherent signifier of social inequalities or structures. When I talk about women and men, or female and male individuals in this paper, I refer to the above-mentioned theoretical notions of Hagemann-White and Puar. "Gender" is to be understood as an analytical category in the following way: "gender" needs to be understood as an attribute that comes into existence through contingent links of a local assemblage and is not to be understood as a pre-given inexorable category. Therefore, the practice of ascribing "gender" to an individual or a group is the result of some human, situated, non-absolute agency ascribing it to this individual or group. If possible the researcher should aim at interrelating such ascriptions to further attributes of the individual or group, such as "race", "class", "sexuality", "ethnicity" or ascribed "bodily abilities".

RESULTS

Under the ethnographic method, the first substantial step is to gain access to the fieldwork site, in this case, a physics laboratory. In doing so, the researcher begins to open up the "black box" of a scientific laboratory.[5] To gain access, we secured written informed consent from the physics department as a whole and orally from members of the specific working group under study. Since we framed our enquiry as a piece of research on gender equality, the willing consent of these actors showed their open-mindedness towards concerns of gender equity.

I conducted four observations in the physics group, each lasting a couple of days. During my first and second stay, I carried out participant observations in the laboratory spaces and offices, during lunchtimes and coffee breaks. In addition, I observed teacher training courses, advanced experimental courses, physics lectures and colloquia. During my third and fourth stay I also conducted semi-structured qualitative interviews with group members including the group's professor, a doctoral student and a master's degree student. The results presented in this paper are based mainly on field notes, interviews with group members and documents that give further insight into different aspects that were discussed during participant observation work.

My analyses below identify instances where my informants were "doing gender" (Butler, 1990) while "doing physics" in: daily interactions and practices; recruitment of new members into the group; organizing laboratory work; and portraying the professional culture of this microcosm of a physics laboratory. Norms and policies intended to promote gender equity contribute to the analysis below.

Impacts of Policy-Governed Changes and Discourses on Gender Equity

Over the last decade, a range of gender-equality initiatives and policies have been established in German research contexts at the national level (for an overview, see Best et al., 2013). These nationwide initiatives built upon gender-equality initiatives at local levels and on the networking of women in STEM professions that originated in the late 1970s. From 1992 until today, women physicists have convened national physics meetings that were open only to women participants. In 1998, a working

group seeking to promote equal opportunities for women and men within the national German physics society was founded.[6] At the university where I undertook the study, each department, including the institute of physics, elects representatives and councils to work on improving gender equality in the department and in the university as a whole.

The group's leader asserted that "gender issues" were not viewed as a problem within his research group. But this de-thematization of gender equality is countered with an ongoing tradition that women in this physics group are routinely elected as representatives onto the gender-equality council of the Universitys physics institute. If there were no gender issues at stake for these women, why would they seek election to this council? However, the efficacy of this gender-equity council was questioned by group members in my conversations and interviews with them. They often said that the gender-equality council did not have any impact. A student who had served as a representative on the council in the past stated to me that she had agreed to be elected only because "no one else did".[7] In my view, this statement shows that she downplayed her own engagement in the gender-equality council. Also, I observed that group members, including the group's professor, were aware of who had been elected as a representative to the council at a given time, even to the point of labeling, or possibly even stigmatizing, those elected representatives, although no such explicit statement was made during my visits to the physics laboratory.

Another institutional policy intended to promote participation by women in STEM was regarded ambiguously: aiming at certain percentages for the participation of women in physics. One student who had obtained a fellowship speculated that an "implicit quota" influenced the decision process. Although no such official "quota" existed for getting her fellowship, she voiced her strong apprehensions about establishing a "forced women's quota" for including women in academic settings during the interview.

Alongside these views on institutional policies regarding gender, personal awareness and involvement in women's issues in physics, another story was given to me during an interview: one of the interviewees recalled how a former postdoc in the group challenged a former male professor of the group. During her research tenure with the group, this female postdoc continually asked the professor to refer to students by the term "Studierende" instead of "Studenten". At that time, the word "Studierende" signaled the inclusion of all genders and a willingness to reach gender equality, in contrast to the generic masculine term "Studenten". This former postdoc is presently engaged in such gender-equality initiatives as mentoring networks and speaking to young audiences as a role model for women in physics. As another personal example, a doctoral student described the impact of her own experience in attending one of the above-mentioned national women-only physics conferences.

Members of the physics group exhibited both an explicit awareness of gender-equality policies, and views on the status and role of gender in the group as well as in physics. Group members were involved in local, regional and national initiatives and networks to attain gender equality. In addition, group members engaged in

gender-equality issues more or less openly. At the same time, this engagement was downplayed by gender advocates themselves and possibly stigmatized by group members who were not in favor of gender-equality issues. Overall, the normative goal to reach gender equality is tolerated and to a certain extent explicitly supported in this physics group.

Impacts of Organizational Structures and Professional Cultures: The Example of the Recruitment Processes

While processes by which new members are recruited into a working group in physics are highly informal, the recruitment process exemplifies the mechanism of research organizations and also professional cultures in STEM. I wondered how gender issues figured in the recruitment process in this physics working group. The participation of women in the group was substantially higher than the participation of women in physics on average at the institute of physics at the university where I undertook the study, and in physics at the national level in Germany. How do group members perceive this group's relatively high participation of women at the bachelor's, master's and especially PhD and postdoc levels?

As reflected to me, under the leadership of its former professor this physics group boasted a high participation by women. However, in the past the postdoc position seemed to have been given only to men. After the former professor retired some years ago, the group went through an interim phase during which no new members were recruited. During this phase, the group consisted of only two students: one man and one woman. In interviews it was conveyed to me that the appointment of the new head professor had changed this exclusion of women from the postdoc position: postdoc positions came to be held also by women physicists. During the time of my study, the only postdoc position was held by a woman who had taken time off for maternity leave during the period of my ethnographic study. Also, all the PhD candidates were women. One woman had to start her professional training in science anew, having migrated to Germany where her Eastern European training was not accepted. A second PhD student had been trained and worked in a trade before she began to study physics and continued with her PhD work in physics. Three of the current PhD students worked in salary-based positions; one was supported by a fellowship. In general, this physics group reflected a diverse student body. For example, one of the male master's students identified himself as disabled. At the same time, he felt completely integrated into the group and its research work.

Asked during the interview about the relatively high participation of women in his group, the current head professor speculated that once the proportion of women in the physics group reached some threshold, more women tended to be attracted. He pointed out that the group was known department-wide for its high participation of women. Also, he correlated the group's relatively high proportion of women to the engagement of women in the equal-opportunity council of the physics institute. Overall, he concluded during the interview that the recruitment of relatively high numbers of women into his group happened unintentionally. Although he gave the impression of being at ease with this situation, he nevertheless mentioned that it

would probably change in the future. Therefore, his attitude to the current situation appeared to be ambiguous.

About one year after my first visits to the physics laboratory, the situation had changed slightly. In addition to the woman postdoc and the four women at PhD level, two men who had already been group members as master's students were now pursuing doctoral-level research in the physics group. At the master's level, one woman and two men were listed as group members; at the bachelor level, two women had become new group members.

Research Organization: Work Segregation in the Physics Group

In this section I outline the characteristics of the second research perspective of gender dynamics, namely: how the work of the physics group is structured and divided up among group members. Asked about how the laboratory work is organized, the group's professor gave an explanation that gave structure to my observations of daily routines in the laboratory and to how the research work in the laboratory was being organized.

Instruments/Apparatus

The group's current head professor said that each group member was responsible for one of the main instruments in the laboratory. During my laboratory observations I concluded that some apparatus was used to create new materials; other devices such as microscopes, X-ray instruments and tunnel microscopes produced visualizations of new materials; another group of instruments were used to measure magnetic, electrical or other properties of materials. These instruments were mostly under the supervision of master's and PhD students or the professor himself. Lab technicians with many years of seniority had acquired substantial expertise in doing research with heirloom instruments that had been in use for many years in the physics laboratory and which were still in active service. During my visits to the physics laboratory I was able to confirm this work segregation in the group by talking to group members during their work with the different instruments.

From manufacturing probes to manufacturing physics

Physicists-to-be are required to work on a thesis project. They work on a bachelor, master's or PhD thesis. Each thesis in this physics group is principally associated with one kind of material. The group's leader conveyed in the interview that he tries to prevent competition among group members by assigning certain materials to only one person, or to a small team. The overarching aim of doing physics research in this group is to create new materials and to characterize their chemical and physical properties.

However, at the societal level, the lab's mandate is to produce publications on the ascribed and newly discovered characteristics of the manufactured and investigated materials. During the interview, the group's leader called these publications the "currency" of the group. In his view, this currency enables him to get funding for new research projects in the future, for which he can hire new students and young scientists. External funding is secured mainly from German national funding

agencies. The group's members participate in national and international conferences. It was my impression that the group fulfills the lead professor's expectation of making contributions to physics knowledge through publications. Their work is published in prestigious international journals such as *Nature* or *Science* as well as in international physics journals.

Acquiring confidence and competence in physics
During my visits to the laboratory, I got the impression that, over time, a member of the group gains experience in handling an instrument. Concurrently, the group member travels through different areas and functions of the laboratory with the material "in hand", so to speak. A first task is to characterize the material. Next – if possible – the material's properties will be measured and defined. All experimental work is continuously evaluated by: comparing its outcomes with knowledge taken from literature; informal and formal discussions among group members; and contacts within associated professional networks. Relevant outcomes of the work are being published in a qualifying thesis, or as a paper in a journal. While knowledge is created as a group effort, it might also be assigned to individual group members through publications. The name of a physicist-to-be might become linked with specific expertise in this field of physics.

The ideal physicist is an all-rounder
The group's leader based this way of organizing the work in the laboratory on his own experiences during his past training in physics. He was appointed to this professorship early in his career, and therefore viewed this way of organizing the research work in the laboratory as fairly successful. He agreed with my stated impression that this way of structuring a student's progress through the lab corresponds with an ideal of a physicist as an "all-rounder". In the literature on the professional culture of physics, this image of an ideal physicist has been identified in the past as a masculine one: prominent physicists tend to be portrayed as single-minded geniuses (Traweek, 1988). Below I discuss how this idealized image of a physicist as an all-rounder might be relevant in disentangling "doing gender" from "doing physics" in this particular laboratory.

Professional Culture of Physics: Group Life in the Physics Laboratory
During the 1980s, Keller (1985) argued that a belief system, rather than reality, underlies the view and portrayal of science as a masculine endeavor. In order to deconstruct this belief system, she recommended investigating the *practice* of research. Ethnographic studies of science provide a means of investigating daily practices in higher education and research in science. Over the last three decades, some exemplary ethnographies of the professional culture of physics have embraced the concerns of gender studies. In common, these studies describe in detail the masculine endeavor of physics. In this regard, Erlemann (2004), Münst (2009) and Hirshfield (2010) examine physics teaching in university settings. Physics research communities exhibiting masculinized notions of physics have been studied for example by Traweek (1988), myself (Lucht, 2004), Hasse and Trentemøller (2008) and lately by Pettersson (2011). In her recent review of research in gender studies of physics, Götschel (2011) concluded that these analyses show a close "entanglement of physics and gender". However, Danielsson

(2012) gives evidence that women in physics also can work successfully at creating disentanglements of "doing gender" while "doing physics".

In this section, I apply the research perspective of "genderDynamics" to investigate the professional culture of physics in the physics working group, by examining different laboratory situations as settings that contribute to the experiences of members of the group in a certain professional culture. From these analyses, I ask the question: Might "doing physics" in daily practice become disentangled from "doing gender" in this physics group? In researching this question in the physics working group, I found that disentanglements of "doing gender" while "doing physics" might be observed to a greater extent during laboratory situations where group members work in small groups with the material or the instruments.

In many situations during the course of carrying out the field work, group members expressed to me how much at ease they felt while working in this physics group. A PhD student whom I interviewed highlighted that she liked the familial atmosphere. The group's leader is accessible to group members during office hours and by working with them at their experiments, sharing his experiences and expertise; the group as a whole gets together for colloquia as well as for lunch and coffee breaks. In my perspective, these local laboratory practices have a high potential to be viewed as contributing to deconstructing gender stereotypes.

During my visits to this physics laboratory I often participated in situations where only women were present in a laboratory setting or in physics training courses while they were working with, and talking about, instruments, materials and possible characteristics of these materials and devices. They consulted handbooks of physics and chemistry while discussing with each other whether a created material would or would not show aspired properties. Laboratory work was interrupted during the day by going to lunch, teaching duties, having coffee, dealing with administration requirements or ordering instruments and materials.

The high participation of women in this physics working group may counter culturally embedded notions that "doing physics" within the professional culture is shaped by multiple connotations of "doing masculinity". However, this impression is countered to a certain extent by those laboratory situations that ensue during "breaks", namely coffee breaks or lunchtimes. These breaks might be viewed as interruptions of "laboratory life". At the same time, laboratory life continues during these breaks, but in ways that differ from the conduct of practical laboratory work. During breaks that I observed, gender was negotiated informally in ways that exhibited heteronormativity of group members. During one coffee break, for example, a female PhD student said that she did not know whether she would be able to join the group for an upcoming hiking trip. A male master's student jumped in and asked whether this conflict was because of an appointment at the hairdresser for to get a perm. In making this remark, he was showing off as "knowing women".

Overall, group members valued these breaks as being essential for the social life of the group. During breaks, the cohesion of the group was negotiated,

communications about laboratory work continued, and common leisure-time activities were planned. Interactions among group members during breaks seemed to me to be more explicitly gendered than those in the laboratory. The most informal settings, such as coffee breaks or lunch, show more explicit notions of "doing gender" while "doing physics".

CONCLUSION – STUDYING EXCEPTIONAL ASSEMBLAGES IN STEM

This case study of a physics group at a university in the German context may be interpreted in relation to Puar's concept of assemblage: patterns of recurring links were explored that could be related to norms and policies of gender equality, the recruitment of group members and the way of organizing work as examples of research organization, and the professional culture of physics, as exemplified in coffee breaks and other components of group life. These links enhance opportunities for including diverse members in the group and for establishing an exceptionally high participation of women in this physics laboratory. This case study sheds light on how "doing gender" while "doing physics" might become disentangled by comparing different laboratory settings within the same working group of physics.

The group conveyed to me a high level of awareness of norms of gender equality and an active engagement in the local council on gender equality. Although no official quota exists, an implicit gender quota is hinted at and an – imagined – explicit quota is rejected by most group members. The group is known for its high participation of women at the institute of physics. The recently appointed new professor continued to recruit women to the group while at the same time stating that this happened unintentionally. Therefore, the present assemblage of this physics group with regard to the currently inverse situation (that more than half of its members at the bachelor s, master's, PhD and postdoc levels are women) might exist only temporarily.

The organization of physics research work in the laboratory was portrayed to me as segregated but highly cooperative. Research work is organized in accordance with the group leader's view that an ideal physicist is an "all-rounder" who creates as well as characterizes new material in relation to bodies of physics knowledge. In the current set-up, members of the group who are viewed as women might fit into a picture that is traditionally associated with male tales of becoming a genius in physics (Traweek, 1988) or of inheriting physics expertise through a masculine genealogy (Lucht, 2004). In many laboratory situations that I observed, the current assemblage of this physics group counters these images of the professional culture that assert that "doing physics" is at the same time inherently a "masculine endeavor".

Groups in STEM settings where women cluster offer possibilities to study such clusters as examples of "best practice" for including women and minorities in science. They serve as "best practice" in a second way too, namely as examples that oppose the notion that STEM disciplines are endeavors where "doing physics" is linked closely to "doing masculinity". However, gender equality has not yet been attained when it comes to leadership positions. The glass ceiling might have been

broken in this group with regard to postdoc and PhD positions, but remains in place with regard to the leadership position.

Breaks during the daily routine of laboratory life shed further light on the professional culture of physics in this group. During breaks, the whole group intermingles across daily work routines and across status groups. Although breaks count as time off from work, laboratory life still goes on through discussions about work and social life. The members of the group value breaks as occasions when the family-like atmosphere is fostered and the group's cohesion is supported. However, "doing gender" is played out more explicitly during breaks than during working time in smaller groups in the laboratory.

Overall, this particular physics group represents an example of an environment where an exceptional assemblage of norms and policies of gender equality, of recruitment processes, of work organization and of professional culture of physics might be studied. Further investigations of such exceptional clusters and assemblages that may serve as examples of "best-practice" physics laboratories might contribute to the study of how disentanglements of "doing gender" while "doing physics" might be fostered. As a consequence, this study and its analyses might inform and encourage research perspectives on gender and STEM that seek to explore further possibilities to de-gender the professional cultures in STEM.

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ENDNOTES

[1] This case study is part of an ongoing collaborative ethnographic investigation of several differing organizational settings for the research and study of physics: the project "genderDynamics. Professional Cultures and Research Organizations in Physics" is a collaborative research project between the Freie Universität Berlin (Prof. Dr. Elvira Scheich, Department of Physics) and the Technical University of Berlin (Prof. Nina Baur, Institute of Sociology; Prof. Sabine Hark, Center for Interdisciplinary Women's and Gender Studies). It is funded by the German Ministry for Education and Research (BMBF) and the European Social Fund (ESF) (No. 01FP1235-38).

[2] This sub-project of "genderDynamics" has been carried out at the Center for Interdisciplinary Women's and Gender Studies (ZIFG) at the Technische Universität Berlin (TU Berlin). For a short description of this sub-project, see www.genderdynamiken.de/hochschulen/en.

[3] Translation: Petra Lucht.

[4] The term "intersectionality" in gender studies has become prominent since the work of Kimberlé Crenshaw (1989) on the context of analyzing affirmative action policies in the U.S. But the notion that several oppressive systems are "interlocking" with each other, such as "racial, sexual, heterosexual, and class oppression", was actually coined during the 1970s by black feminists (Combahee River Collective ([1977] 2000, p. 210).

[5] Before we undertook our ethnographic work, we asked for the consent of the physics department. We asked to study a particular working group in physics that is led by a physics professor. In order to get access to this group, I asked for the consent of its leader, and during fieldwork, I obtained consent from individual members of the group.

[6] For further information on this working group on equal opportunities, see http://www.genderdynamiken.de/

[7] The student did not explain this statement in more detail.

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