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LGBT+ physicists: Harassment, persistence, and uneven support

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Diversity and inclusion in the field of physics has been an important area of research in the last two decades. However, such work has scarcely looked at the concerns and barriers faced by LGBT+ physicists, despite numerous indications they face discrimination in wider society. This article presents the first study looking at the climate experiences and persistence of LGBT physicists through an online survey ($N = 324$) focused on intragroup differences within the LGBT+ community. The results indicated that 36% of all respondents reported considering leaving their institution or workplace with 22% reporting that they experienced exclusionary behavior in the last year (i.e., being shunned, ignored, or harassed). However, this number varied by gender with transgender participants (49%) experiencing the most exclusionary behavior. Overall, respondents who could be out about being LGBT+ were more comfortable at their institutions and workplaces. The results point to the increasing challenges of LGBT+ physicists who are also transgender or persons of color, indicating the need for further research on this topic.

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I. INTRODUCTION

Over the last two decades the issue of inclusion and equity has been a significant topic of concern in the science, technology, engineering, and mathematics (STEM) community. Physics education research (PER) has also sought to grapple with and understand the complexity of an increasingly more diverse student body in higher education. This work, however, has primarily focused on topics of gender in physics with a smaller but growing body of work considering race [1–15]. Few to no studies have been done on students and professionals from other groups, including

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parents, people with disabilities, and gender and sexual minorities [16–19].

The work that has been done in PER looking more deeply at gender, and issues of identity, is informative to the results presented here. Qualitative studies on graduate women in physics have revealed complicated relationships between gender identity and physics participation [20–22]. These articles have demonstrated the cultural manifestation of a contradiction between being women and doing physics, and the challenges of being feminine presenting when completing graduate work in physics. Work by Rosa and Mensah has explored the further intersectional challenges of being both black and a woman in physics [15]. For example, they found that exclusion from peer study groups could be detrimental to the academic development of black women in physics Ph.D. programs. Their results indicated a physics community that can be exclusive, which is a challenge for potential physicists who are both women and black. Two recent papers from one study in Texas stand out in addressing race, gender, and sexual orientation in physics [23,24]. This qualitative study interviewed physics students who identified as LGBT, including women of color. Their first paper looked at how each participant saw themselves as a physicist and their own views on stereotypes that may have prevented this self-identification [24]. Their second paper uncovered how departmental structures and a culture of teamwork led these participants to a model of finding "success together" [23]. Combined they suggest the importance of being inclusive of multiple intersecting identities and building policy structures that encourage communal attitudes towards accomplishments and success. These papers and other work on identity in physics suggest the importance of exploring many varied identities and how they impact one's experiences [13,14,25].

Within PER it is also important to expand the communities being researched and supported. Over the last half decade significant strides in the LGBT+ (lesbian, gay, bisexual, transgender; the "+" represents additional gender and sexual minorities as described in Sec. II) community have translated to important work in STEM and more specifically physics [16–18,26–28]. The first such efforts were qualitative in nature focusing on both faculty [26] and students [17]. Their findings suggested an academic environment that was often dismissive of the experiences of gender and sexual minorities. More often than not LGBT+ faculty and students felt compelled to hide their gender and sexual identities to navigate their respective STEM communities.

Further work has begun to explore this topic quantitatively. Secondary data analyses demonstrated the negative impact being out had on LGBQ faculty (the subgroup of LGBT+ specifically studied), as well as how their experiences of exclusionary behavior predicted their inclination to leave their positions [18]. Later work included climate analyses of LGBT+ STEM workers in the government, which indicated more negative experiences for LGBT+ than non-LGBT+ persons [16]. This article offers one of the first looks at the lives and experience of LGBT+ physicists from students to career professionals, growing out of a grass roots movement aiming to support and retain LGBT+ talent in physics while building a community through the advocacy work of Dr. Elena Long in her creation of the LGBT+ physicists organization.

The LGBT+ physicists organization started in 2010 as an independent organization to serve the interests and community of LGBT+ people in physics. Through advocacy at the American Physical Society (APS), the largest physics member society, the organization hosted an invited session on LGBT+ issues in physics at the March 2012 conference meeting [29]. This session highlighted the experiences of LGBT+ physicists, data on LGBT+ scientists, and suggestions for their inclusion in APS at large. Following this session an *ad hoc* APS committee on the status of LGBT+ persons in physics was created to prepare a report to APS leadership recommending changes in the organization. The research presented here was part of the committee's work and led to the eventual creation of an APS report that outlined the research and policy recommendations [30].

This is the second article in a three paper series focused on this dataset. Each paper uses a different methodology to address different aspects of the LGBT+ climate experience in physics. The first article [31] used a qualitative approach to analyze the responses of 71 survey participants about their experiences of harassment and exclusionary behavior. These findings indicated that many persons had negative experiences from students, faculty, and staff concerning their LGBT and gender identities. The majority of these negative interactions were verbal comments and social exclusion. A few, however, did report sexual harassment and physical touching. In this paper, we use a mixed-methods approach to explore the overall climate experiences of participants and relate these to their consideration to leave their institution. The third paper will focus on the workplace climate of participants through a quantitative approach by analyzing a workplace climate survey instrument. In that paper, the workplace data will be used to understand its impact on consideration to leave and outness of participants about their LGBT+ identity. A common theme through these combined works is the necessity of a positive environment in supporting retention, which we show to be more important than negative experiences in predicting an individual's consideration to leave.

II. TERMINOLOGY

Before presenting the methods and results of this work, we first define the terms used:

LGBT+: A common acronym that refers to gender and sexual minorities broadly, but specifically encodes Lesbian, Gay, Bisexual. and Transgender people. The + is used to represent the many other gender and sexual minority identities part of the LGBT+ identity who are not L, G, B, or T.

Transgender: A person who identifies their gender differently than that which they were assigned at birth. For example, a person who was assigned male at birth but identifies as female is a transgender woman.

Cisgender: A person who identifies as the gender assigned to them at birth.

Gender nonconforming (GNC): An umbrella term for gender identities outside the gender binary (i.e., outside of the categories of men and women). "Nonbinary" and "genderqueer" are commonly used as synonyms, although some people who use those terms might not view them as synonyms.

Out: Adjective used to describe someone who openly discloses their identity as part of the LGBT+ community. Also can be used as a verb to describe the act of revealing, perhaps publicly, the LGBT identity of someone who is not out, typically without the person's approval. Outing an individual can be harmful or even dangerous to that person.

Gender and sexual minorities: A term meant to encompass all persons who identify with genders and sexual orientations not considered to be in the majority of the population.

Queer: A former term of abuse that has been reclaimed by some members of the LGBT+ community as an identity that may be used in place of, or in conjunction with, other identities within the LGBT+ spectrum.

Genderqueer: A person who identifies their gender outside of traditional labels (i.e., man and woman).

Questioning: An individual who is not yet certain of their sexual orientation or gender identity.

Race: Social construction of groups based on physical traits that are seen as important (e.g., skin color).

Ethnicity: Refers to shared history and culture (e.g., language, traditions, religion).

III. METHODOLOGY

This research was conducted as part of the American Physical Society (APS) *ad hoc* committee on LGBT+ physicists (C-LGBT). The charge of the committee was as follows:

> *The committee (C-LGBT) will advise the APS on the current status of* LGBT+ *issues in physics, provide recommendations for greater inclusion, and engage physicists in laying the foundation for a more inclusive physics community. More specifically, the committee will investigate* LGBT+ *representation in physics, assess the educational and professional climate in physics, recommend changes in policies and practices that impact* LGBT+ *physicists, and address other issues that affect inclusion.*

The work of the committee included a survey instrument distributed globally that had both enumerated and open-ended responses. Five interviews were also conducted after the survey to give more context to specific LGBT+ subpopulations, consistent with an intersectional outlook. The subpopulations of focus were transgender persons and LGBT+ persons of color. The methodology of the survey is described in detail below; survey questions are included in the Appendix. Preliminary results of the survey were included in the committee's final report [30].

A. Problem statement

This study seeks to create a baseline of understanding about the climate experiences, persistence, and outness of LGBT+ physicists. The study took an exploratory approach to report the climate experiences of LGBT+ physicists broadly, and to understand the impact of gender and race identity on LGBT+ participants. Lastly, this study seeks to understand how the climate experiences of LGBT+ physicists impacts their consideration to leave their department, job, or education.

B. Theoretical framework

A recent paper suggested the importance of moving beyond binaries in gender and considering noncomparative research methodologies to investigate the lives of underrepresented and underserved populations in physics [32]. In light of this and attempting to understand the lives of LGBT+ physicists from their own perspectives, the design and implementation of this study used standpoint theory [33–35]. Standpoint theory, and feminist standpoint theory in particular, postulates that real knowledge can be gained only through understanding the experiences of an oppressed group from their own perspectives, and by juxtaposing the experiences of those with various standpoints surface intersections and differences. Consequently, the design of this study was to look at the experiences of LGBT+ physicists without comparing them to their non-LGBT+ peers. In this vein, comparisons were only made across LGBT+ persons to understand the varying experiences within the group. Standpoint theory also focusses the researcher's attention on the question of why research is being done, and for the advancement of whom [35]. This idea prompts researchers to make sure that the aims and purpose of research is for the group being investigated. The work by the C-LGBT put the improvement of the experiences of LGBT physicists first, and worked to develop promising proposals in their charge. We further chose interview subjects and approached the survey analysis with an intersectional outlook in mind. According to this perspective, one should acknowledge that those whose identities lie at the intersections of multiple marginalized groups have compounded vulnerabilities and may experience ostracization even within communities with which they share common oppression.

C. Survey

The survey instrument was designed using prior literature [18,28,36] and the expertise of the C-LGBT+ committee to assess (i) demographics, (ii) climate experiences, and (iii) persistence. Section (i) was created to look for salient information about the participants such as their gender identity, sexual orientation, race, level of outness, and more. Phrasing of the questions was designed around previous LGBT+ climate research in higher education [18,28] and the expertise of the committee members. Section (ii) was created to understand the personal climate experiences of participants on campus, in the classroom, and in their work places. Several questions used a Likert scale of strongly agree to strongly disagree; this will be abbreviated as (Likert) in the following. Section (iii) was comprised of one yes or no question asking participants if they considered leaving their institution in the last year.

The survey included three overall climate questions about their experiences (Likert), two questions about their personal experience of exclusionary behavior (yes or no answers), and a larger workplace climate questionnaire designed by Liddle *et al.* (Likert) [36]. The lack of trans-specific questions in this questionnaire prompted the researchers to create a subscale of trans-specific climate questions (Likert), which were only available to participants who self-identified as being transgender. Our theoretical framework of standpoint theory necessitated this decision in order to ensure that the trans standpoint was included in our work. Their unique perspective, and differences between those experiences and other groups, gives their insights particular salience when discussing the LGBT+ experience.

In all of these sections participants also had the opportunity to type in open-ended responses to elaborate on their choices. Within the survey, one question was included to check for participant attention. Midway through the survey a question asked participants to select a specific answer to ensure their focus.

D. Participants

The survey was approved for use by the Institutional Review Board at the University of Maryland and included a consent question at the beginning of the survey. The survey was distributed online through snowball sampling. Snowball sampling is a method that asks identified participants to share the survey with persons they believe should take the survey [37]. Since LGBT+ people cannot be readily identified across physics, such methodology enabled the greatest reach. In order to begin this snowball effect the survey was sent out to the LGBT+ physicists list-serv of ally and LGBT+ physicists. It was also posted on Facebook in various diversity in physics groups and LGBT+ STEM groups. The survey was further distributed to various physics list-servs. In all, 324 usable responses were received. Details of these participants can be found in Sec. IV A.

E. Analysis

The survey results were cleaned and analyzed using the SPSS statistical software package. Statistical methods for analysis include descriptive statistics, chi square analysis, t tests, and binary logistic regression [37]. Descriptive statistics will present the relative representations of various question answers and demographics. Chi squared analysis will look for statistical significance of answer differences between groups. Chi squared is useful in assessing the differences between answers on multiple response questions. It looks for the expected results and checks to see the difference between these expected results and the actual participants answers. Chi squared can detect differences between groups where there is a large discrepancy in representation [37], so it was a useful measure to look at the experience of trans people relative to nontrans persons. t tests are a more traditional comparison of difference between groups, but here our goal is tocompare the distributions of responsesand not try to translate the responses to an interval scale to compare the means for different groups. t tests can also fail to see difference if the group sizes are too different or if a test is being done across multiple groups. Finally, a climate model was built to understand how participant experience of harassment and climate impacted their persistence.

Qualitative responses to questions were pulled out from the survey and coded by four separate persons using six categories: (1) gender, (2) trans identity, (3) sexual orientation, (4) general climate issues, (5) life circumstances, and (6) issues of career advancement. The four coders met to compare their results and these responses are intended to flesh out the overall meaning of the survey results, adding context and detail to the numerical results. This context, and the participants individual experiences, enabled us to identify their unique standpoints as subgroups within the LGBT+ community.

F. Interviews

Five interviews were conducted with persons representative of intersectional groups within the dataset, as well as to provide standpoints poorly represented in the survey data. Participants were recruited from a confirmative response to a survey question that they would like to be interviewed. They were further selected by the first author based on their underrepresented intersectional identities. The interviewees were all students (this was an artifact of the available pool rather than an intentional decision) and represented voices from women, genderqueer persons, and trans-masculine persons. One participant identified as a trans person. Another participant was African American. Further details on the interview subjects will not be shared in order to protect their anonymity. Quotes from their stories will be shared in Sec. IV to contextualize statistical results with lived experience.

(a)

Gender	N	%
Man	162	50%
Woman	119	37%
GNC	25	8%
Other	11	3%
Missing	7	2%

(b)

Trans identity	N	%
Trans	37	11%

(c)

Intersex identity	N	%
Intersex	2	1%

(d)

Sexual orientation	N	%
Asexual	15	5%
Bisexual	86	27%
Gay	116	36%
Heterosexual	46	14%
Lesbian	45	14%
Man Loving Man	10	3%
Pansexual	26	8%
Queer	63	19%
Questioning	8	2%
Woman Loving Woman	6	2%
Not listed above	15	5%

(e)

Race	N	%
African	2	0.6%
African American	6	1.9%
Alaskan Native	1	0.3%
Asian	19	5.9%
Asian American	11	3.4%
Southeast Asian	2	0.6%
S Asian	7	2.2%
Carribean/West Indian	2	0.6%
White	267	82.4%
Latino	16	4.9%
Latin American	4	1.2%
Middle Eastern	5	1.5%
Native American Indian	6	1.9%
Pacific Islander/Hawaiian Native	2	0.6%

(f)

Workplace	N	%
Academia	272	84%
Industry	16	5%
Government	19	6%
Other	8	2%

(g)

Workplace Status	N	%
Undergraduate	62	19%
Graduate	126	39%
Postdoc	29	9%
Faculty	42	13%
Staff	9	3%
Administration	2	1%
Research Scientist	17	5%
Technician	5	2%
Engineer	7	2%
Project Manager	3	1%
Other	14	4%

(h)

Undergraduate	N	%
1st year	7	11%
2nd year	8	13%
3rd year	15	24%
4th year	25	40%
Other	7	11%

(i)

Graduate	N	%
Masters	12	10%
PhD	111	88%
Other	2	2%

(j)

Faculty	N	%
Instructor	2	5%
Assistant Professor	10	24%
Associate Professor	12	29%
Professor	15	36%
Visiting Professor	1	2%
Other	2	5%

(k)

USA Citizen	N	%
Yes	239	74%
No	78	24%
Missing	7	2%

(l)

Work in USA	N	%
Yes	254	78%
No	63	19%
Missing	7	2%

(m)

Identify as Physicist	N	%
Yes	299	92%
No	15	5%
Missing	10	3%

FIG. 1. Demographic information of survey participants.

IV. RESULTS

A. Demographics

Results from the demographic responses of the survey participants are displayed in Fig. 1. When asked to provide their gender, the majority of participants identified as men and women, with smaller numbers identifying as gender non conforming or other gender identities [Fig. 1(a)]. Participants were also asked in two separate questions if they were transgender [Fig. 1(b)] or intersex [Fig. 1(c)]. Participants could select multiple categories to describe their sexual orientation [Fig. 1(d)]. Most identified as being gay, queer, lesbian, and heterosexual. We note some identities, and combinations of identities, are better represented in the data than others: A particular limitation is that there were no respondents who identified as trans and men.

When asked about race, participants could select multiple boxes to describe themselves. Respondents identified as White, Asian, Latino, Asian American, African American, and Native American Indian and other identities as shown in Fig. 1(e). The overwhelming majority of the respondents identified as White, with Asian Americans being the second largest (but much smaller) group. The particularly small number of African American respondents (1.9%) stands out as likely reflecting their underrepresentation within the wider physics community [15].

The workplace status and context of participants is shown in Figs. 1(f)–1(j). The majority of survey participants reported working in academia with fewer participants reporting to work in industry or government [Fig. 1(f)]. Within academia most respondents were graduate students, undergraduate students and faculty members; these categories are broken down by stage in Figs. 1(h)–1(j).

Further, participants were asked in separate questions to provide their USA citizenship status [Fig. 1(k)], whether they primarily worked in the USA [Fig. 1(l)], and whether they identified as physicists [Fig. 1(m)].

In Fig. 2, we display responses to a question that asked participants to identify their relative degree of outness in different social contexts. Participants in this study were less likely to be out to their coworkers than their friends or immediate families. But slightly over half were completely out or out to most of their co-workers about their identity as an LGBT+ person or ally. Participants were more likely to be out to their co-workers than their extended family, which was the social category that drew the largest number of "Not out" responses.

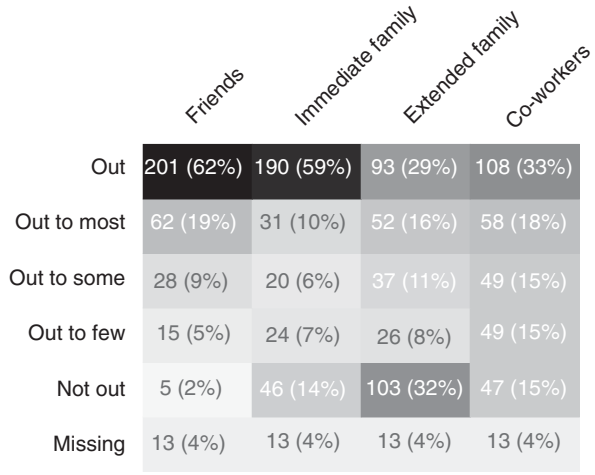

FIG. 2. Participant outness in different social contexts.

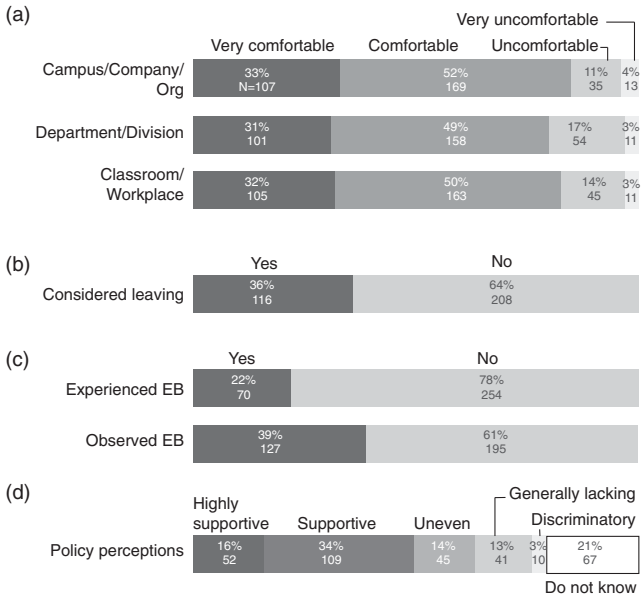

FIG. 3. Participant perceptions of overall climate. (a) Comfort in different institutional contexts. (b) Whether participants had considered leaving. (c) Experience and observation of exclusionary behavior. (d) Perceptions of institutional policies.

B. Climate experiences and persistence

Figure 3 displays an overall picture of participants' climatic experiences. In Fig. 3(a), their comfort level in different institutional contexts is displayed. A majority reported being very comfortable or comfortable on their campus or in their company, in their department or division, and in their classroom or workplace.

Despite this, over one-third of participants reported considering leaving their institutions in the past year before taking the survey [Fig. 3(b)]. In this same period a sizable minority of participants reported experiencing and/or observing exclusionary behavior due to gender, gender expression, gender identity, sexual orientation, and sexual identity [Fig. 3(c)]. In response to a question about their perception of workplace policies, around half of participants saw policies in place as supportive of LGBT+ persons [Fig. 3(d)].

C. Impact of gender on experiences and standpoint

In Fig. 4, we display responses to some of the climate questions described in the previous section broken down by the gender of the respondent. Significant differences were found in the reporting of climate, experience of exclusionary behavior (EB), and observation of EB between participants who identified as men, women, and gender nonconforming compared to a model where there was no association (i.e., the actual counts are different from those expected from a model with no significant differences due to gender). As shown in Fig. 4(a), men reported being very comfortable in their campus, company, or organization at higher rates, while GNC respondents reported being uncomfortable at higher rates. These trends are broadly similar in other institutional contexts. Men also reported being very comfortable in their department or division as well as classroom or workplace at higher rates while women and GNC participants reported being uncomfortable at higher rates. In all contexts, GNC participants reported being uncomfortable at higher rates than women. Through these results we are able to see that the individual standpoints of people from different genders produces differential experiences as expressed in the data. Their standpoints continued to differ in their responses on other items as well.

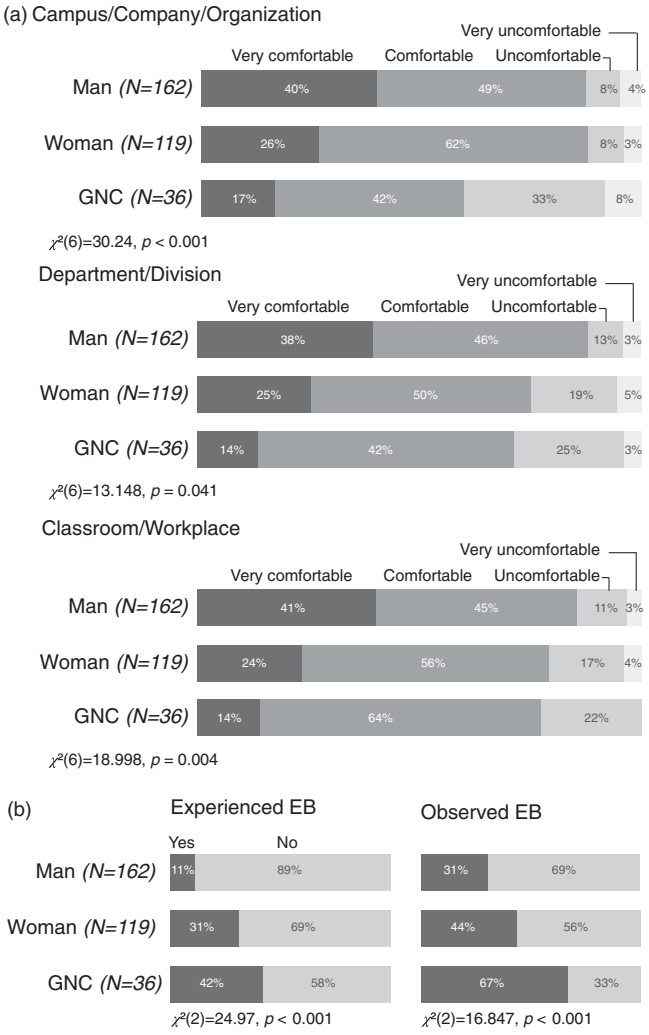

FIG. 4. Climate responses by participant gender. (a) Perceptions of comfort in different institutional contexts. (b) Experience or observation of exclusionary behavior.

A similar trend with respect to gender is visible in responses to the question asking participants whether they had experienced or observed exclusionary behavior [Fig. 4(b)]. Women respondents reported these experiences or observations at higher rates than men, and GNC respondents reported them at higher rates than women.

In contrast to these two categories of question where participant gender did lead to a significantly different response, participants' consideration to leave did not vary significantly [$\chi^2(2) = 0.913, P > 0.1$] across gender compared to a model where no relationship was apparent in the expected counts.

1. Gender in the open-ended responses and interviews

In the survey open-ended responses, survey participants cited physical and verbal sexual harassment experienced by women. This included both reports of harassment by students and faculty,

> *"[I was] Touched inappropriately by another graduate student I did not know in my office (which I never gave him). When [I] emailed him to ask that he does not come to my office or contact me again, he again showed up at my office."*

and,

> *"I was verbally sexually harassed by a male classmate during lab."*

Another participant reported being harassed by a faculty member:

> *"An older faculty retired who was on campus to teach part-time inappropriately touching or trying to touch and [stalk] me. I am a petite first year female assistant professor. After two quarters of it I wrote him an email asking him to back off and got my chair involved who was supportive. Apparently he has a history of doing this to women and they say he won't be hired back."*

Another participant noted in the survey responses that, despite reporting these issues, they were not acted on:

> *"An example: I was sexually harassed for multiple years within my physics department. Despite repeated attempts on my part to discuss the matter with other students, faculty, and the department head, I was consistently shut down, told that I was overreacting, or misinterpreting the other student who was consistently given the benefit of the doubt in contrast."*

The interviews also revealed gender issues. One interviewee saw the gender standpoint in physics as central to understanding their experience:

> *"I'd rather be a gay man than a straight woman any day. So I think that like gender seems to play a much bigger role than orientation at least in what I've experienced."*

This same interviewee explained that people were being discouraged from bringing up their gendered experiences:

> *"I think that people are discouraged from making a fuss. So I've witnessed people explicitly like say things like, 'Oh I mean this is a big problem, but I'm not going to bring it up because it'll be over in six months'"*

This interviewee also felt that specific training on gender bias has helped to articulate their experience. Another participant felt supported by her advisor who was sending her to be trained in experimental techniques that require physical strength. Other graduate students in the lab questioned why she was allowed to do these trainings because they could just do the work:

> *"And he like sends me to training on very experimental techniques that require strength. (LAUGHTER) And I get comments from my fellow grad students about why are you… 'I mean, why are you learning those things? We know how to do those things. You and the other girl can just go do the detail work and we can do the heavy stuff.' And… (PAUSE) Also, our postdoc has been trying to take credit for some of my work. I always e-mail my advisor and don't CC him. So it hasn't been working. But he's been trying"*

The interviewee also reported the same postdoc who was trying to take credit for her work would frequently complain about the interviewee's clothes to her advisor. She thought this might be derived from his religious conservative background.

D. Trans experience and standpoint

In Fig. 5, we display responses to climate questions separated by whether participants identified as trans, together with responses to the additional questions concerning trans policies. Significant differences were found between participants who identified as trans and cisgender in comfort, experience of exclusionary behavior (EB), observation of EB, and perception of workplace policies. These models are significantly different from a model where there is no association between factors. Differences in the trans standpoint from non-trans people was evident in the data.

As shown in Fig. 5(a), in their campus, company or division, cisgender participants reported being either very comfortable or comfortable at higher rates while trans participants reported being either uncomfortable or very uncomfortable at higher rates. Similar trends were observed for participant's comfort in their department or division and in their classroom or workplace, although the difference is less pronounced.

Further, trans participants report experiencing and observing EB at higher rates than cis participants [Fig. 5(b)] and reported perceiving their institutional policies as being more discriminatory than cis participants at higher rates [Fig. 5(c)].

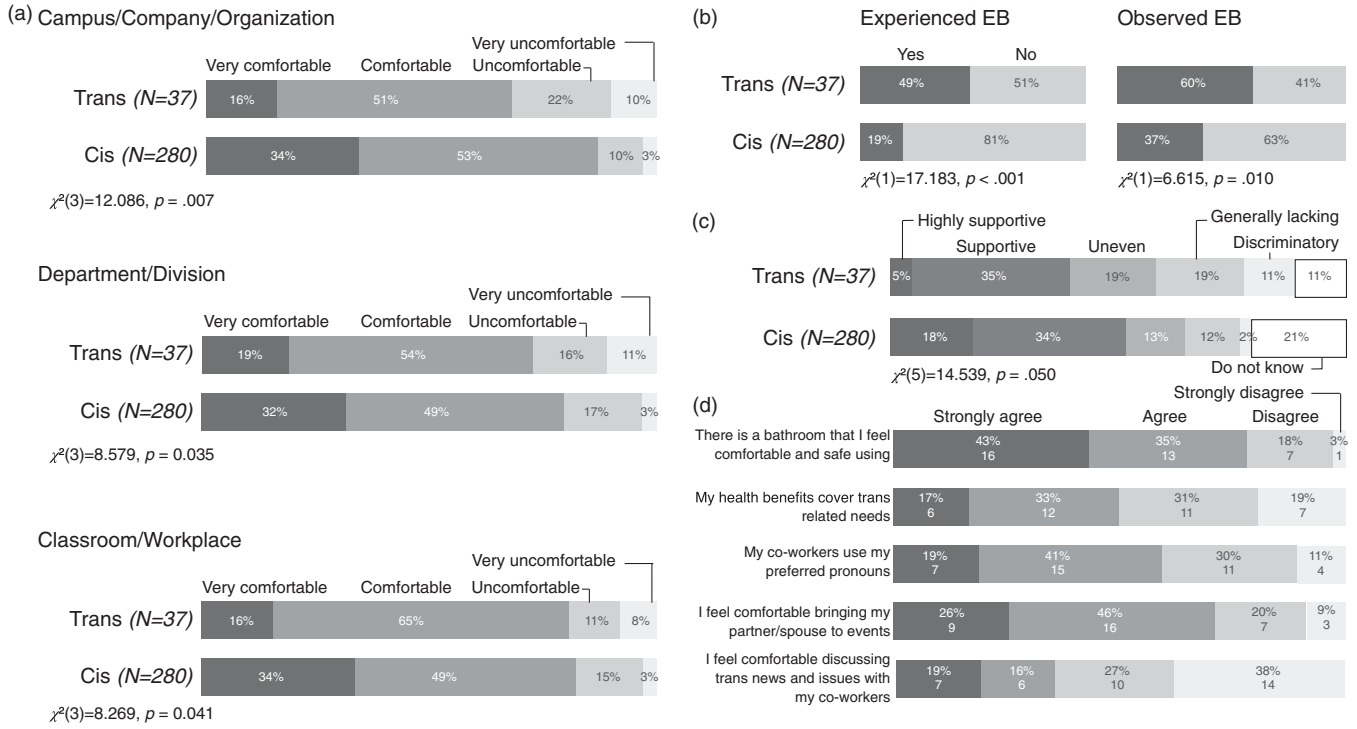

FIG. 5. Climate responses by trans status. (a) Comfort level in different institutional contexts. (b) Experience and observation of exclusionary behavior. (c) Perceptions of institutional policies. (d) Responses to trans-specific climate questions.

The trans climate responses presented in Fig. 5(d) provide insight into issues that potentially drive the difference in reported comfort level between transgender and cisgender standpoints. For example, twenty-two trans respondents agree or strongly agree that their co-workers use correct pronouns, while fifteen respondents (about 40%) disagree or strongly disagree. A person persistently referred to with incorrect pronouns during a research group meeting would likely be, at best, significantly distracted from the discussion at hand. If this is extended to other interactions throughout the person's workday, it could easily become a source of isolation and frustration.

Exactly half of respondents to the second prompt in Fig. 5(d) felt that their health benefits supported their needs, while half did not. Again, worrying about provision of these benefits could prove a distraction from work. Further, those who might be able to obtain additional external support for their healthcare needs could be community members who are relatively better supported. For example, it could be that a trans person of color is less likely to have access to such additional support, which could provide a motivation for leaving physics. While our present data cannot address this possibility directly, further investigation of these intersections is warranted.

Finally, a majority of respondents (about 65%) in Fig. 5(d) disagree or strongly disagree that they are comfortable discussing trans-related news and issues with their co-workers. This suggests that even in relatively supportive environments, some trans people might feel that their colleagues would prefer to maintain a somewhat distant relationship.

1. Trans open-ended responses and interviews

Many trans survey respondents reported particular difficulties from their standpoints of being trans on campus and in their department. One respondent reported struggles derived from other people at their institution:

> *"Most prominently, an ordinance that would be (somewhat) protecting me as an autistic trans lesbian was repealed by people who think trans women are predators and men. This included very hateful campaigns on their part, ones in which my old landlord even participated. Some of this was on campus. There are also evangelical christian men who protest* LGBT+ *people's existence on campus and nearby with hateful signs. There are transphobic gay men in the on campus* LGBT+ *groups who make things worse."*

as well as specific problems with the provision of trans-supportive healthcare policies:

> *"And the school insurance has exclusions against trans people getting care. These exclusions are archaic, hateful, and not financially necessary given how few*

AMAB (assigned male at birth) people even undergo sex reassignment surgery, hormone treatments, facial hair removal (to name the ones I either have done or want).”

Multiple survey respondents struggled with peers in their departments and workplace that did not use their proper gender pronouns:

“Misogynistic comments (both benevolent and outright) from those who perceive me as female. Open mockery of the concept of gender identity & associated terms at social events.”
“I deal with not having my choice of pronoun respected every day. Sometimes these situations affect me deeply on an emotional level, and affect my ability to work for several hours.”

Moreover, survey respondents reported bearing the burden of educating others and advocating for these pronouns to be respected:

“I had to testify at length at an appeals hearing brought by a fellow departmental faculty member who was appealing the disciplinary action taken against him. He had refused or was unable to use the correct pronouns when referring to me even though my transition had been 5–6 year prior to the last instance of his use of the wrong pronouns.”

Other participants in the survey reported being mocked and harassed publicly:

“Being mocked and openly laughed at by a group of colleagues in a corridor of my department as a result of my gender expression.”
“A professor harassed me about bathroom usage.”

Trans interviewees also faced significant barriers in their educations. One person’s barriers came from institutional issues while another came from hostility and ignorance in their own department. One student struggled as she came to graduate school because the university could not match her gender on paperwork that was erroneously labeled with the gender assigned to her at birth. As a graduate student coming into her program she spent significant time and mental energy dealing with multiple offices to remedy the situation. Eventually, she had to get the Title IX representative (an employee discharged with ensuring a University’s compliance with USA Federal law on sex discrimination) involved because the human resources department refused to act.

Safety was also a very prominent concern for this interviewee. Before she even came to the program she asked her future advisor about safety:

“And so part of me talking with my advisor and asking him if the school would be a safe and welcoming place was asking if the group would be safe and welcoming and him having a conversation with them about me coming. And everyone was fine with it. But I meant that everyone who was there knows more or less”

Safety for her also meant finding a bathroom she could use without fear of confrontation or legal action. The policies that she was told were in place discriminated against her using the correct bathrooms. She then had to seek out the actual policies in order to protect herself:

“When I first came here the policy that I was informed of using bathrooms here was that I had to match my driver’s license, which was stressful to start. And it wasn’t until after the first semester when over Christmas break I came across the, let’s see, EEOC [The US Equal Employment Opportunity Commision] statements about Title IX and Title VII [USA federal civil rights laws] where basically they said that discrimination on the basis of gender identity or presentation is sex discrimination and therefore banned I was like boom, okay, great.”

Another trans interviewee had problems integrating in their first nonphysics department:

“… there’s a lot of gender—pushing for gender roles to be conformed to and they would not respect where I was coming from or respect my pronouns or that kind of thing. So there were issues just in the department. They kind of make it clear that they’re looking for people that fit their—a female should be a flirty individual that’s going to kind of cater to older males in the industry…”

This interviewee also had issues with their bathroom use being policed:

“The school, when I got here, I was harassed by a professor going into the bathroom like the first week that I was on campus. So there were—I knew that I was coming into—I’m in a small rural area at STEM (ph) college so I knew that it was a place that would probably not know how to deal with gender nonconforming people…”

Other members of the department would not respect their correct pronouns:

“Consistently if you ask them to either not use pronouns or to use correct pronouns, then they don’t. They refuse to and they will talk about you a lot so you hear of them or maybe they talk about me a lot, but they—it’s not just in passing or “oops,” it’s consistent conversations

through the hallways. Just a couple of weeks ago, I'm walking out and they're like, "Oh, look, she doesn't even want to talk to us"."

In addition to their physics workload, this interviewee felt burdened with educating people in their department about LGBT+ people. They felt that they just wanted to be a physics student, and not the representative of all trans people. Further, they saw their institution as being comfortable with gay people, but not necessarily trans people.

"I have—there's still a professor who yesterday sat down with me and said, "You know, I really have to work to try to make sure every person is someone that I can shake their hands, but I just can't get away from the fact that there are really defined roles in my upbringing and I really am comfortable with the those roles."

These experiences made them less willing to seek support.

"Like can we—why do we keep having this conversation (laughter) and that's a thing that makes it—I'm less willing to want to go and seek that person out if I have a class or a question or that kind of thing and I think the fact that it's hard to just let people be people when I—in those—there are a few individuals. It's not a conglomerate. There are these people that make it hard to say I can just be a student here and I would rather come down to a place where I'm just a student. Just you not being able to figure me out doesn't really need to qualify whether I can be educated here."

However, they found that for some physicists, human interactions with LGBTQ people helped "break down barriers":

"I think continuing to host like everything that you can that helps, you know, put—whether it's in conferences or newsletters saying, "Here's how we're trying to diversify physics and here's-" Maybe spotlights on people. I don't know if people are comfortable with that. But when you see the number of people who are LGBTQ that work in STEM work and physics work in your own field and half the time people's biases are because they don't know somebody that they're judging, right? So when people are in front of them and they're just normal people and they're doing great things and they make some huge research—you know, it's pairing the person who put out the paper that everybody loves with the idea that they are also a gay person or they're a trans person. That's another thing, my school is very comfortable with a gay or lesbian person, but has the complete opposite—and I think it's just not having dealt with as much the trans or gender queer person. But when you see those people as just as successful and just as human as you are, then I think that's where those barriers get broken down."

E. Persons of color standpoint

Statistically significant differences between the experiences of persons of color and white physicists who were LGBT+ were not found in the survey data except for one measurement, which may be in part due to the limited number of respondents who identified as persons of color. The one quantitative difference that emerged was in outness, as displayed in Fig. 6. Across all four outness domains surveyed, persons of color reported being out at lower rates than their white peers. This model was statistically significant compared to the model where no association between outness and being a person of color was assumed for immediate family, extended family, and co-workers.

The open-ended responses in the survey and an interview from a queer black woman's standpoint documents issues with racism. One survey response suggested that participant was perceived negatively by her students due to her gender and minority status:

"It's been slightly more than a year but my students tend not to believe I'm competent to teach Maths when they see me, because I'm a woman and a minority."

Two other respondents reported that they have heard both homophobic and racist comments from their colleagues:

"Upon hearing comments made by faculty, I know there are negative attitudes and stereotypes towards LGBTQ people and people of color."
"Racist and homophobic remarks because it seems they lack the exposure of other cultures beyond their own. (re: observing exclusionary behavior)"

In the interviews one participant identified as African American and saw race as an impacting factor in her education, more so than her sexuality:

"… and I'll tell you this. I think I grappled more with the race element than I do with the sexuality because the deal is, is that that's what they see first. I can't actually closet my race because I'm, evidently I'm brown, my hair looks different, so it's just there. That said, I think there's already a prejudgment there on the basis of how high my aptitude is, just in general. It doesn't necessarily have to be specific to physics but anything that requires some level of critical thinking is always kind of under examination or assumed to be mediocre or subpar."

She also acknowledged barriers in her family to coming out as they intersected with race, reflecting differences in outness observed in the survey data:

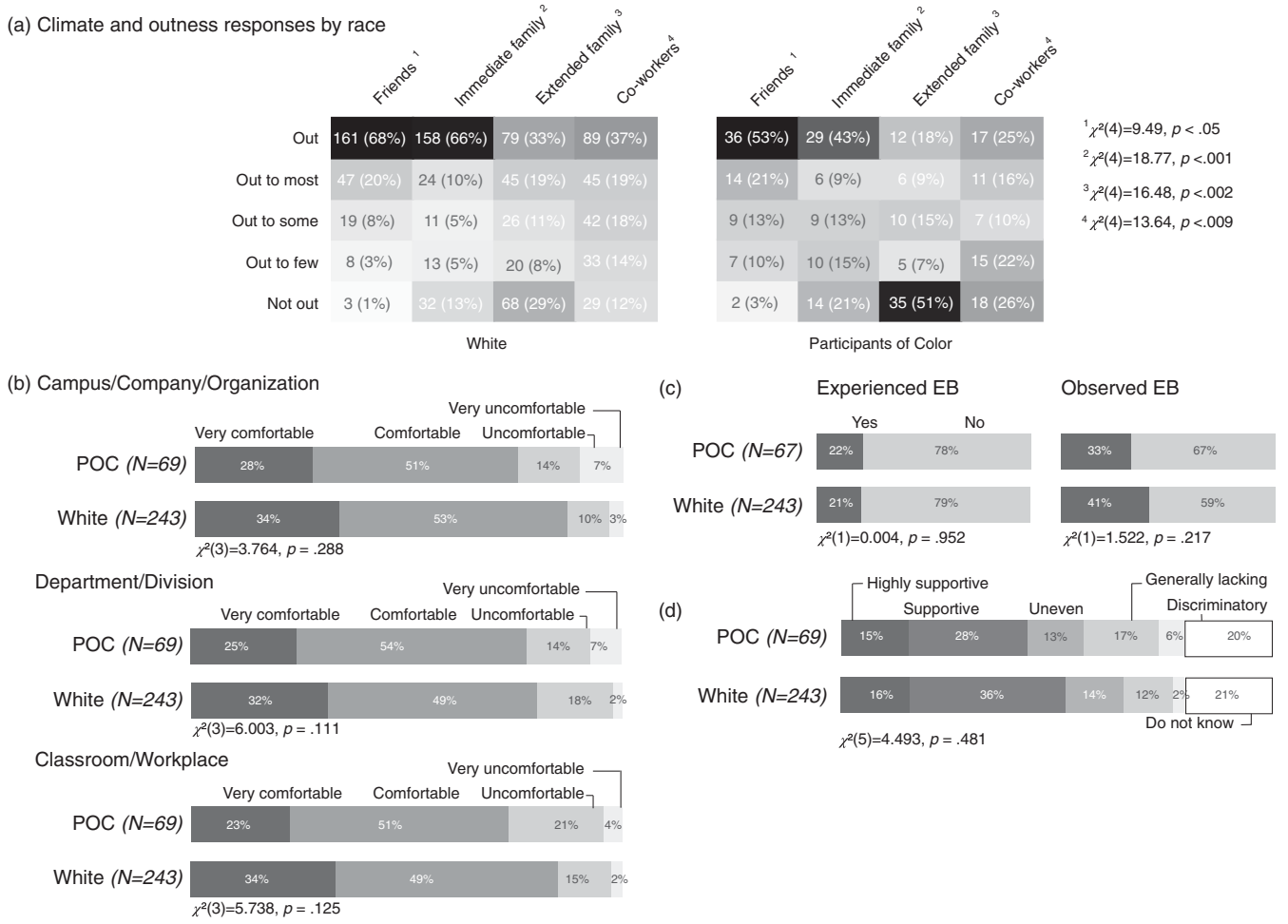

FIG. 6. Survey data disaggregated into white participants and Participants of Color.

"I know my racial counterparts somebody might be Caucasian they may have far more acceptance in their family than I would. So the coming out process that is very dicey or difficult. I'm not necessarily saying or making a generalization that all people who are Caucasian happen to have more ease in terms of coming out but I can definitely say at least the people who I've come across who identify either as gay or lesbian or queer, they seem to have a little bit more ease of access in terms of being able to have conversations like that with the people in their family or the people amongst their friends, whereas with me that's not necessarily the case. And the reason why I say that is that in terms of coming out I did this when I was 28, so I did this a year or two ago and usually and most people that I've found have come through this and have had the scriptures, information around them mainly because they have people or family members I mean that they've been exposed to."

Finding support in her queer identity was important to her in her education:

"So I'll definitely say I've identified two professors at [University] who are okay working with queer, LGBTQ people and one of them was actually my thesis advisor. And the reason I was able to identify him was because he had a little rainbow sticker on his window. And I would kind of see some of these, I don't want to call them Easter eggs, in different places and I don't necessarily know that he's queer himself. I think his children may be or something like that, and that was kind of a cue for me to be a little more comfortable around him in terms of just talking about my family life or just opening up in general although being queer was never a topic of conversation. I was able to kind of receive whatever critique it was that he was giving me in terms of work style or homework sets whatever without having the stigma of being stereotyped for being queer or making him feeling uncomfortable because I might present something that may be queer or whatever."

This participant, however, struggled with asking for help when she needed it because of others perceptions about her competence:

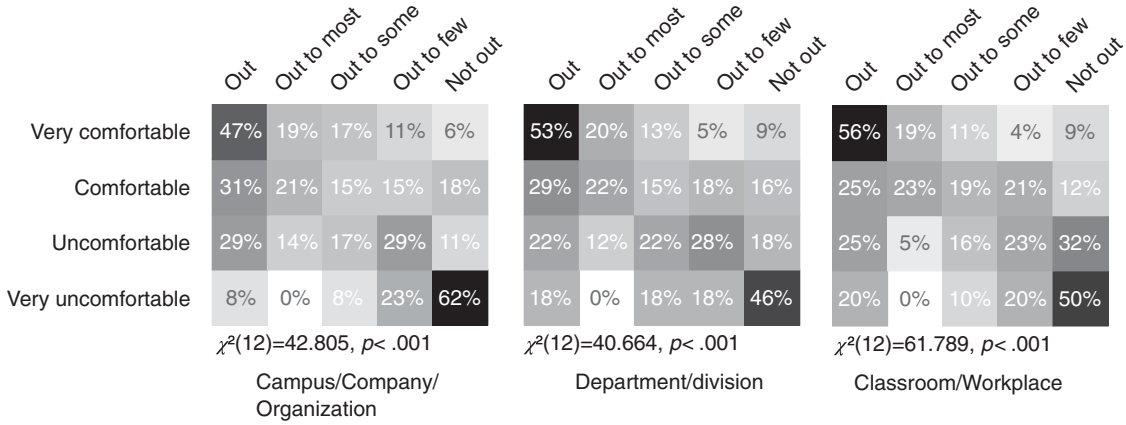

FIG. 7. Relationship between participant comfort level and their degree of outness in different institutional contexts.

"… I know I grapple with that a lot because when it comes to asking questions or completely having no idea about how to start a problem it becomes injurious to me in terms of being able to progress through a course because professors may have made the stereotype that I already came in with this low level of aptitude or mediocre level of aptitude and not able to get something that they consider to be basic. So my chances of excelling or understanding the help that they may be providing to me it's something that they will probably be well I don't think she'll stand a chance and be able to do well. So the climate is much more difficult for me in that regard."

Figuring out how to navigate her multiple identities was challenging:

"So in terms of bringing on the queer aspect to that it is, it's kind of really difficult to deal with both at the same time. So it's weird; although I'm valuable, I have to learn how to practice detachment from one to understand how to be able to grapple with the part of being a woman of color, and being a woman first and then being colored second or however you want to put it, both paramount, and then figure out how those balance. But I feel like through the course of my education I've become more adept at dealing with that but I think in the long run it is been definitely been a very difficult for me to have confidence in my abilities. And I can for sure tell you that my grades have suffered because of that."

She now works in industry and her experiences have deterred her from pursuing a Ph.D.:

"but I think in the long run it is been definitely been a very difficult for me to have confidence in my abilities. And I can for sure tell you that my grades have suffered because of that. And the outlook for me in terms of getting a Ph.D., which is what I'm kind of debating whether or not if I want to do, is really contingent upon whether or not if I have the right type of support system around me to be able to facilitate my success in becoming better."

F. Out or not out

How out a participant was to their colleagues or coworkers had a significant interaction with their climate experience as shown in Fig. 7. Participants who were out were more likely to report being comfortable in all three measured contexts, while participants who were not out were more likely to report being very uncomfortable at higher rates than out peers. This model is significant compared to a model where there is no association between outness and comfort.

1. Outness open-ended responses and interviews

Many of the survey respondents reported not being out in their departments as a result of fearing the impact on their experiences:

"In the last lab I worked with, I was afraid to even mention that I might be gay. They were all very traditional sort of people."
"I am not really out at work because I don't feel comfortable outing myself in the environment. There are no other out LGBT+ *individuals in my department."*

One participant, however, noted that remaining closeted enabled them to be comfortable:

"Because I am in the closet about my identity, and I pass just fine as a result, I am actually quite comfortable in these areas. What people don't know can't hurt me!"

In the interviews being out came up as something that was not happening in the physics community and that LGBT+ support was not visible:

TABLE I. Impact of climate and observation of EB on consideration to leave.

	B	S.E.	Wald	df	Significance	Odds ratio
Campus, company, organization climate	−0.487	0.212	5.263	1	0.022	0.615
Department or division climate	−0.166	0.239	0.484	1	0.487	0.847
Classroom or workplace climate	0.353	0.239	2.184	1	0.139	0.702
Experience of exclusionary behavior	0.116	0.327	0.125	1	0.723	1.123
Observation of exclusionary behavior	0.759	0.273	7.705	1	0.006	2.135
Constant	1.143	.857	1.781	1	3.13	3.137

TABLE II. Reduced model with only significant variables included.

	B	S.E.	Wald	df	Significance	Odds ratio
Campus, company, organization climate	−0.771	0.178	18.773	1	0.001	0.463
Observation of exclusionary behavior	0.88	0.255	11.897	1	0.001	2.411
Constant	0.687	0.581	1.402	1	0.236	1.989

> *"I don't think that* LGBT+ *support is visible. I don't think it's absent, but I don't think it's visible in physics."*

This interviewee saw physics as a community where you could not bring in your personal life, and thus your LGBT+ identity was not present. Other interviewees saw not coming out as part of surviving, for fear of what would happen if they did:

> *"I know that a lot of them are very conservative. And I feel like they respect me right now. But I don't know that they would respect me if I came out to them"*

This same interviewee was out as an undergraduate student but experienced discrimination that may have been in part due to her gender:

> *"It was mostly just exclusionary discrimination. I don't know if it was based on my gender or my sexual orientation. But I was very out. So it could have been either or both. (PAUSE) I know that all of the other students, literally all of them, studied together and did their homework together and all of that. And I tried to participate in these things and was often, you know, given the run around on the times and I just stopped trying after a while and stopped interacting with them socially."*

G. Climate model

To conclude these analyses we wanted to determine what statistical impacts the climate experiences of participants had on their consideration to leave. The measures used in this were the three climate questions, experience of EB, and observation of EB.

To understand the impacts of these climate factors and demographics, a binary logistic regression was conducted. Binary logistic regressions produces an "odds ratio" which indicates how much more likely a person is to make a decision for each unit increase on its Likert scale (e.g., climate factor, or gender) [37]. Running this analysis only demonstrated two significant variables. The results are shown in Table I. Respondents who reported a better climate on campus, in their company or in their workplace were 1.63 times less likely to consider leaving and participants who observed exclusionary behavior were 2.14 times more likely to consider leaving. We then ran a second model only using the significant variables in the model, see Table II. Using only the significant factors respondents who reported a better climate on campus were 2.16 times less likely to consider leaving and those that had observed exclusionary behavior were 2.4 times more likely to consider leaving.

V. DISCUSSION

From the survey and interview data, a number of cross-cutting themes emerge.

A. Intersectionality with gender and race

Strikingly, we find that LGBT+ people experience climate differently depending on their standpoint. People whose standpoint included different gender identities as men, women, and GNC physicists had differential experiences. This was also true for the LGBT+ physicists whose standpoint included their experiences as a person of color, as shown in the qualitative responses. At all levels, from the whole organization to departments and in the classroom [Fig. 4(a)], women and GNC individuals are more likely to report a significantly less comfortable

experience relative to the population. We emphasize that the comparison being made is between LGBT+ individuals, not with the general population of physicists, and note that a significant minority, ∼15%, of men also report an uncomfortable or very uncomfortable experience. This figure rises to about 25% for women. For GNC people, the fraction is even higher, up to 40% and, interestingly, there appears to be a difference in the comfort reported at the level of the organization as opposed to classroom for these individuals. This suggests that the intersectional identities of those who are LGBT+ but also from other underserved groups (i.e., being an underrepresented gender, race, or ethnicity) face more challenges than their LGBT+ peers.

The same trend is even more strongly visible in the propensity of people to observe or experience exclusionary behavior [Fig. 4(b)]: women and GNC respondents are 3 to 4 times more likely to experience exclusionary behavior and 1.5 to 2 times more likely to observe it, with the higher figures for GNC individuals. Indeed, the number of people who report experiencing or observing exclusionary behavior are overall concerningly high at 20% and 40%, respectively, for the whole group of respondents. Interviews provided some illustrations of exclusionary behavior that included inappropriate physical touching, stalking, verbal harassment and, notably, specifically identified the role of gender in these behaviors. We note that these statements are consistent with reports of sexual harassment experienced by women in the larger physics community, for example, undergraduate physics students as reported in Ref. [38].

Beyond exclusionary treatment and harassment, there are also safety concerns caused by location and institution. Olcott and Downen [39] surveyed 261 LGBT geoscientists and found that 62% of white cisgender men and 75% of cisgender women of color felt unsafe doing fieldwork due to their LGBT identity; 50% of cisgender women of all races and 46% transgender people of color reported that these safety concerns had led them to refuse fieldwork. This was largely attributed to the necessary travel to do research in countries where their identities are criminalized and possibly punishable with death. Although physics does not generally require as much direct fieldwork as the geosciences, there are many international conferences, collaborations, and projects which may necessitate travel to places which are dangerous to LGBT individuals. This research demonstrates how safety concerns are uneven based on gender and race, but ultimately prescient for all LGBT people.

The emergence of gender as an important factor, even where the focus has been placed on LGBT+ experiences, has important ramifications for both physics as a discipline and for PER. Organizations and departments need to develop better policies, resources and processes to handle and report exclusionary behavior, but these need to be developed to be responsive to the needs of LGBT+ people. The interviews underscore the need for this: that these experiences often go unreported and are not acted on by those with the power to do so.

Another challenge for future PER studies highlighted by the present results is less nuanced approaches to gender have neglected GNC individuals, whose experiences are markedly different, and worse, than those with a gender identity that falls cleanly into the binary paradigm. PER practitioners engaging in climate should therefore carefully examine GNC experiences, because they might be expected to show important differences compared with other study participants.

Our study hence supports the recent suggestion of Ref. [40] that PER needs to adopt a more sophisticated approach to gender in order to fully describe and include physicists' varying standpoints. The implication of the present work is that attempts to address gender inequities in physics without acknowledging other identities will achieve limited success, particularly for the most vulnerable subpopulations. The gender effect in our study is an empirical example of *intersectionality*, which is

> *"The interconnected nature of social categorizations such as race, class, and gender as they apply to a given individual or group, regarded as creating overlapping and interdependent systems of discrimination or disadvantage [41]."*

As the author of the term, Crenshaw describes in Ref. [42] that intersectionality is *"a lens through which you can see where power comes and collides, where it interlocks and intersects."* The ramification is that an intersectional approach to gender in future PER work could untease these complex interactions.

While our survey instrument was limited in its ability to resolve intersections with race due to the small number of people of color respondents (Fig. 1), important evidence of such intersections and standpoints were indicated in the interviews and the outness measure. While some interviewees dealt with negative stereotypes and felt that their race was the most important component, one interviewee heard both racist and homophobic remarks and found barriers within her family to coming out that intersected with race. These findings are echoed by the qualitative work of Miller and Downey [43] which shared the experiences of six disabled queer students in STEM majors and found that their identities were often split by the spaces around them. They struggled to interact with resources designed for LGBT people since those resources were not inclusive to their racial identities, but the students were simultaneously tokenized to maintain a facade of inclusiveness. Clearly, similar implications exist for interventions that aim to address racial disparities in physics as those that aim to address gender, and this should be an important focus of further study. These findings can be

juxtaposed to recent work in PER focused on building identity frameworks for Black physicists [14]. In their work Hyater-Adams *et al.* found the importance of various kinds of resources in the experiences of Black physicists. Lack of access for physicists who are Black and LGBT+ may be more compounded at this intersection than for other LGBT+ persons from majority racial and ethnic backgrounds. The growing literature on Black women in physics has also demonstrated their experience of social exclusion in pursuit of physics and the important role of recruiment and funding in supporting their success [15]. Considering these findings combined with those presented here, it is crucial that we disaggregate the LGBT+ community and ensure equal conversation and weight is given to those who live at the intersection of racial and ethnic oppression along with their LGBT+ identity. Lastly, in this sample persons of color were less likely to be out as white LGBT+ community members. Considering the negative experiences of persons of color demonstrated in the literature it may not be surprising that some persons choose to hide other identities for which they may also experience oppression or discrimination.

B. Transgender people encounter the most negative experiences

The climatic experiences of trans individuals are markedly less comfortable than those for cis individuals, with 30%–35% of trans people experiencing an uncomfortable climate versus 13%–20% for cis people. This difference between trans and cis experiences is amplified in responses to questions on exclusionary behavior: the fraction of trans people experiencing exclusionary behavior is almost 50%, while the fraction observing such behavior is 60%. These values are the highest for any subpopulation in our study and should be a matter of great concern. This is consistent with other literature which shows that transgender and GNC individuals were significantly more likely to experience stress, depression, and minor health issues than cisgender LGB and non-LGB individuals, and women are more likely to experience professional devaluation and harassment at work than LGBT men [44]. We also note an important limitation of our study, and an important target for future research, is that we had no respondents who identified as trans and as men.

Challenges reported by trans interviewees that help elucidate these experiences include deliberate misgendering, which from the corresponding question in Fig. 5(d) appears to be a prevalent problem as well as harassment, a lack of safety and access to appropriate bathrooms. Given the significant number of respondents who reported a lack of trans supportive policies at their institution, such as bathrooms that people feel comfortable and safe using and health benefits for trans needs, there remains a great need for organizations to adopt such policies.

C. Climate and observing exclusionary behavior predicts consideration to leave

Because of their negative experiences in physics, a significant number of participants (36% overall) have considered leaving [Fig. 3(b)]. The present study determines that *two* factors appear to be significant to predict which participants are thinking of leaving. These are the *individuals' perception of the overall climate* on their campus, at their company or in their organization, and *observation of exclusionary behavior*. Participants who observed exclusionary behavior were more than twice as likely to consider leaving. A secondary analysis of the 2010 State of Higher Education for LGBT people by Patridge [18] found very similar results: respondents who reported that they considered leaving their institution observed explicit bias, experienced explicit bias, and felt uncomfortable in their departments far more than those who had not considered leaving.

While a full understanding of the role of LGBT+ status on the career pipeline remains a future research area, this result underscores the importance of policies to create a positive climate and address exclusionary behavior in physics.

VI. CONCLUSION

In this work, we have studied the experiences of LGBT+ people in physics using a survey instrument and interviews to explore the standpoints in the physics community. The results indicate a great deal of variability in climate: while many (80% of respondents) enjoy a positive workplace, a significant minority (20%) do not. Individuals with more than one marginalized identity are more likely to experience a chilly or hostile environment, which suggests the intersecting effects of gender, race, and trans identity. Trans respondents experienced the most hostile climate, experiencing or observing exclusionary behavior at much higher rates than nontrans respondents. Negative perceptions of climate and observations of exclusionary behavior are found to predict an individuals consideration to leave physics.

This snapshot of an unexplored group in physics has important ramifications for all members of the community: First, that perception of a hostile climate and presence of exclusionary behavior limits the ability of the discipline to retain marginalized members, and thus presents a risk to the health of the community. Further, that diversity interventions presently undertaken by community members designed to address inequities along one set of identities may have limited success for individuals who identify with additional marginalized identities.

A new program of research is required to further elucidate the experiences of LGBT+ people in physics and design evidence-based interventions to address climatic issues revealed from their standpoints. This survey should be conducted longitudinally and in other geographic groups

to enable comparisons. As a model, a recent survey conducted by the Institute of Physics, Royal Society of Chemistry, and Royal Astronomical Society in the United Kingdom appears to replicate our findings around gender and trans experiences [45]. Additional work must be undertaken to understand the experiences of groups insufficiently represented in the present dataset, such as trans men, people of color, and physicists at national labs or in industry. Their unique intersectionally of marginalized standpoints may offer even more guidance for improving the physics community.

From the perspective of our theoretical framework standpoint theory, it is crucial that this research program benefits the groups of people who have been studied. The results should not only be reported in published scholarship, but must be taken into action by physics community leaders and future scholar to motivate and make change. For example, programmatic interventions ranging in scale from institutional to departments to specific classes should be designed with reference to the needs of LGBT+ people, assessed for effectiveness, and transferred. To catalyze this, a valuable collection of best practices has been developed by the grassroots LGBT+ physicists group [46]. The particularity of climate, experienced by specific people and shaped by interactions between many individuals, requires the participation of all physicists to create a workplace that welcomes all marginalized groups.

ACKNOWLEDGMENTS

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APPENDIX: SURVEY QUESTIONS

1. Consent

The data collected in this survey will be used to better understand how the physics community can better support LGBT+ persons. All data will be reported anonymously and email addresses of participants will never be released.

(1) Do you consent to take this survey? ( ) Yes ( ) No

2. Climate

Climate is defined as the "current attitudes, behaviors, and standards held by faculty, staff, and students concerning access for, inclusion of, and level of respect for individual and group needs, abilities and potential."

(1) Overall how comfortable are you with the climate in the following areas?

( ) Very Comfortable ( ) Comfortable ( ) Neither ( ) Comfortable nor Uncomfortable ( ) Uncomfortable ( ) Very Uncomfortable

Campus/Company/Laboratory

Department/Division

Classroom/Workplace

Please elaborate on your responses to experiences of climate.

(2) Have you ever seriously considered leaving your campus/company/laboratory?

( ) Yes ( ) NoWhy did you consider leaving and why did you decide to stay?

(3) Within the past year, have you personally experienced any exclusionary (e.g., shunned, ignored), intimidating, offensive and/or hostile conduct (harassing behavior) that has interfered with your ability to work or learn on your campus or workplace because of your gender, gender identity, gender expression, sexual orientation, or sexual identity?

( ) Yes ( ) No Please elaborate on your experience of exclusionary behavior.

(4) Within the past year, have you observed or personally been made aware of any conduct directed toward a person or group of people on campus that you believe has created an exclusionary (e.g., shunned, ignored), intimidating, offensive and/or or hostile (harassing) working or learning environment because of their gender, gender identity, gender expression, sexual orientation, or sexual identity?

( ) Yes ( ) No Please elaborate on your observations

(5) How do you find the policies in place at your campus, company or laboratory with respect to hiring, benefits and institutional practices relevant to LGBT+ persons?

( ) Highly Supportive ( ) Supportive ( ) Uneven ( ) Generally Lacking ( ) Discriminatory Please Explain

3. Workplace climate

(1) Using this scale, please respond to each statement with respect to your experience within your workplace or department

( ) Strongly Agree ( ) Agree ( ) Neither Agree nor Disagree ( ) Disagree ( ) Strongly Disagree

(a) Lesbian, gay, bisexual, and transgendered (LGBT employees are treated with respect).
(b) LGBT employees must be secretive.
(c) Coworkers are as likely to ask nice, interested questions about a same-sex relationship as they are about a heterosexual relationship.
(d) LGBT people consider it a comfortable place to work.
(e) Non-LGBT employees are comfortable engaging in gay-friendly humor with LGBT employees (for example, kidding them about a date).

(f) The atmosphere for LGBT employees is oppressive.
(g) LGBT employees feel accepted by co-workers.
(h) Coworkers make comments that seem to indicate a lack of awareness of LGBT issues.
(i) Employees are expected to not act "too gay."
(j) LGBT employees fear job loss because of sexual orientation.
(k) My immediate work group is supportive of LGBT coworkers.
(l) LGBT employees are comfortable talking about their personal lives with coworkers.
(m) There is pressure for LGBT employees to stay closeted (to conceal their sexual orientation or gender identity/expression).
(n) LGBT employees are met with thinly veiled hostility (for example, scornful looks or icy tone of voice).
(o) The company or institution as a whole provides a supportive environment for LGBT people.
(p) The atmosphere for LGBT employees is improving.
(q) There is a bathroom that I feel comfortable and safe using.
(r) My health benefits cover trans related needs.
(s) My co-workers use my preferred pronouns.
(t) I feel comfortable bringing my partner/spouse to events I feel comfortable discussing trans news and issues with my co-workers.

4. Demographic questions

(1) How out about yourself as an LGBT+ person or ally are you to your:
( ) Out ( ) Out to most ( ) Out to some ( ) Out to a few ( ) Not out
Friends
Immediate Family
Extended Family
Coworkers

(2) What is your current gender identity?
( ) Man ( ) Woman ( ) Gender Non-conforming ( ) Other:

(3) Are you transgender?
( ) Yes ( ) No

(4) Are you intersex?
( ) Yes ( ) No

(5) What best describes your sexual orientation?
( ) Asexual ( ) Bisexual ( ) Gay ( ) Heterosexual ( ) Lesbian ( ) Man loving man ( ) Pansexual ( ) Queer ( ) Questioning ( ) Woman loving woman ( ) Other:

(6) Are you a US citizen?
( ) Yes ( ) No

(7) What is your race/ethnicity?
( ) African ( ) African American ( ) Alaskan Native ( ) Asian ( ) Asian American ( ) Southeast Asian ( ) South Asian ( ) Caribbean/West Indian ( ) Caucasian/White ( ) Latino(a)/Hispanic ( ) Latin American ( ) Native American Indian ( ) Pacific Islander/Hawaiian Native ( ) Other:

(8) What is your primary status on campus or in your work place?
( ) Undergraduate Student ( ) Graduate Student ( ) Post Doctoral Researcher ( ) Faculty ( ) Research Scientist ( ) Technician ( ) Engineer ( ) Project Manager

(9) What is your current status as an undergraduate student?
( ) First year student ( ) Second year student ( ) Third year student ( ) Fourth year student ( ) Other:

(10) What is your current status as an graduate student?
( ) Masters student ( ) PhD student ( ) Other:

(11) What is your current status as a faculty member?
( ) Instructor ( ) Adjunct ( ) Assistant Professor ( ) Associate Professor ( ) Professor ( ) Visiting Professor ( ) Other:

(12) Would you be willing to participate in an interview?
( ) Yes ( ) No; If so please provide your email address.

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