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# Prevalence and Nature of Threats Facing U.S. Physics Departments

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\**speaker*



# Outline

- Define Departmental Threats
  - Introduction to the EP3 Project and Survey of Department Chairs
  - How did we ask about Departmental Threats?
  - Survey Results: **The prevalence of threats and ways departments addressed these threats**
  - Summary
- See Sara Frederick's talk on *Cultures of Assessment and Change in US Physics Departments* (#1602)

# What do we mean by “Departmental Threat”?

- An action by an institutional administrative body outside of the program that would negatively impact the sustainability of the department and its undergraduate program.
  - Significant loss of funding
  - Significant reduction of faculty lines
  - Potential closure or merger of your department or degree program
  - \*Threats related to the pandemic were asked to be excluded at the time of the survey
- APS Departmental Toolkit
  - Currently conducting interviews with department chairs
  - Name undergoing changes

# Effective Practices for Physics Programs (EP3)

- Project co-led by APS and AAPT.
- Create a guide with effective practices for undergraduate physics programs, including recommendations for program review
- Supporting programs in implementing these practices through Departmental Action Leadership Institutes (DALI)

# Survey of department chairs

- Baseline measurement of current program practices, conducted over the summer of 2020.
  - Sent to 757 unique institutions, 310 research consenting responses (41% response rate).
  - Each response was completed by a chair of the physics department, or someone in a similar program leadership role.
- See *Supplemental Information* at the end of the slide deck for complete survey sample details and study limitations

# Survey questions concerning departmental threats

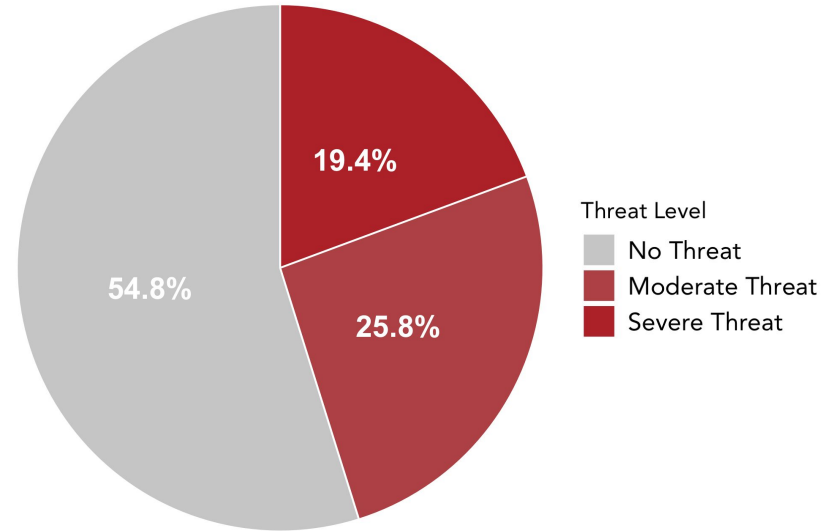
- Has your department faced a significant threat that you are aware of such as significant loss of funding, significant reduction of faculty lines, or potential closure or merger of your department or degree program?

Further questions:

- Asked respondents to select from a list of things the department might have done when **preparing to address** the threat.
- Asked respondents to select from a list of things the department might have done when **actually responding** to the threat.

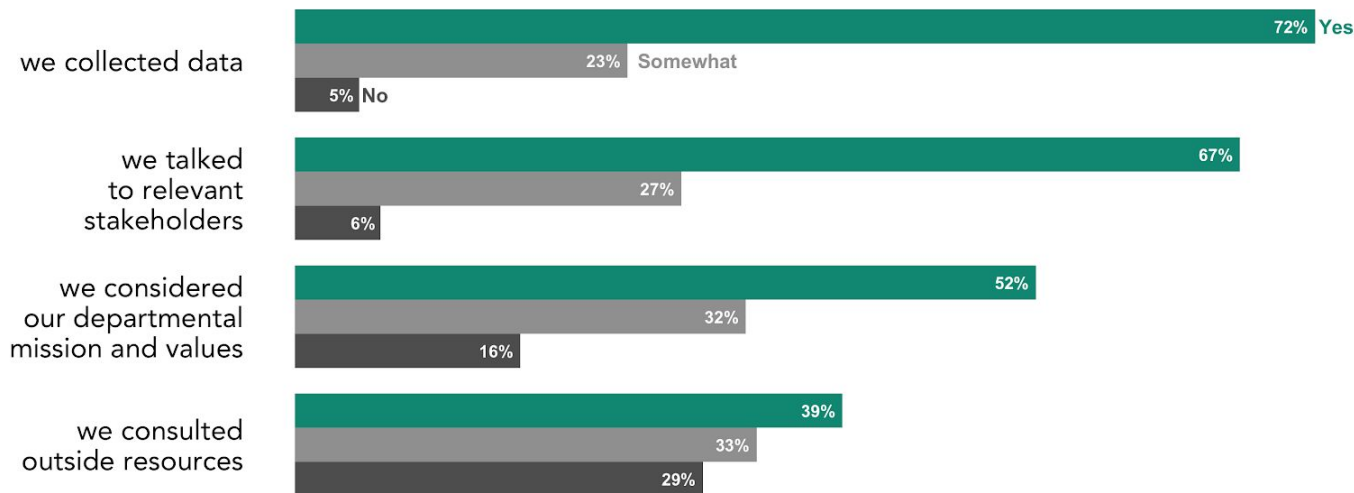
**Almost half of physics departments have faced a moderate or substantial threat to the sustainability of their program.**

Departments facing threats (N = 310)



# When preparing to address the threat, departments are likely to collect data and talk with stakeholders

Did your department do any of the following when preparing to address the threat?  
(N = 132)



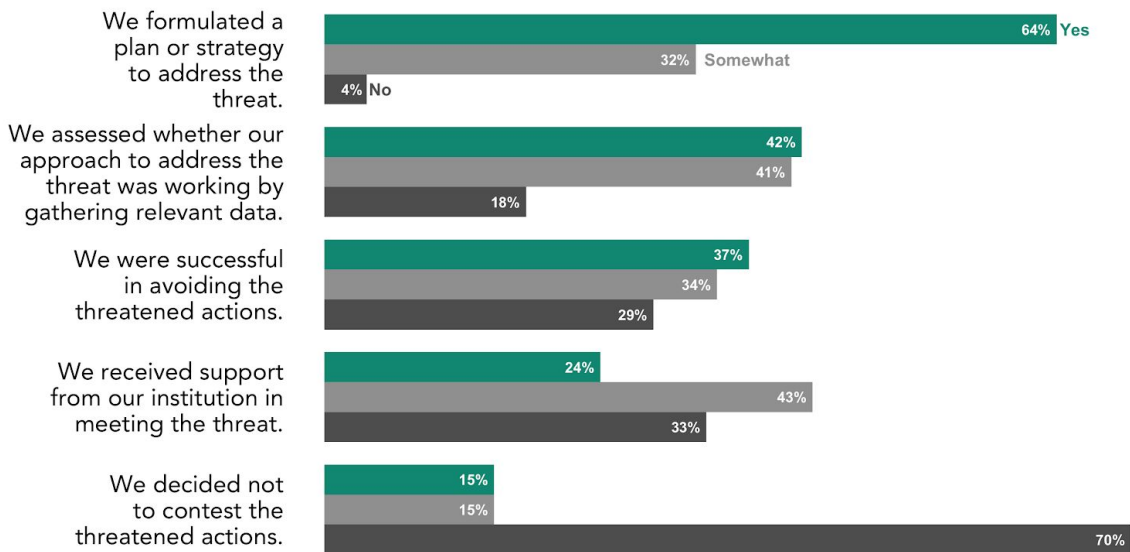
*8 respondents did not respond to one or more of these options and are not included in this plot.*



# Only 37% of departments avoided the threatened actions, with less than a quarter receiving support from their institution

Did your department do any of the following when responding to the threat?

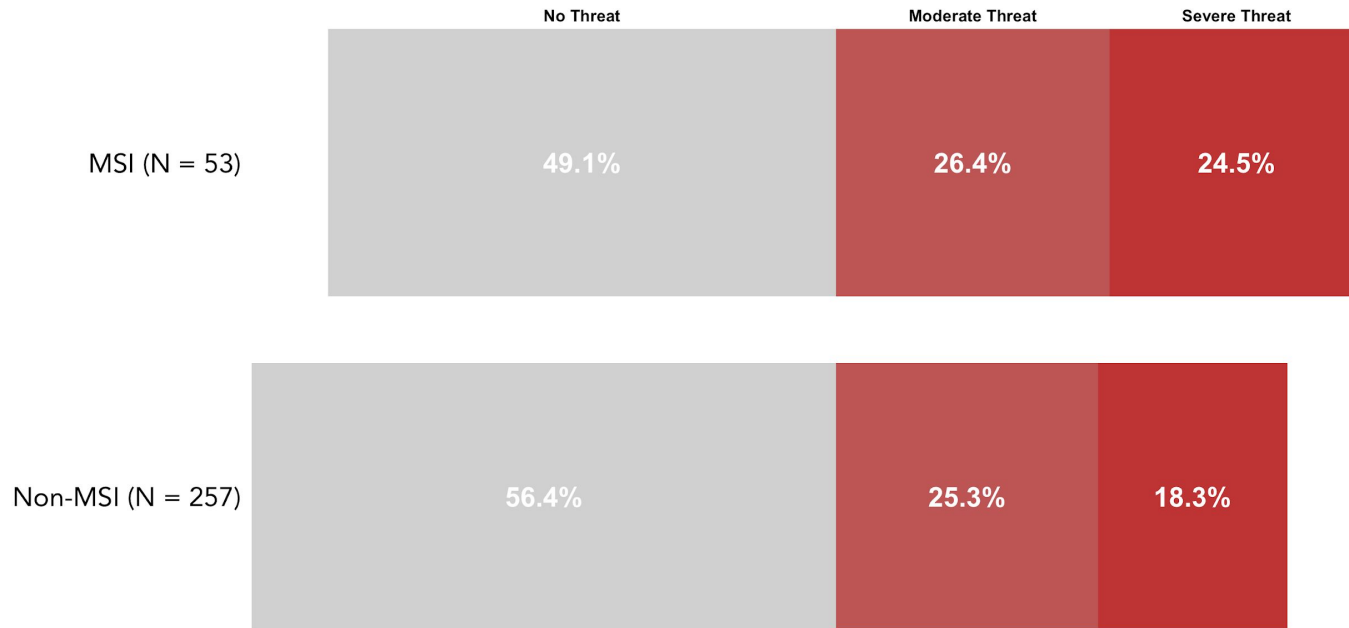
(N = 108)



32 respondents did not respond to one or more of these options and are not included in this plot.

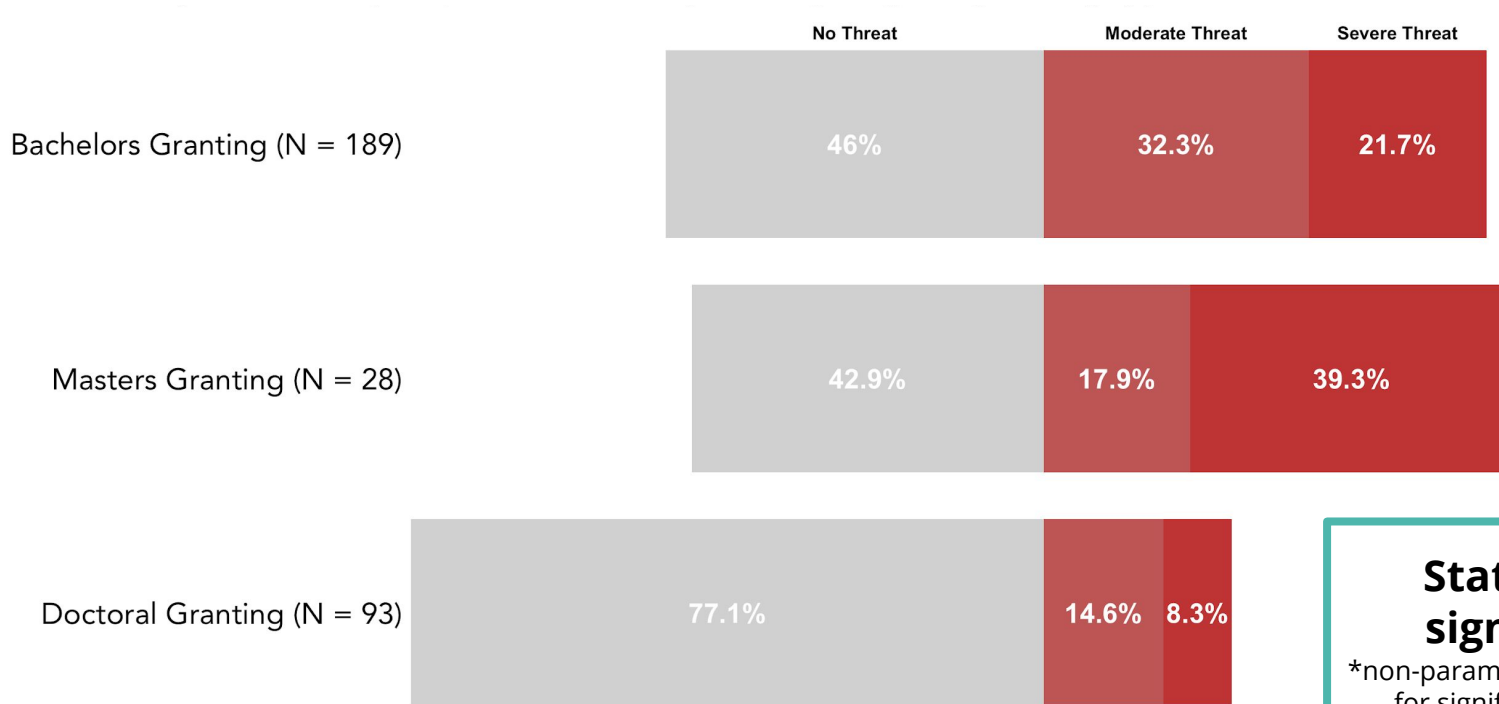
**What departments are facing these threats?**

# Threats appear to be more prevalent & more severe at Minority Serving Institutions (MSI).



**Not statistically different\***  
\*non-parametric rank order test for significance

# Threats are more prevalent at Bachelors granting and Masters granting departments.



**Statistically significant\***

\*non-parametric rank order test for significance ( $p < 0.05$ )

# Bachelors granting departments at MSIs are more threatened than bachelors granting departments not at MSIs

**72%** (18/25) of bachelors granting departments at MSIs have experienced a moderate or severe threat.

Compared to **52%** (83/161) of bachelors granting departments that are not at MSIs.

# Summary

- Almost half of physics departments have faced a moderate or substantial threat to the sustainability of their program.
- Many departments that have been threatened have been unsuccessful in avoiding the threatened actions.
- There are contextual differences between departments that make certain resources easier or harder to obtain, thus leading to departments being more or less likely to face threats.
- Departments at MSIs are more likely to be under threat, we face losing programs that have knowledge of how best to support students of color.

*This work is supported by the National Science Foundation under Grant Nos. 1738311, 1747563, and 1821372*

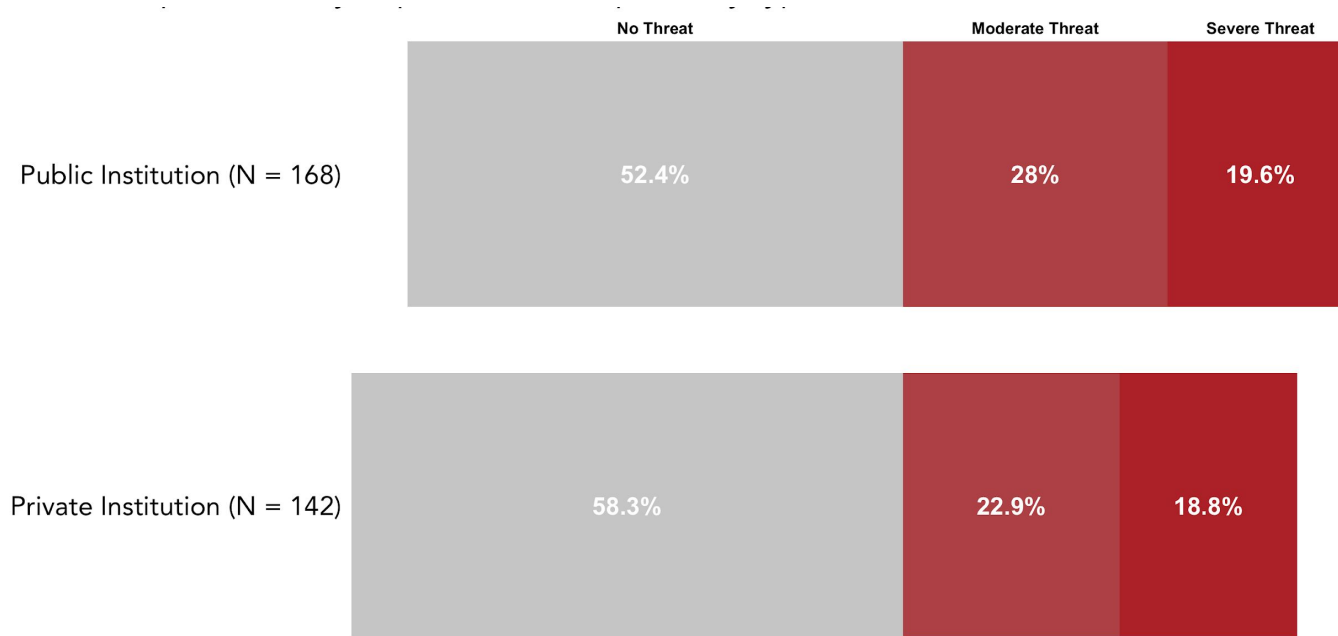
# Supplemental Information

# **Additional Data of Threatened Departments**

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# Threats also appear to be more prevalent at public institutions, yet less than half have experienced a threat



**Not statistically different**

# Cross-tabulation of level of physics degree granted and MSI designations

|      | MSI   |           |                 |               | non-MSI |           |                 |               |
|------|-------|-----------|-----------------|---------------|---------|-----------|-----------------|---------------|
|      | Total | No threat | Moderate threat | Severe threat | Total   | No threat | Moderate threat | Severe threat |
| Bach | 25    | 7 (28%)   | 11 (44%)        | 7 (28%)       | 161     | 78 (48%)  | 49 (30%)        | 34 (21%)      |
| Mast | 10    | 5 (50%)   | 2 (20%)         | 3 (30%)       | 18      | 7 (39%)   | 3 (17%)         | 8 (44%)       |
| Phd  | 18    | 14 (78%)  | 1 (6%)          | 3 (17%)       | 78      | 60 (77%)  | 13 (17%)        | 5 (6%)        |

# Survey Sample Details & Limitations

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# Study Limitations

1. The majority of respondents are dept. chairs, which only represent one type of stakeholder in a dept.. We also only accepted one response per dept. Thus, the view of the respondent may not represent the views of other faculty members, staff members, or students in the dept.
2. We did not collect demographic information about respondents, but based on empirical data on physics faculty as a whole it is likely that respondents are disproportionately white and male.
3. Because of the way that APS defines who is included in their email list, the survey administration excluded two-year colleges, any depts. that teach physics but do not award a degree in physics, and “general science” or similar depts. which include physics. As a result, MSIs are underrepresented in our results compared with their national prevalence.

# Study Limitations

4. Because of the relative rarity of Master's granting institutions and MSIs in the data, any results that are unique to them will be drowned out in the aggregate data.
5. It is not always the case that the demographics of the student population in a physics department at an MSI are reflective of the demographics of the student body at the MSI as a whole. This may alter the conclusions that one can draw from the MSI data that we collected.

# Response Rate

The survey was sent to 766 physics departments/programs. Nine institutions have two physics programs, meaning that surveys were sent to 757 unique institutions. We received a total of 388 unique survey submissions from institutions, of which 310 have given consent to have their responses used for research purposes and are therefore included in this report.

**In all, 41% of institutions that received the survey submitted a response and consented to having their responses used for research purposes.**

# Sample of Institutions

|                                    | Percent of institutions of a given characteristic out of all degree-granting institutions that received the survey (N=757) | Percent of institutions of given characteristic out of all degree-granting institutions that responded and consented to research (N=310) |
|------------------------------------|--|--|
| Bachelor's granting                | 66%<br>(N=498)   | 61%<br>(N=189)   |
| Master's granting                  | 9%<br>(N=71)   | 9%<br>(N=28)   |
| Doctoral granting                  | 25%<br>(N=188)   | 30%<br>(N=93)  |
| Public                             | 48%<br>(N=362)   | 54%<br>(N=168)   |
| Private                            | 52%<br>(N=395)   | 46%<br>(N=142)   |
| Minority Serving Institution (MSI) | 17%<br>(N=128)   | 17%<br>(N=53)  |
| Non-MSI                            | 83%<br>(N=629)   | 83%<br>(N=257)   |

# By MSI-type

|  | Percent of institutions of a given characteristic out of all degree-granting institutions that received the survey (N=757) | Percent of institutions of given characteristic out of all degree-granting institutions that responded and consented to research (N=310) |
|--|--|--|
| Asian American and Native American Pacific Islander-Serving Institutions (AANAPISIs) | 6.3%<br>(N=48)   | 6.8%<br>(N=21)   |
| Alaska Native-Serving and Native Hawaiian-Serving Institutions (ANNHIs)              | 0.5%<br>(N=4)  | 1%<br>(N=3)  |
| Historically Black Colleges and Universities (HBCUs)                                 | 4.1%<br>(N=31)   | 2.3%<br>(N=7)  |
| Hispanic Serving Institutions (HSIs)   | 9.7%<br>(N=74)   | 11.3%<br>(N=35)  |
| Native American-Serving Nontribal Institutions (NASNTIs)                             | 0.5%<br>(N=4)  | 0.6%<br>(N=2)  |
| Predominantly Black Institutions (PBIs)  | 0.5%<br>(N=4)  | 0.6%<br>(N=2)  |
| Tribally Controlled Colleges and Universities (TCCUs)                                | 0%<br>(N=0)  | N/A  |