Women in Plasma Physics

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W&M
To infinity and beyond?

Representation of Women in the American Physical Society Division of Plasma Physics

- SpaceX founded
- SpaceX crewed flight to ISS
- SpaceX crewed flight to Mars
- ITER construction began
- ITER first plasma
- ITER burning plasma
- SpaceX self-sustaining colony on Mars

Projection for % women assuming exponential growth

DPP membership data


 Courtesy of Dr. C. Collins
How do we compare to others and what about our pipeline?

**Percent of PhDs Awarded to Women in Specified Fields, Classes of 1920 through 2016**

- **All Fields**
- **Physical Sciences**
- **Physics**

**Women in Each Membership Category**

- **Undergrad**
- **Grad Student**
- **Early Career**
- **Regular**
- **Life**
- **Senior**

- **2016**
- **2017**
- **2018**
- **2019**

- **General physics 20%**
- **Plasma physics 12-15%**

While 99% of all matter comes in the form of a plasma, physics departments do not teach plasma at an undergraduate level.

760 institutions offer bachelor's degrees in physics and 170 offer PhDs.

~70 institutions present at recent graduate school fair for plasma & fusion (not all PhD granting).

~800 student members DPP

This number has been constant for the last 3 years.
What makes the climate to women in (plasma) physics hostile?

NAS 2018 report on sexual harassment in academia

- Key observations on prevalence:
  - sexual coercion is rare: 4% of women report experiencing this in the past year
  - unwanted sexual attention: 25% of women report experiencing this in the past year
  - gender harassment is very common: 59% of women report experiencing this in the past year

  These rates are correlated

- Most of these behaviors center around contempt for women rather than desire
- Most of the behaviors come from peers rather than supervisors
So how can we change the status-quo and at least go for exponential growth?

Increase the pipeline

- Increase the number of institutions with plasma faculty member
- Role models
- Introduce plasma in undergraduate level courses
- Partner with URM schools to provide research experiences/equipment
- Summer school opportunities
- Improved partnership with NL and more REU opportunities
- Holistic approach to graduate school admissions
  - GRE and GRE-physics are better at predicting race/gender than PhD success

Increase retention

Increase Thriving
So how can we change the status-quo and at least go for exponential growth?

- Increase the pipeline
- Increase retention
- Increase Thriving

- Accept and take responsibility that something must change
- Have a Code of Conduct
- Train leadership to understand and address issues related to climate
- Make diversity and climate part of work evaluation
- Role models: diverse leadership
- Create networks (across institutions when numbers are too low)
- Don’t put the burden on the minority to fix the climate
So how can we change the status-quo and at least go for exponential growth?

- Increase the pipeline
- Increase retention
- Increase Thriving

- Adopt **double blind reviews** for
  - Experimental time
  - Funding proposals
  - Publications
- **Transparency** in hiring, promotions and distribution of resources
  - Often leaders are appointed within an organization, no open application process
- **Actively seek out diverse candidates** for leadership and other positions
  - Imposter syndrome is well documented among URM candidates
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