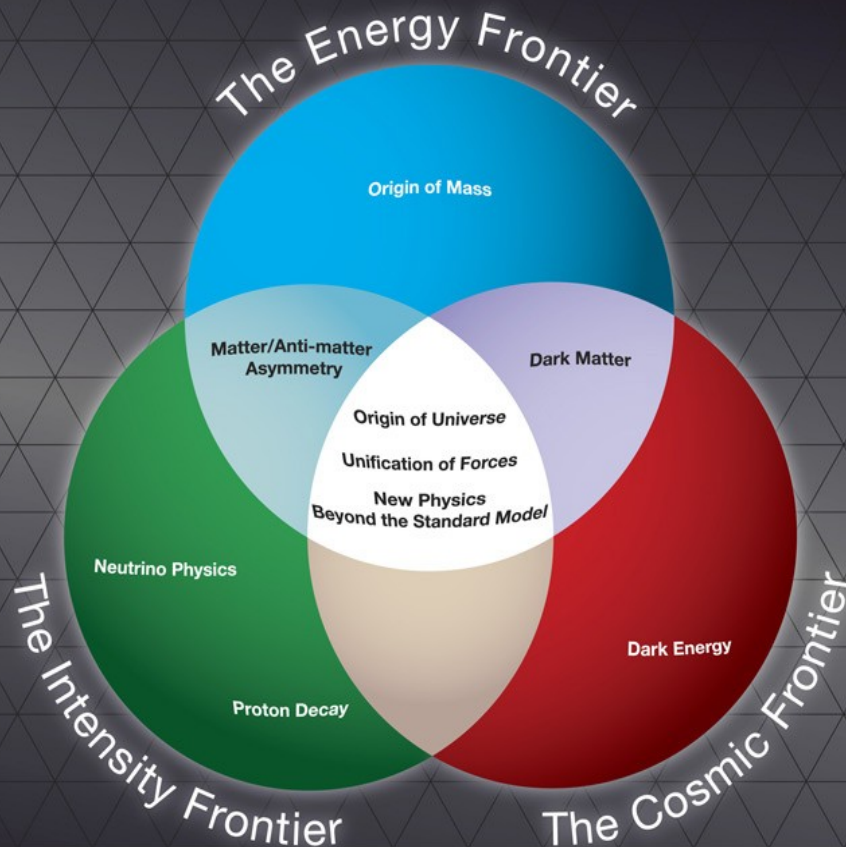


# Snowmass Young Physicist

**Jonathan Asaadi**

On behalf of the  
Snowmass Young  
Physicist Movement



## Contributors

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**Conveners**

# Purpose of Snowmass Young

- Provide a conduit for untenured (young) particle physicists to participate in the Community Summer Study.
- Facilitate and encourage young people to get involved
  - “Future experiment planners are not the future experimenters”
- Provide a deliverable to Snowmass reflecting the demographics, current attitudes, opinions, and concerns of young physicists.
  - Give a voice to the next generation of leaders
- Become a long term asset to the field and a place where young peoples voices can be heard
  - Networking amongst young people
  - Providing information about current and planned experiments
  - Information about career options and “out of the box” talks



# Story....

- Snowmass Young in 2001

- Self organize to give input
- Took a survey to get the opinions of the field as input to Snowmass
- Formed the YPP (Young Particle Physicists) to act on behalf of “young” people after Snowmass



- Snowmass Young in 2013

- Organized during the Community Planning Meeting at FNAL in October 2012 (with encouragement from former “young” Snowmass)
- Formed the Snowmass Young Physicists to help organize efforts both during and after Snowmass
- Decided to administer another survey to build on the success of the last effort





# How the YPM has been involved

- Participating in the Snowmass Process
  - We had dedicated sessions at more than 6 of the Pre-Snowmass workshops
  - We held over a dozen of our own YPM town-hall meetings
- Inviting speakers to engage with the young community
  - We had speakers from FNAL lab directorate, DOE, NSF, as well as scientists and professors
  - Hearing from and speaking on behalf of many, many young people
- White papers
  - Encourage young people to make contact with various people working on white papers for Snowmass
  - Many young people can be found as (co-) authors on many white papers
- Survey





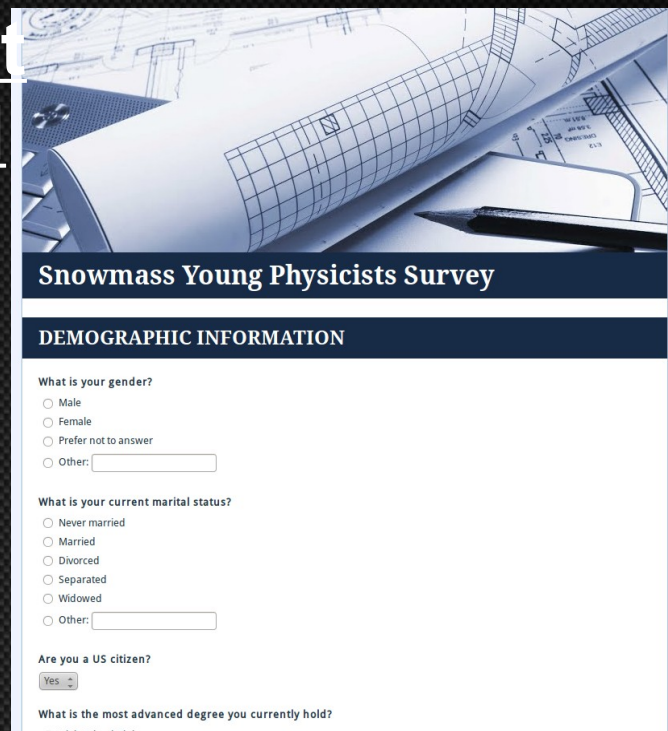
# Survey Methodology

- Collect a broad range of opinions that reflect both the physics interests and career concerns of HEP

- Allow us to look for trends across frontiers and at different stages in their career
- Attempt to figure out what physics people are excited about (“vote with their feet”)
- Additionally, collect the opinions and work experience of those who have left HEP for jobs outside the field

- Survey broken into 4 sections

- Demographic
- Career Outlook
- Physics Outlook
- Non-academic career paths



**Snowmass Young Physicists Survey**

**DEMOGRAPHIC INFORMATION**

What is your gender?

☐ Male

☐ Female

☐ Prefer not to answer

☐ Other:

What is your current marital status?

☐ Never married

☐ Married

☐ Divorced

☐ Separated

☐ Widowed

☐ Other:

Are you a US citizen?

What is the most advanced degree you currently hold?

☐ High School Diploma

## Snowmass 2013 Young Physicist Science and Career Survey Report

Arxiv: Posting tomorrow

<http://snowmassyoung.hep.net/Snowmass2013Survey.pdf>

## Comprehensive Paper

*Being worked on during Snowmass and will be submitted at the end*



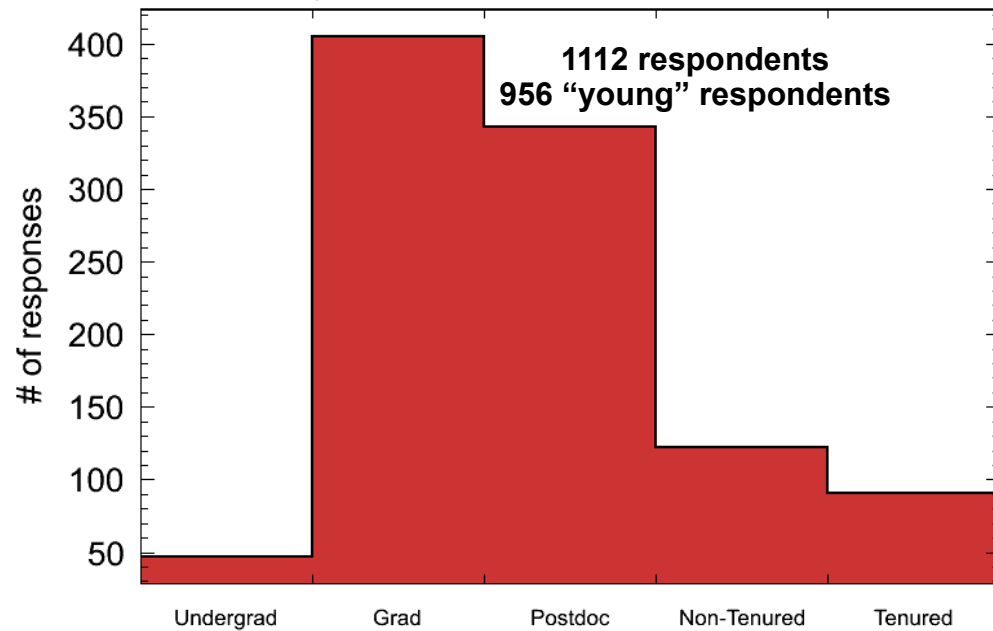
# Demographic Information



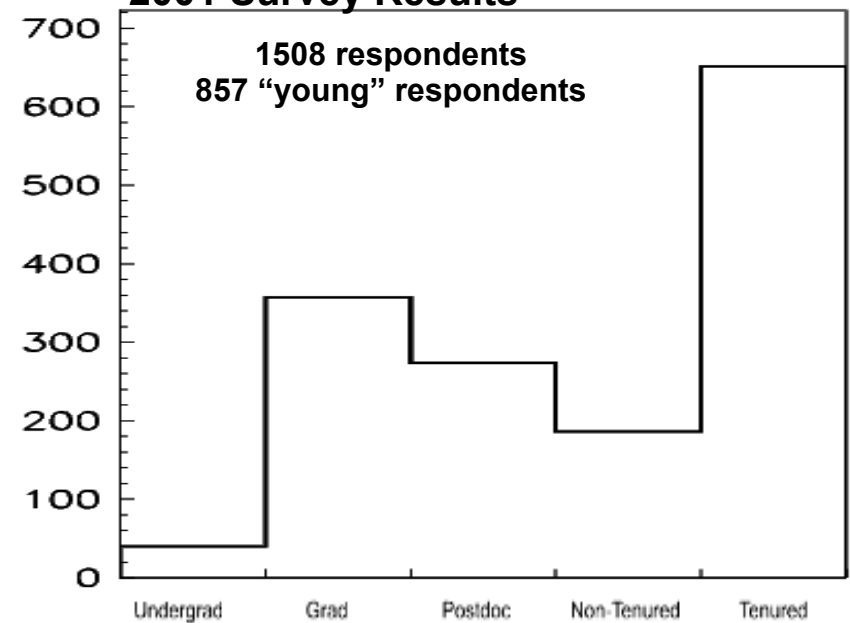
- We asked lots of demographic information in our survey
  - Gender, marital status, household income, number of children, etc...
  - Broader information included in the paper along with comparisons to 2010 Census Data
- General information
  - 1112 responses to the survey
    - 956 fit the “young” definition (current non-tenured position)
    - 74 from non-academic career paths
  - 77.6 % Male / 22.4 % Female (*49.2 % Male / 50.8 % Female in US population*)

# Results: Demographic

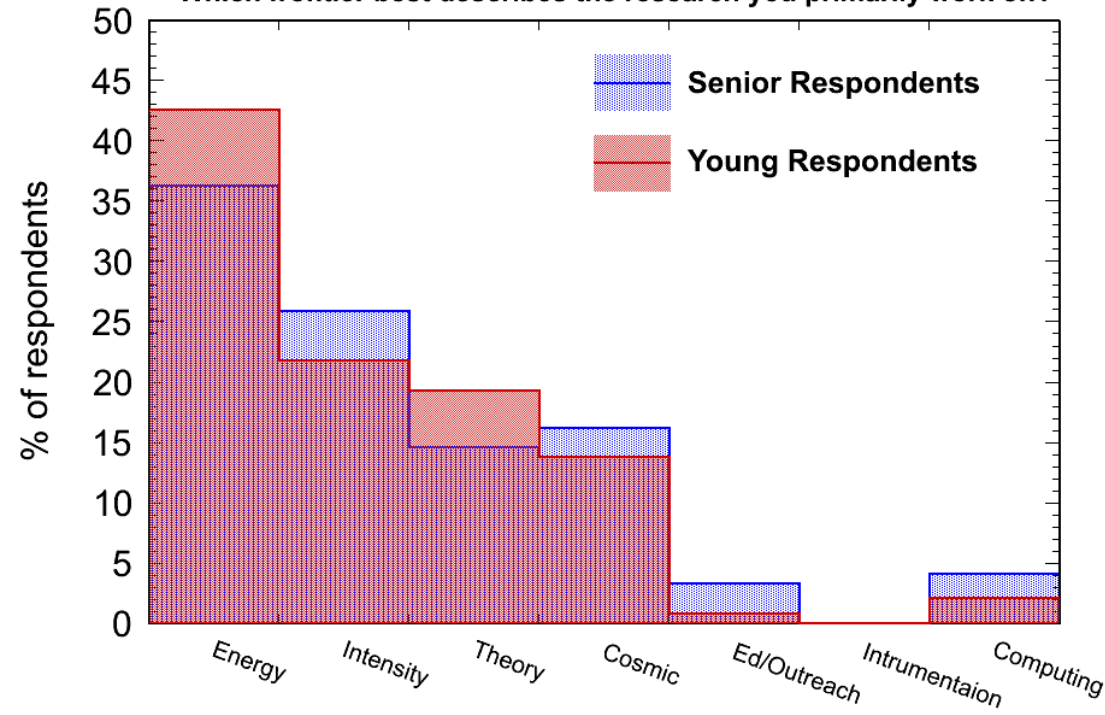
## 2013 Survey Results



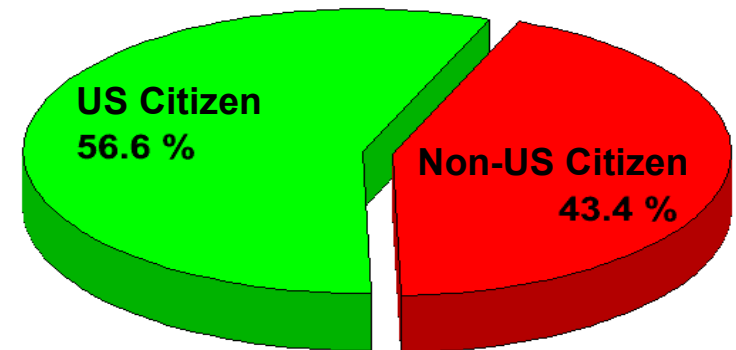
## 2001 Survey Results



## Which frontier best describes the research you primarily work on?

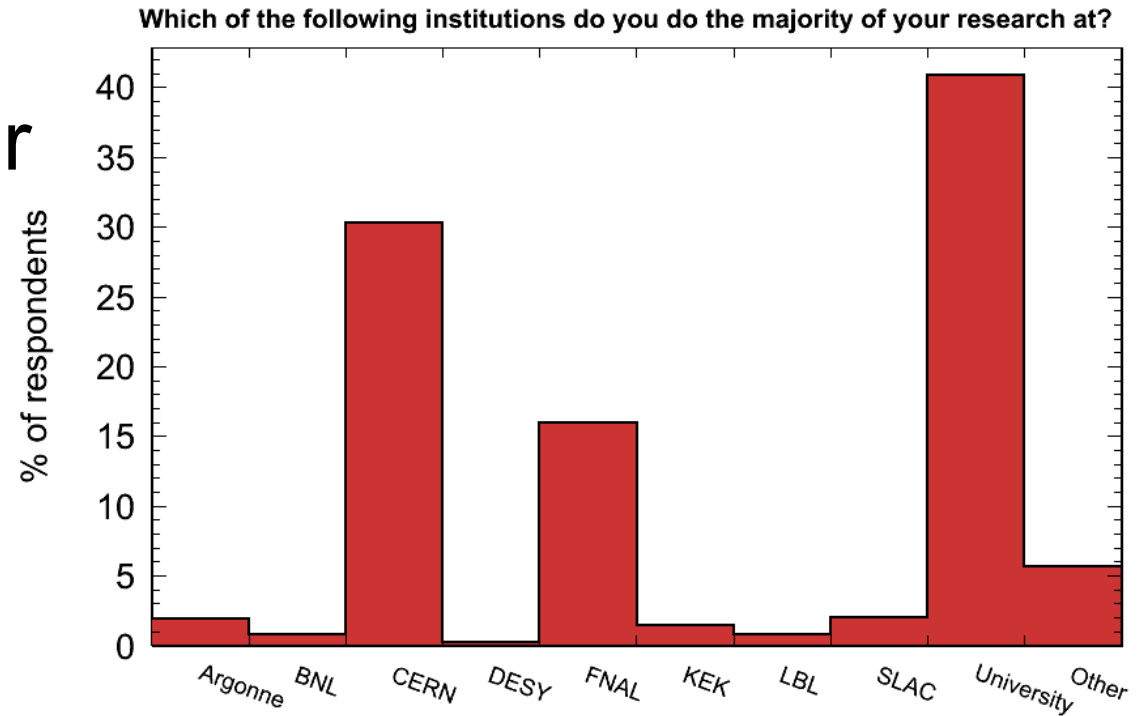


## Are you a US citizen?

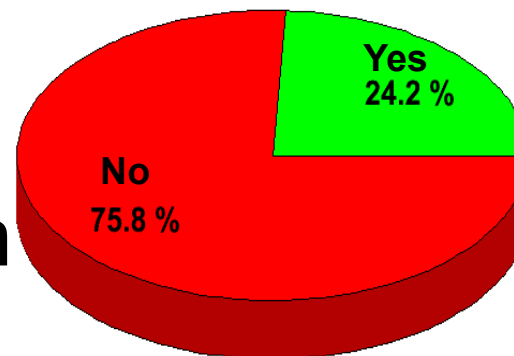


# Results: Demographic

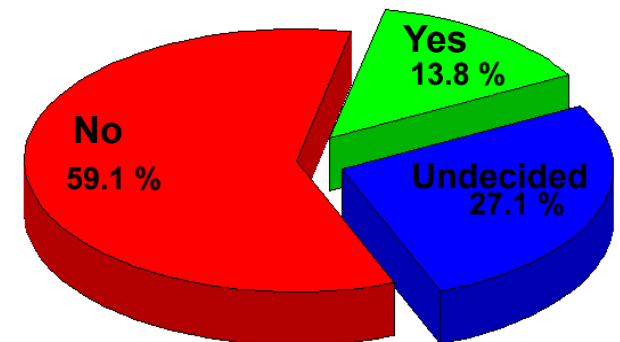
- Most of our respondents do their research at Universities (**41%**), CERN (**30%**), or FNAL (**16%**)
- Our respondents **had not been participating** in Snowmass prior to taking the survey and **did not plan on attending** Snowmass



Have you been contributing to Snowmass?



Do you plan on attending Snowmass?



**This makes the opinions heard in the survey all the more important!**

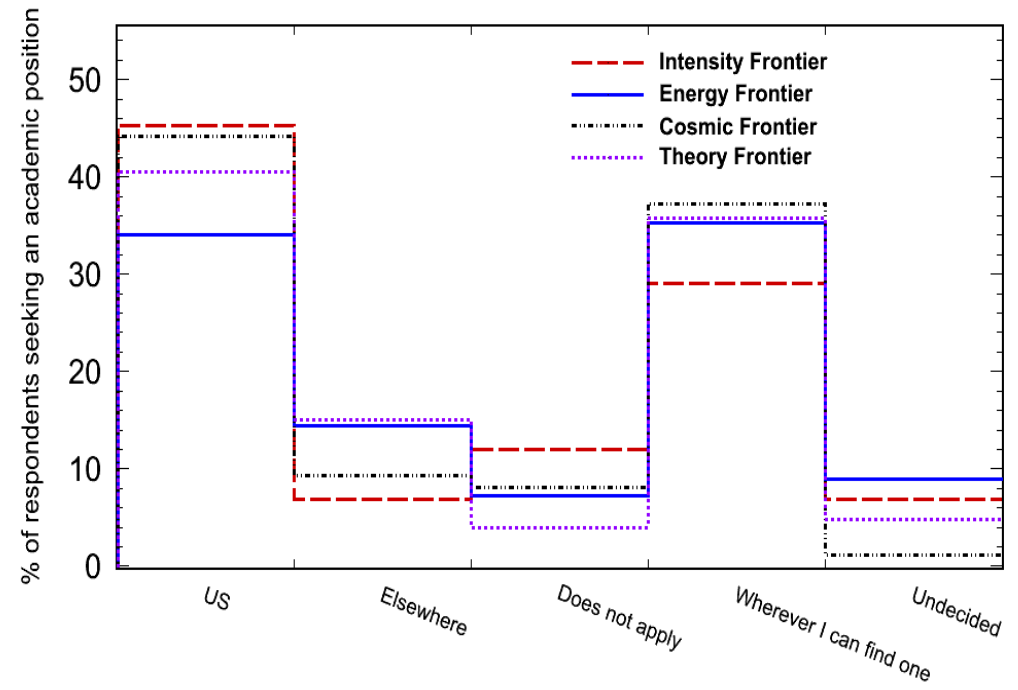
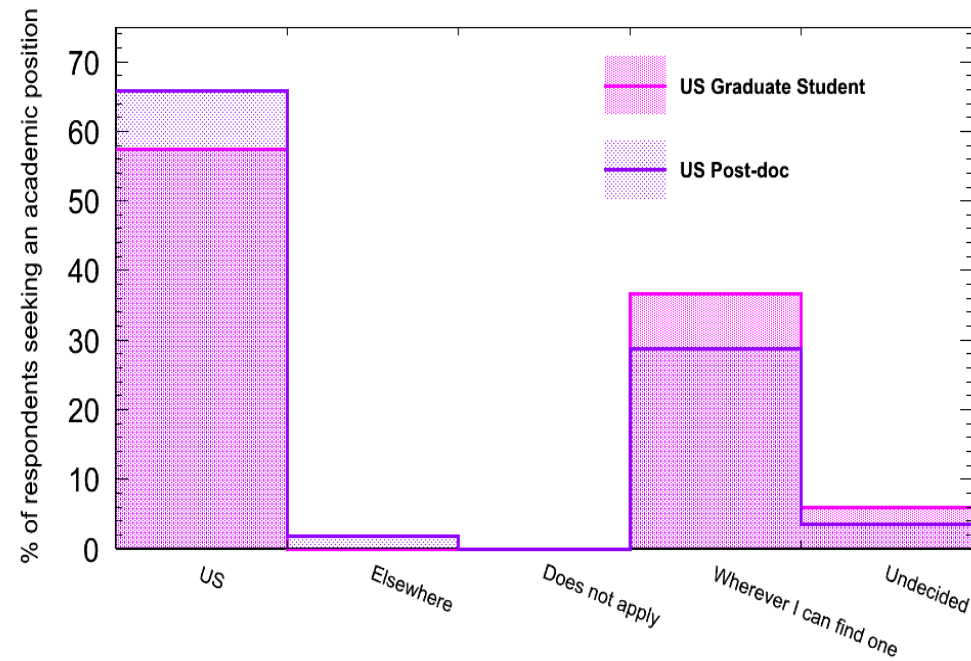
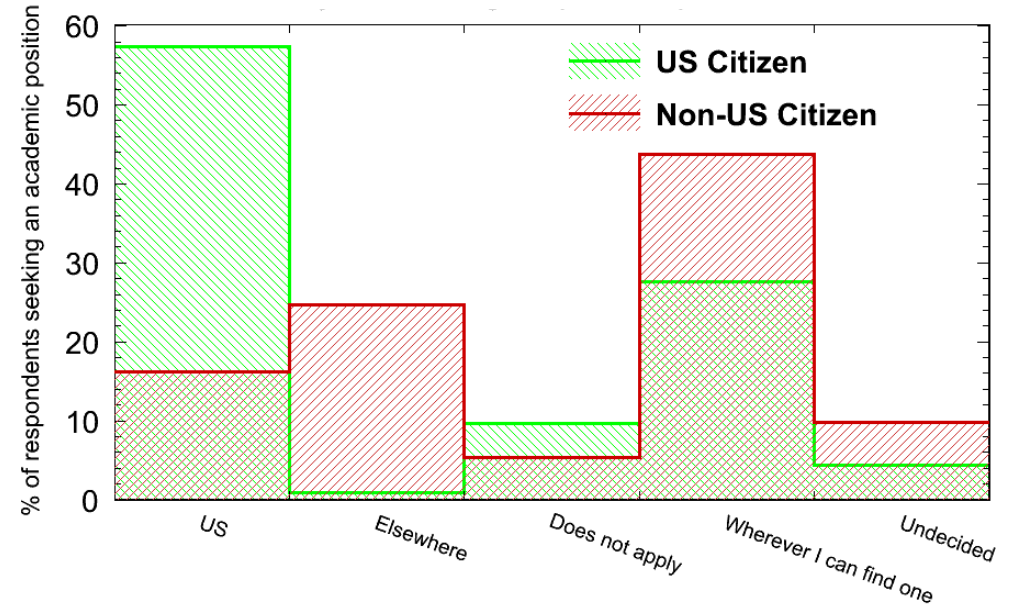
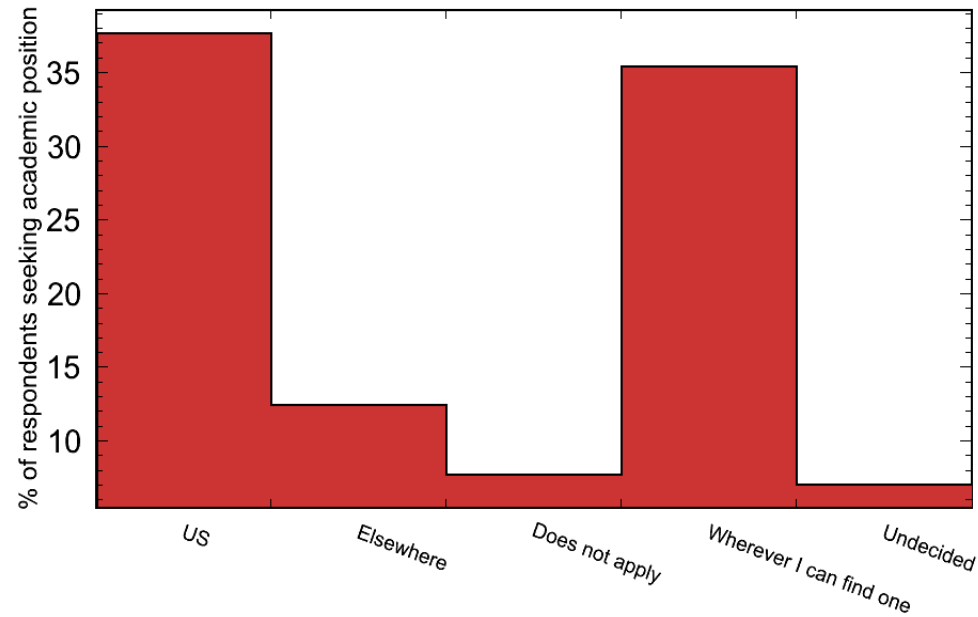


# Career Outlook



- Try to get a sense of what concerns HEP the most when it comes to careers
  - We focused on those concerns most relevant to “younger” folks in HEP, but still included questions about the general state of things
  - We all know the funding situation isn't the best...but we wanted to know how this translates into direct concerns
- General trends we observed
  - Generally a realistic (pessimistic) outlook for funding for HEP in the future (**60% believe funding is more likely to decline in the future**)
  - Despite this, a large percentage of young people intend to pursue a career in academia (**60% are planning on seeking an academic job**)
  - Most respondents plan to search for a job in the US (**see coming slides**)
  - More of the young people are apt to seek a position outside of the US depending on where the experiments are built (**see coming slides**)

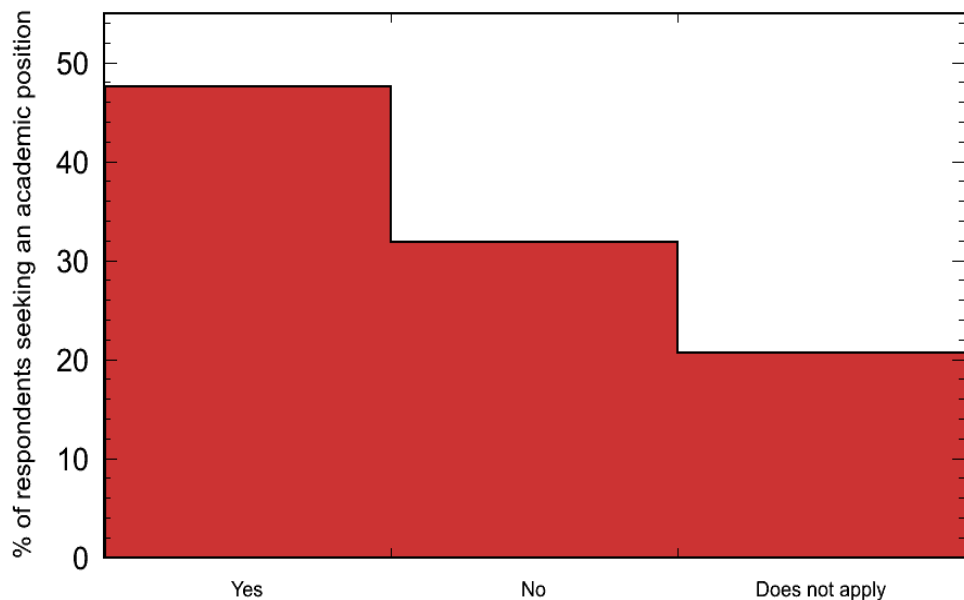
# In the future will you be searching for a permanent academic position in the US or abroad?



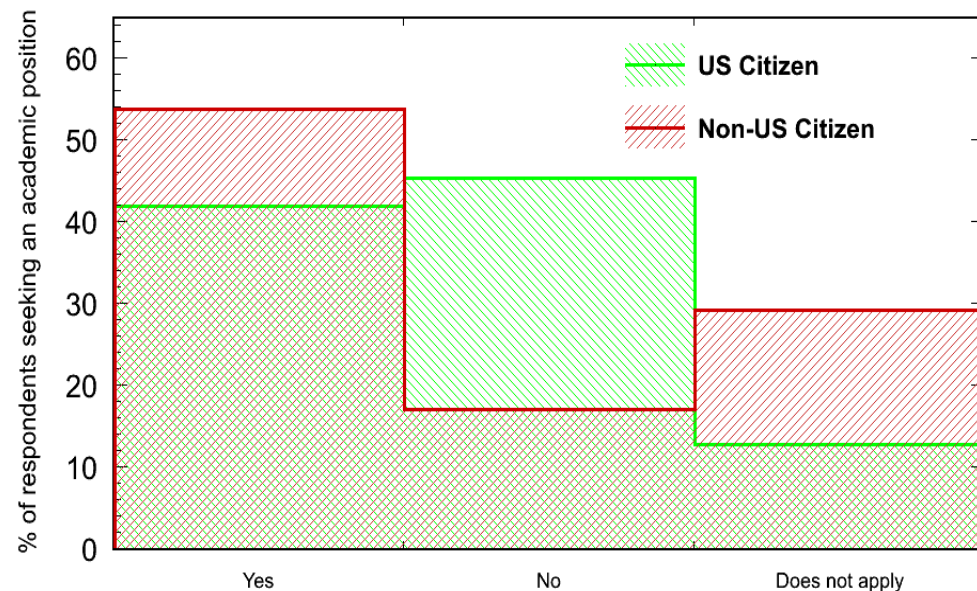


# If the next major experiment in your frontier is built outside the US would you be inclined to search for a job outside the US?

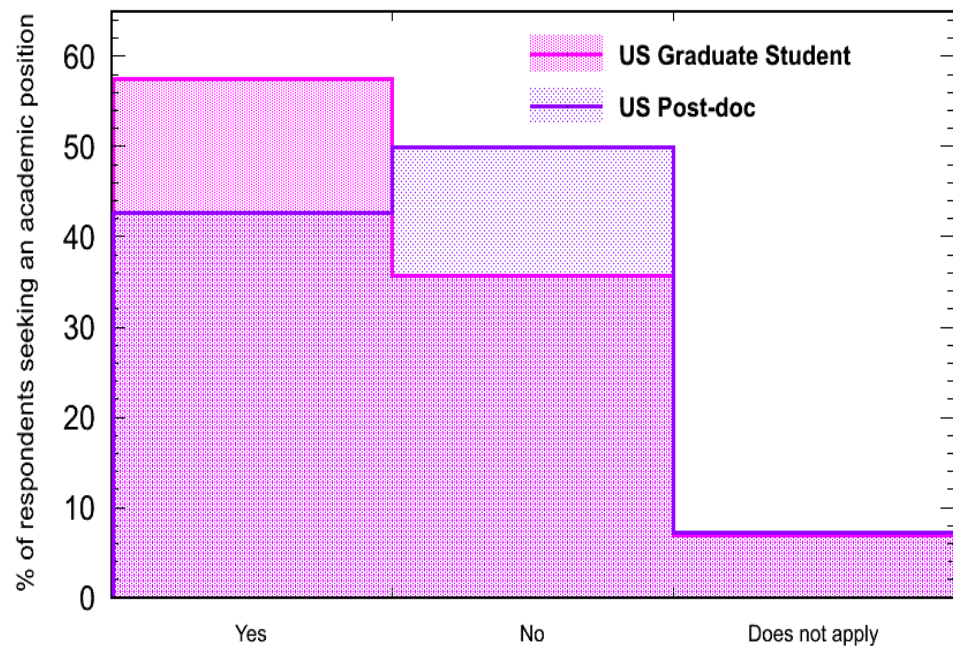
If the next major experiment is built outside the US would you be inclined to search for a job outside the US?



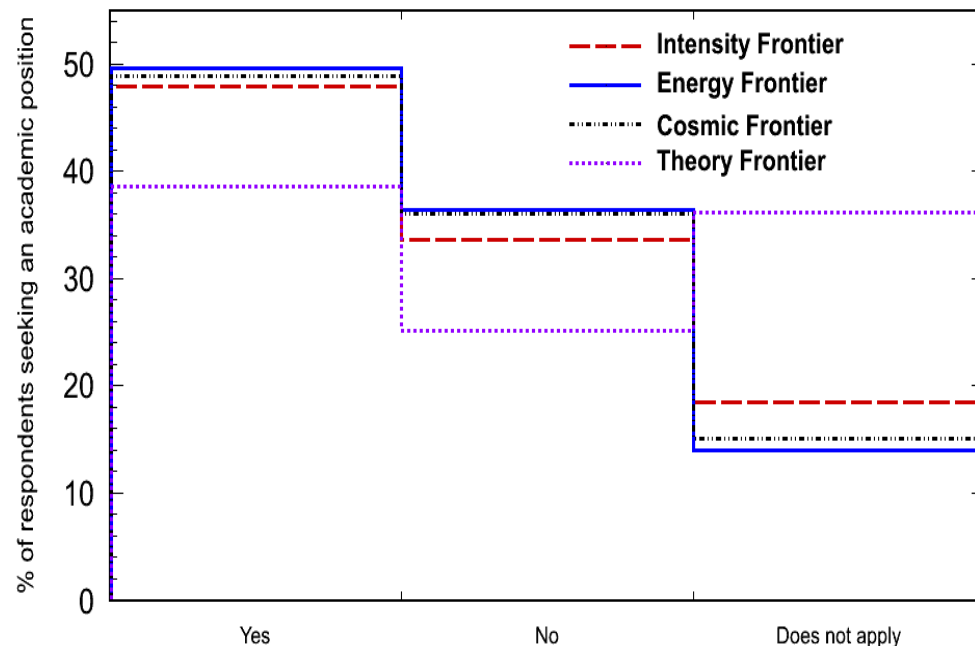
If the next major experiment is built outside the US would you be inclined to search for a job outside the US?



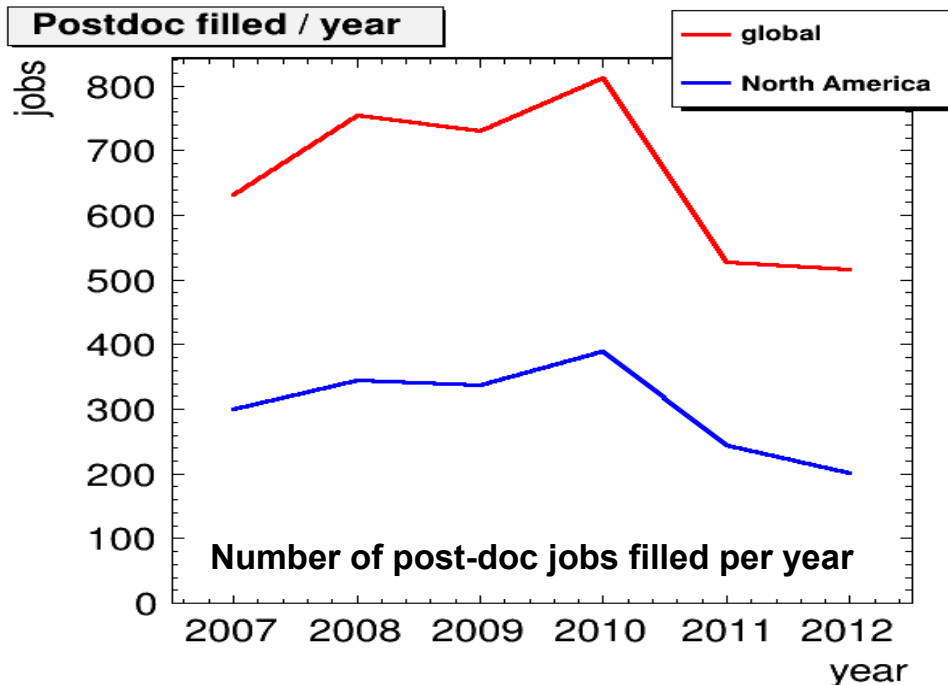
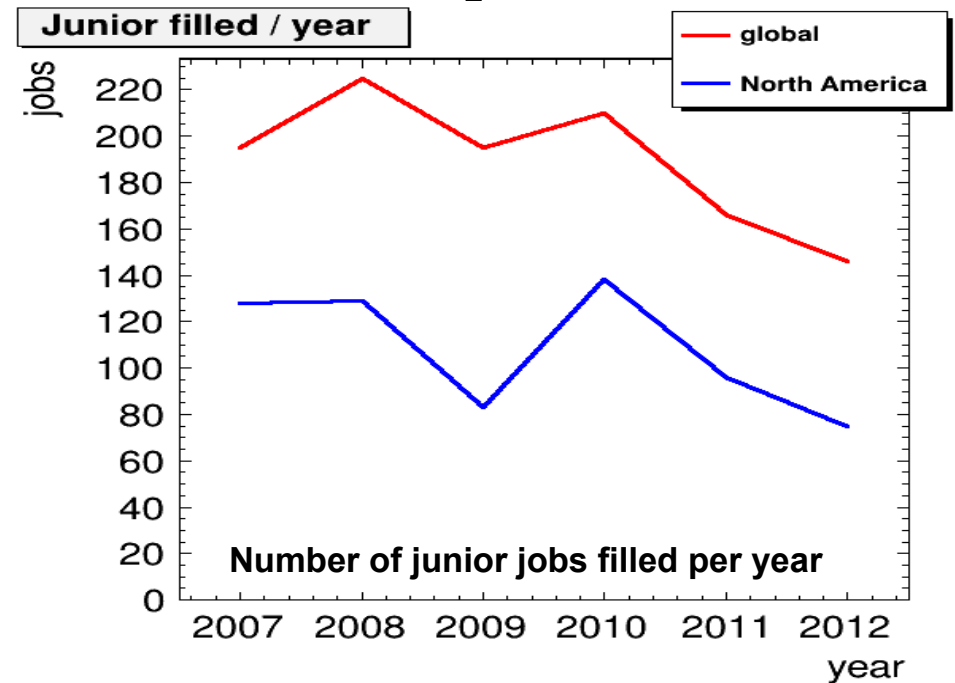
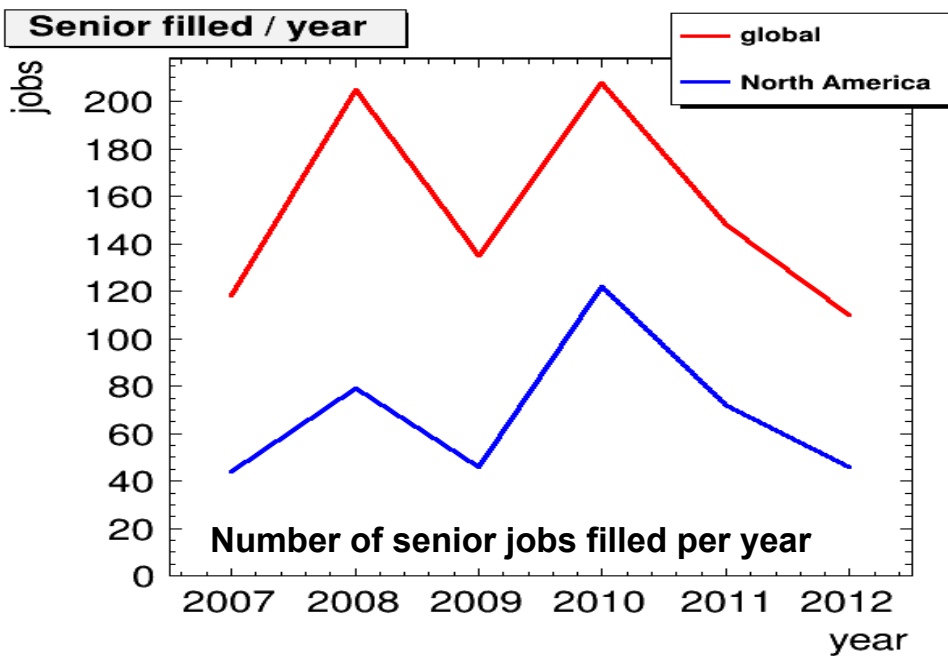
If the next major experiment is built outside the US would you be inclined to search for a job outside the US?



If the next major experiment is built outside the US would you be inclined to search for a job outside the US?



# Preliminary Data from Spires



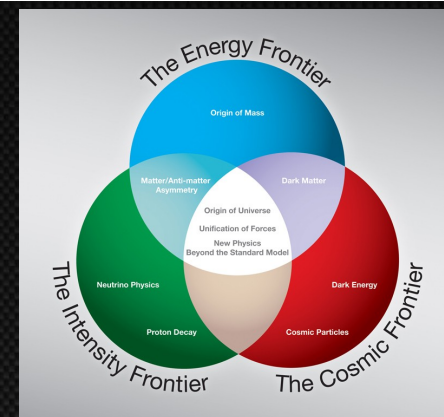
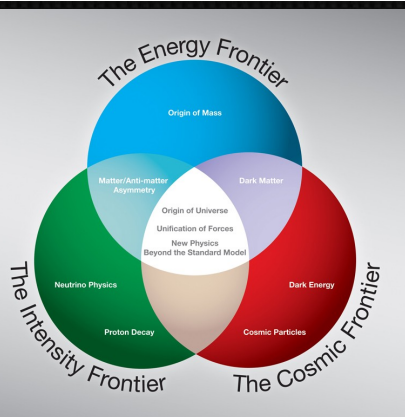
Recall 62% of our young scientists say they intend to pursue a permanent position inside HEP.

62% x 956 young respondents =  
**592 job applicants**

**~ 160 Global junior jobs** in 2012 listed on Spires



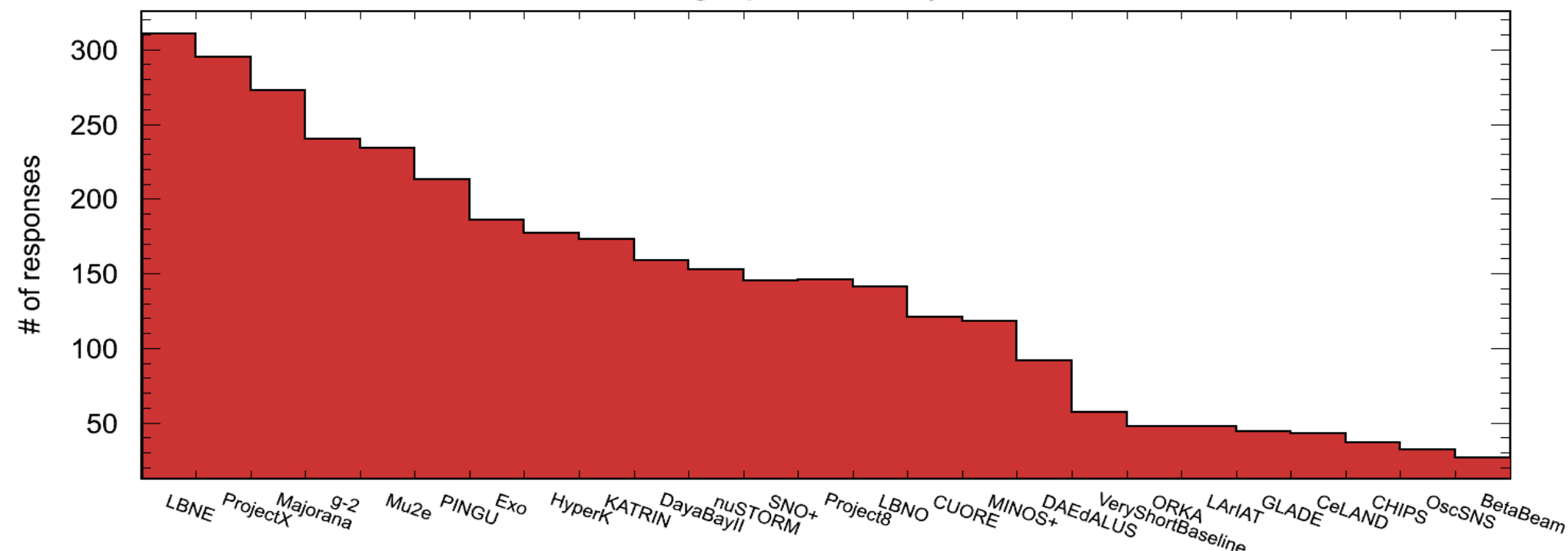
# Physics Outlook



- We really wanted to know about the science that is going to drive our field
  - Find out which of our frontiers “young” people find exciting
  - See if those taking the survey are “happy” with their current frontier
  - Try to get a sense of which of the planned experiments are “young” people most excited about
- Despite knowing that funding in the coming years will be difficult and the permanent careers in HEP will be scarce, **the science still drives us!**
  - 75.7% would recommend other talented young physicists to pursue a career in their frontier (universal across all frontiers...see backup slides!)
  - **Which frontier will have the greatest impact on HEP in the next 10 years?**
    - **Senior People:** 40% Energy Frontier, 22% Cosmic Frontier, 20% Intensity Frontier
    - **Young People:** 35% Energy Frontier, 25% Cosmic Frontier, 19 % Intensity Frontier
    - **By Frontier:** 60% of people in the Energy Frontier believe their frontier will have the most impact  
55% of people in the Intensity Frontier believe their frontier will have the most impact  
70% of people in the Cosmic Frontier believe their frontier will have the most impact

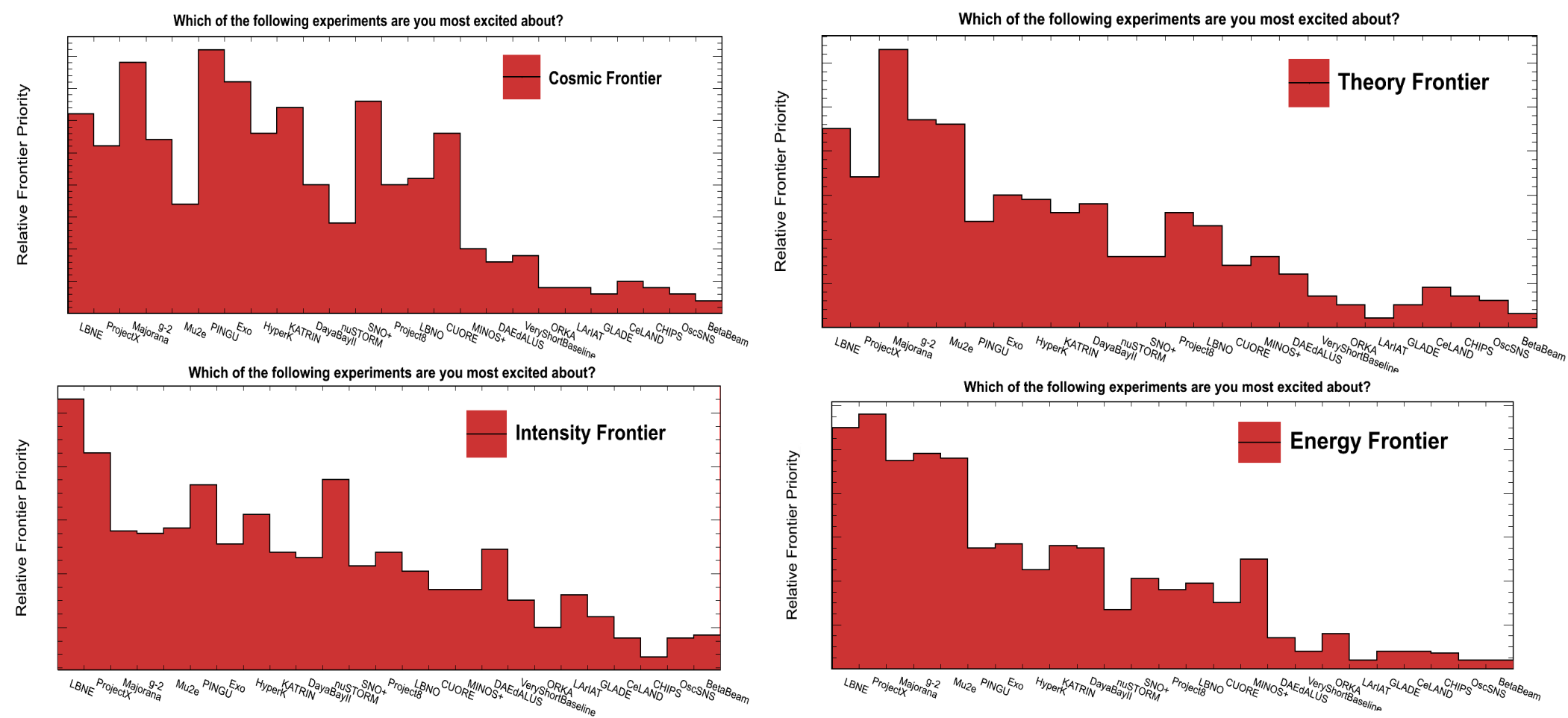
# Intensity Frontier

Which of the following experiments are you most excited about?



- **Top 3 Intensity Frontier Experiments people are excited about (can select more than one)**
  - LBNE
  - Project X
  - Majorana
- **We can also look so see which experiments are found most exciting by different demographics**
  - Frontier (shown on the next slide)
  - Current position (to be included in the comprehensive study)



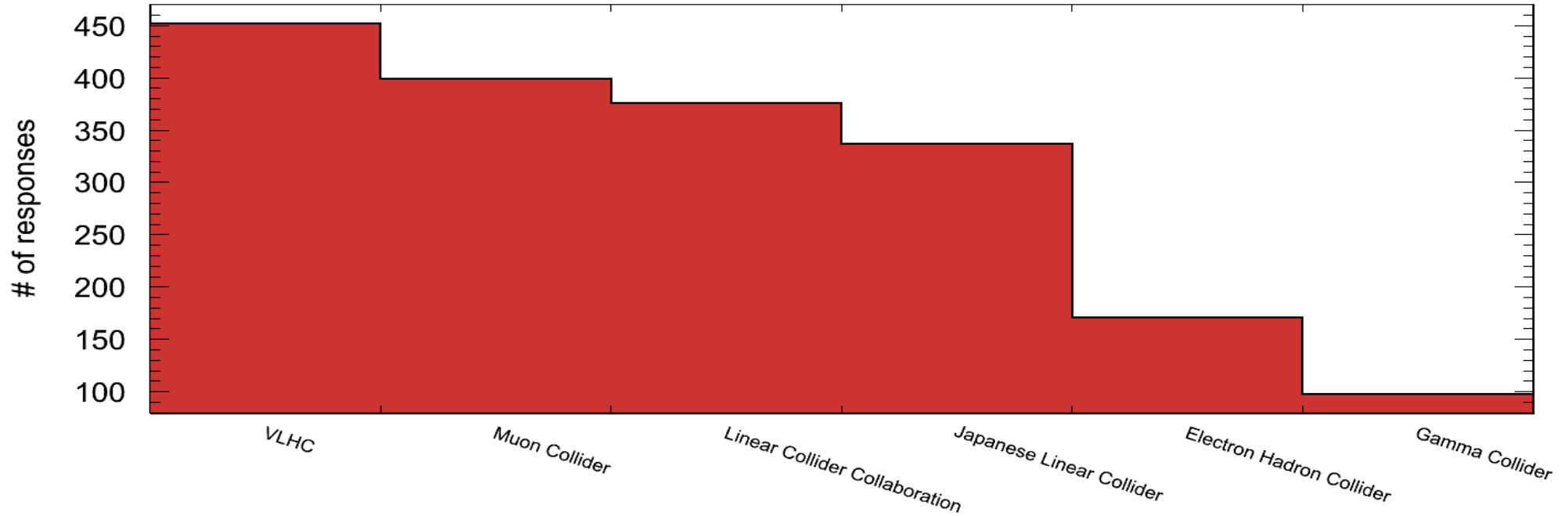


	Cosmic Frontier	Theory Frontier	Energy Frontier	Intensity Frontier
1	PINGU	Majorana	Project X	LBNE
2	Majorana	g-2	LBNE	Project X
3	Exo	Mu2e	g-2	nuStorm
4	Sno+	LBNE	Mu2e	PINGU
5	Katrin	HyperK	Majorana	HyperK
6	LBNE	Exo	Exo	Majorana

Table 1: The top six Intensity Frontier experiments respondents were excited about, broken down by their current frontier.

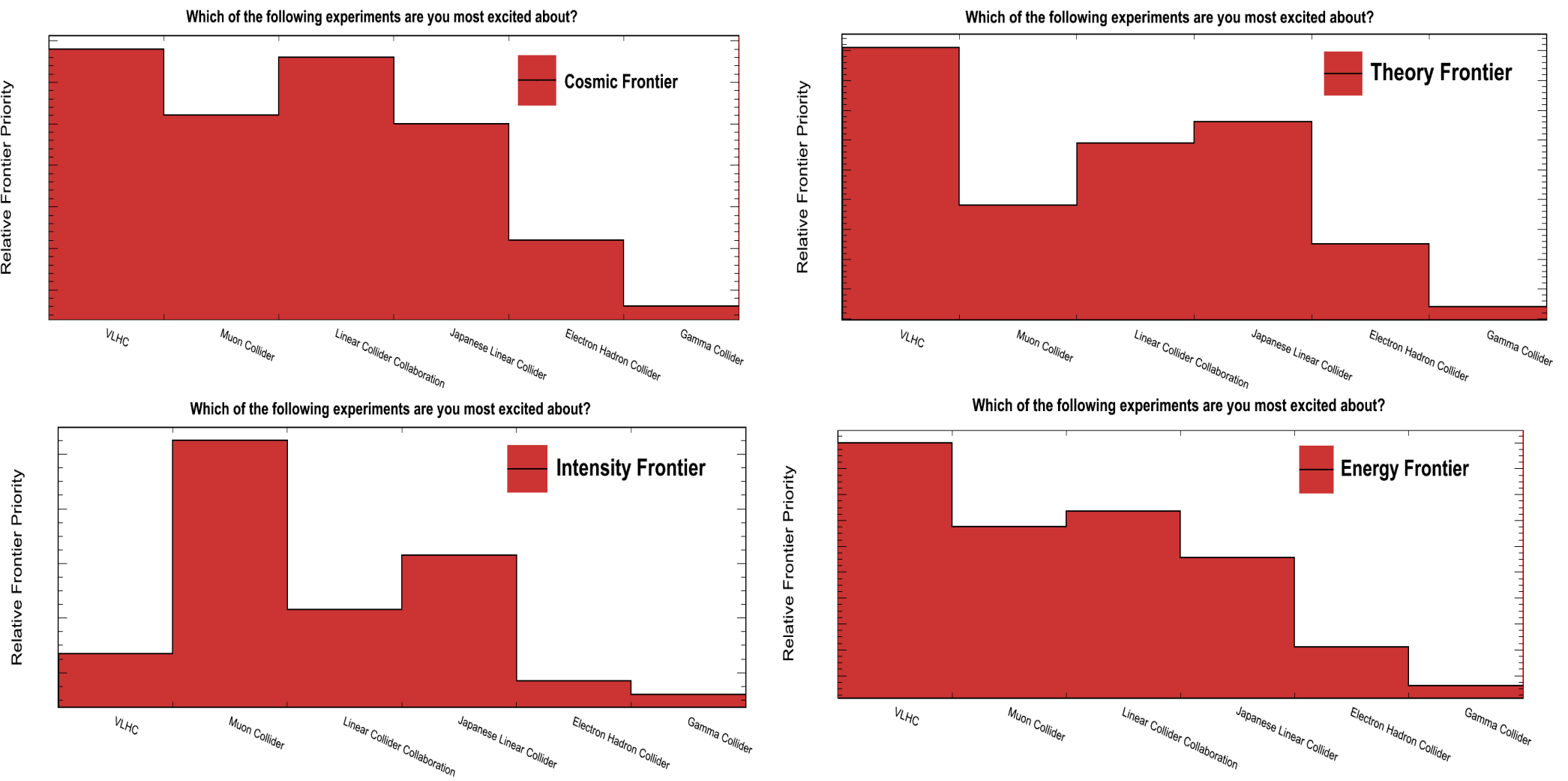
# Energy Frontier

Which of the following experiments are you most excited about?



- **Top 3 Energy Frontier Experiments people are excited about (can select more than one)**
  - Very Large Hadron Collider
  - Muon Collider
  - Linear Collider Collaboration
- **We can also look so see which experiments are found most exciting by different demographics**
  - Frontier (shown on the next slide)
  - Current position (to be included in the comprehensive study)



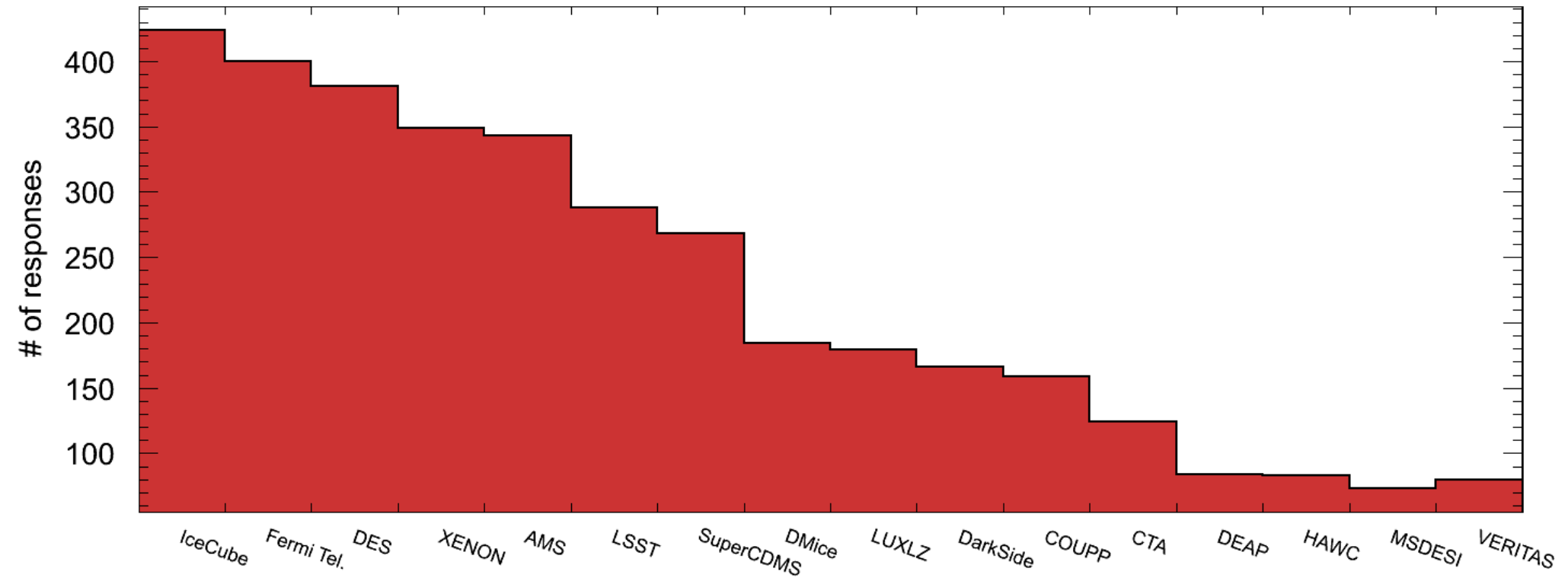


	Cosmic Frontier	Theory Frontier	Energy Frontier	Intensity Frontier
1	VLHC	VLHC	VLHC	Muon Collider
2	Linear Collider Collaboration	Japanese Linear Collider	Linear Collider Collaboration	Japanese Linear Collider
3	Muon Collider	Linear Collider Collaboration	Muon Collider	Linear Collider Collaboration
4	Japanese Linear Collider	Muon Collider	Japanese Linear Collider	VLHC
5	Electron Hadron Collider	Electron Hadron Collider	Electron Hadron Collider	Electron Hadron Collider
6	Gamma Collider	Gamma Collider	Gamma Collider	Gamma Collider

Table 2: The top six Energy Frontier experiments respondents were excited about, broken down by their current frontier.

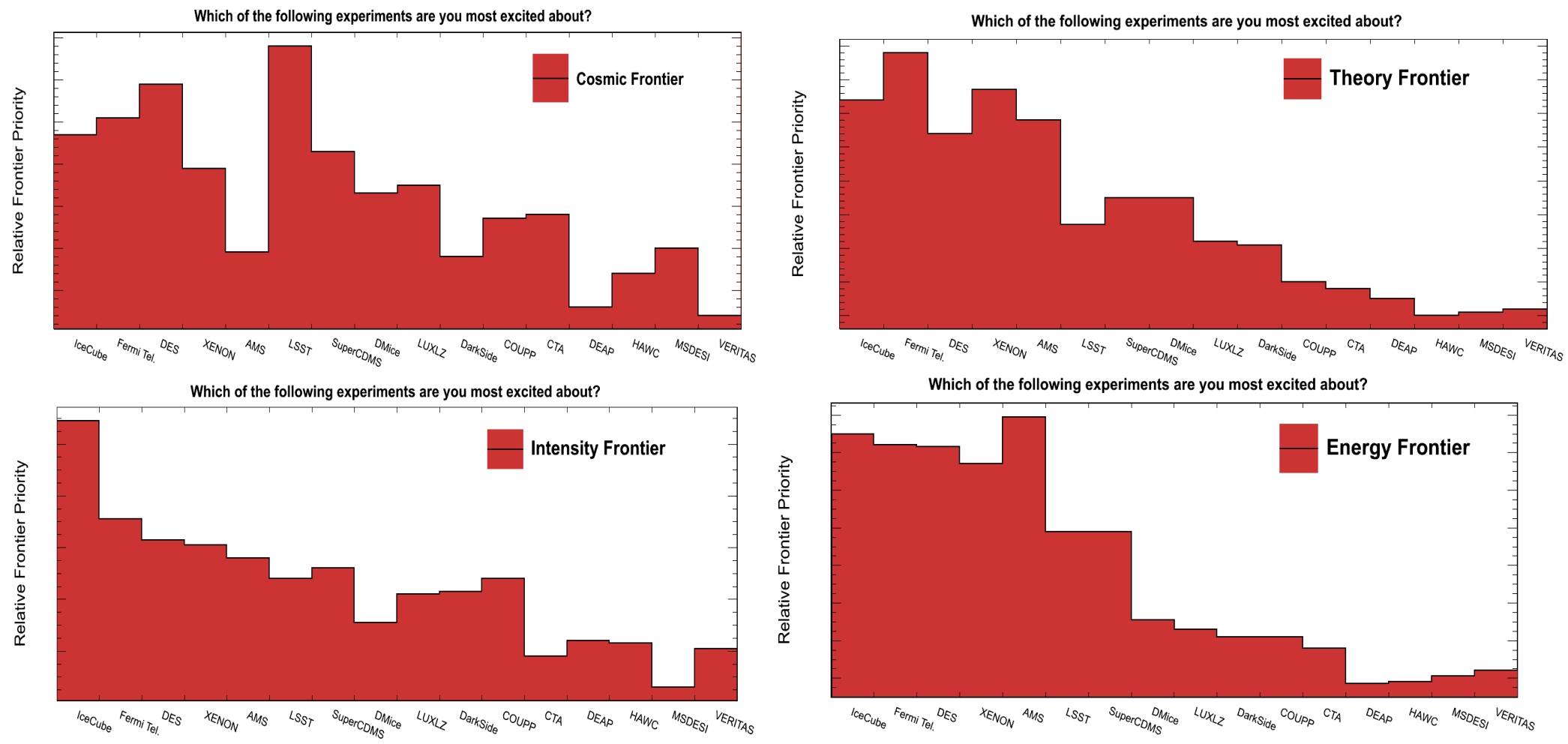
# Cosmic Frontier

Which of the following experiments are you most excited about?



- **Top 3 Cosmic Frontier Experiments people are excited about (can select more than one)**
  - IceCube
  - Fermi Telescope
  - Dark Energy Survey
- **We can also look so see which experiments are found most exciting by different demographics**
  - Frontier (shown on the next slide)
  - Current position (to be included in the comprehensive study)

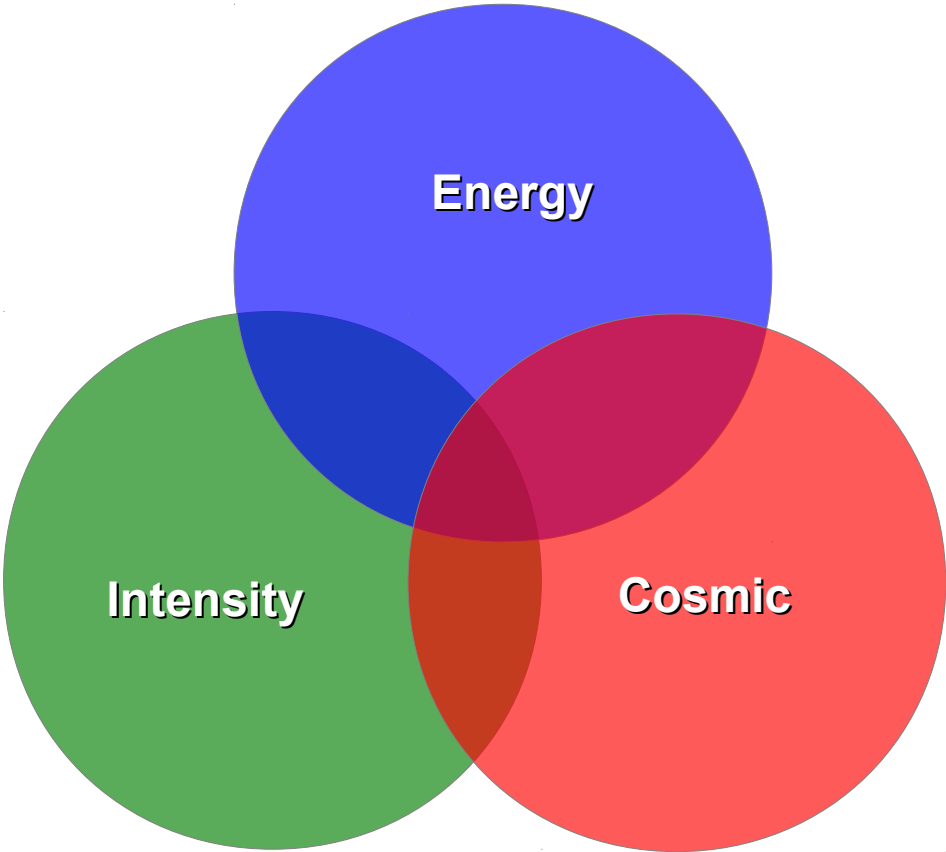




	Cosmic Frontier	Theory Frontier	Energy Frontier	Intensity Frontier
1	LSST	Fermi Telescope	AMS	IceCube
2	Dark Energy Survey	XENON	IceCube	Fermi Telescope
3	Fermi Telescope	IceCube	Fermi Telescope	Dark Energy Survey
4	IceCube	AMS	Dark Energy Survey	XENON
5	SuperCDMS	Dark Energy Survey	XENON	AMS
6	XENON	SuperCDMS	LSST	SuperCDMS

Table 3: The top six Cosmic Frontier experiments respondents were excited about, broken down by their current frontier.

	Cosmic Frontier	Theory Frontier	Energy Frontier	Intensity Frontier
1	VLHC	VLHC	VLHC	Muon Collider
2	Linear Collider Collaboration	Japanese Linear Collider	Linear Collider Collaboration	Japanese Linear Collider
3	Muon Collider	Linear Collider Collaboration	Muon Collider	Linear Collider Collaboration
4	Japanese Linear Collider	Muon Collider	Japanese Linear Collider	VLHC
5	Electron Hadron Collider	Electron Hadron Collider	Electron Hadron Collider	Electron Hadron Collider
6	Gamma Collider	Gamma Collider	Gamma Collider	Gamma Collider



	Cosmic Frontier	Theory Frontier	Energy Frontier	Intensity Frontier
1	PINGU	Majorana	Project X	LBNE
2	Majorana	g-2	LBNE	Project X
3	Exo	Mu2e	g-2	nuStorm
4	Sno+	LBNE	Mu2e	PINGU
5	Katrin	HyperK	Majorana	HyperK
6	LBNE	Exo	Exo	Majorana

	Cosmic Frontier	Theory Frontier	Energy Frontier	Intensity Frontier
1	LSST	Fermi Telescope	AMS	IceCube
2	Dark Energy Survey	XENON	IceCube	Fermi Telescope
3	Fermi Telescope	IceCube	Fermi Telescope	Dark Energy Survey
4	IceCube	AMS	Dark Energy Survey	XENON
5	SuperCDMS	Dark Energy Survey	XENON	AMS
6	XENON	SuperCDMS	LSST	SuperCDMS

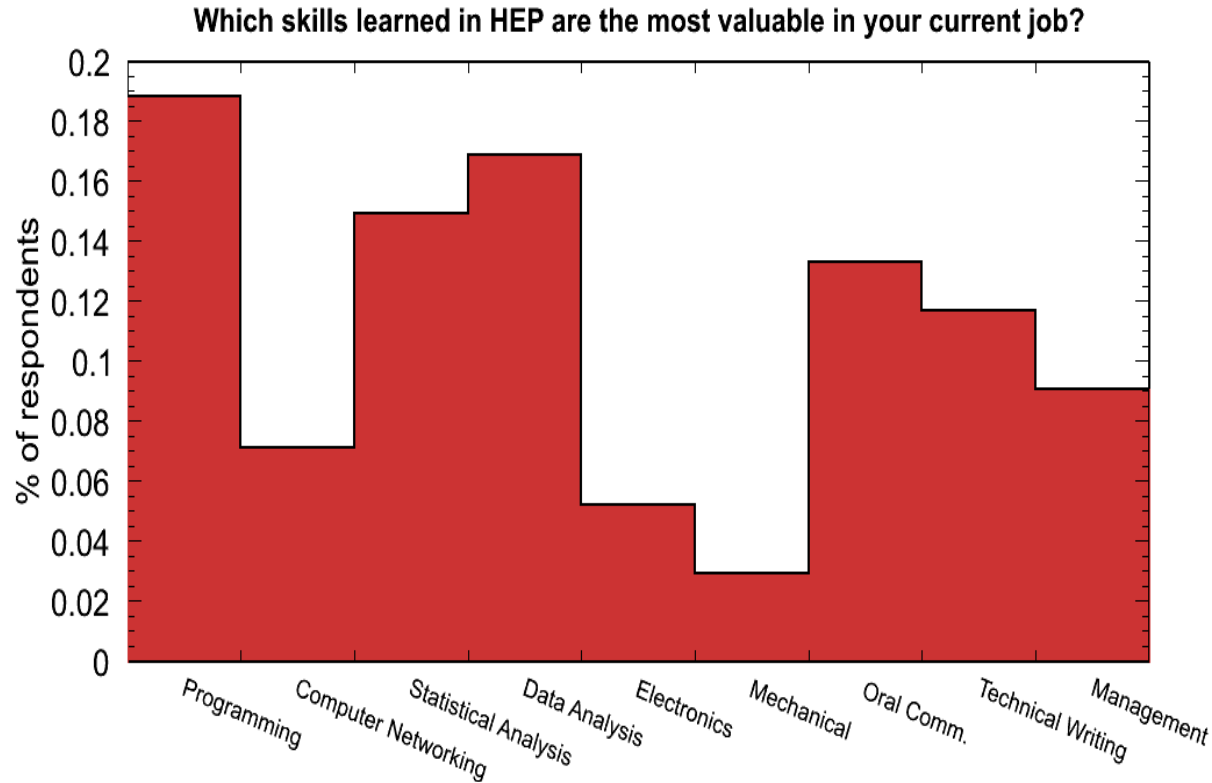


# Non-academic Career Paths



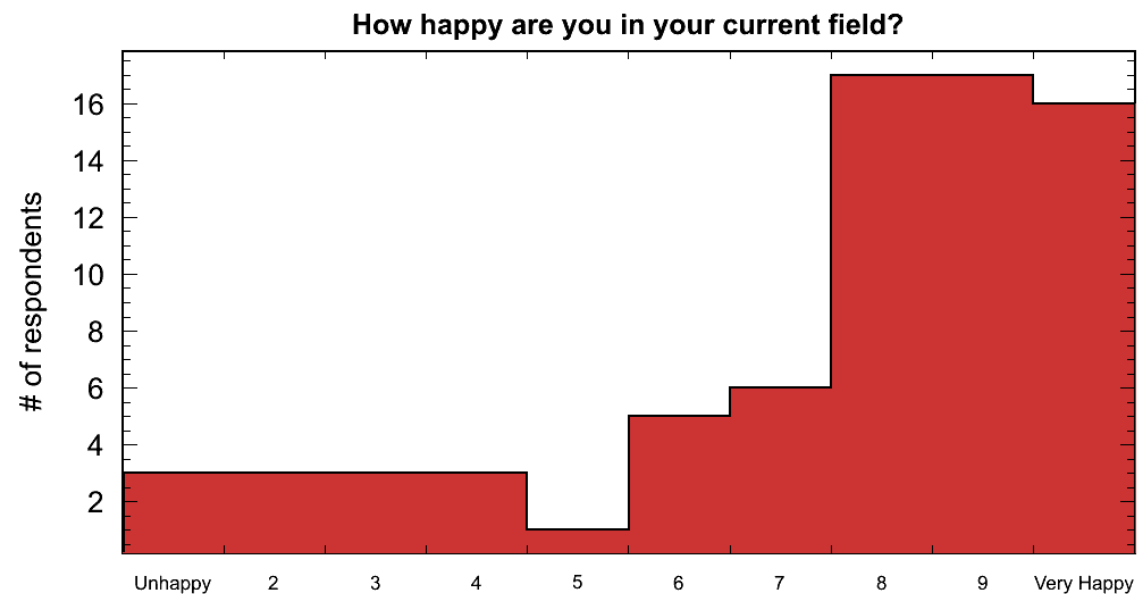
- Reached out to people who received their training in HEP but since left the field
  - Find out how their time in HEP prepared them for their career
  - Interested in how their work lives compare with our own
- Received 74 responses from those on a non-academic career path
  - 87% would likely recommend other people to pursue a career in their field
  - On average people in non-academic careers self report the same hours worked per week
    - Average 50.0 work hours per week for non-academic (7.4 hours / weekend)
    - Average 49.1 work hours per week for academic (7.3 hours / weekend)
  - Skills learned in HEP are valuable in their job (*see next slide*)
  - Respondents who have left HEP are happy in their job (*see next slide*)

# Results: Non-academic Career Paths



## Most Commonly listed non-academic career paths

- Consulting
- Finance
- Data Analyst





# Broad Conclusions from the Survey

- Demographic Conclusions

- Reached a large fraction of young people in HEP, many of which had not been participating in Snowmass and are not present at this meeting

- Career Outlook Conclusions

- People are excited about jobs in HEP (despite knowing that funding is tough) and will search for jobs in the US
- However, this can shift if the US misses an opportunity to build the next major experiment

- Physics Outlook Conclusions

- General excitement about the upcoming science both within your own frontier and in other frontiers
- Still some work ahead to build consensus about which of the experiments are seen as most exciting

- Non-academic Career Paths Conclusions

- Self reported work habits seem the same for both academic and non-academic careers
- Many of the skills learned in HEP are valuable in non-academic career paths and leads to generally happy careers

# Where do we go from here

- Upcoming comprehensive paper
  - Work continuing on analysis and writing during Snowmass ( People welcome to get involved)
- Snowmass Young Meeting
  - Wednesday: **Blegen 150 12:00pm – 1:30pm**
  - **Alan Stone from the DOE** will come speak
    - “The funding process and what people need to know about the DOE”
- DPF 2013
  - More detailed presentation of survey results will be presented at a Young Physicists Forum
  - Special panel discussion addressing young scientists concerns
- Provide input into the P5 process
  - Provide analysis that aids in the upcoming decision making process
  - Continue to be an advocate for young scientists to the P5 panel
- Continue efforts to keep the Snowmass Young Physicists as a resource to young scientists





## **Snowmass 2013 Young Physicist Science and Career Survey Report**

Arxiv: Coming out tomorrow

<http://snowmassyoung.hep.net/Snowmass2013Survey.pdf>

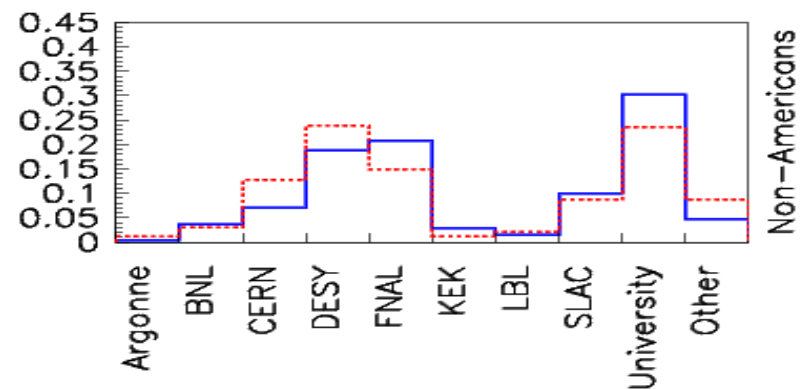
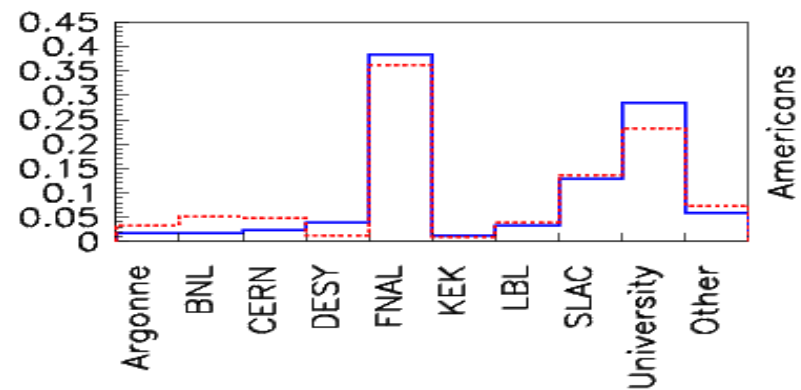
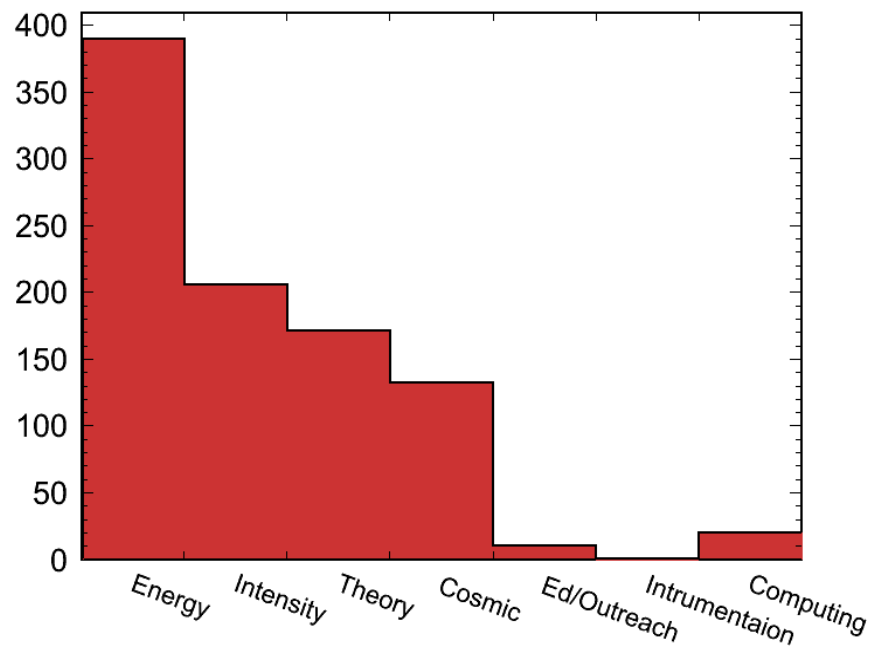
## **Snowmass YPM Survey Comprehensive Paper**

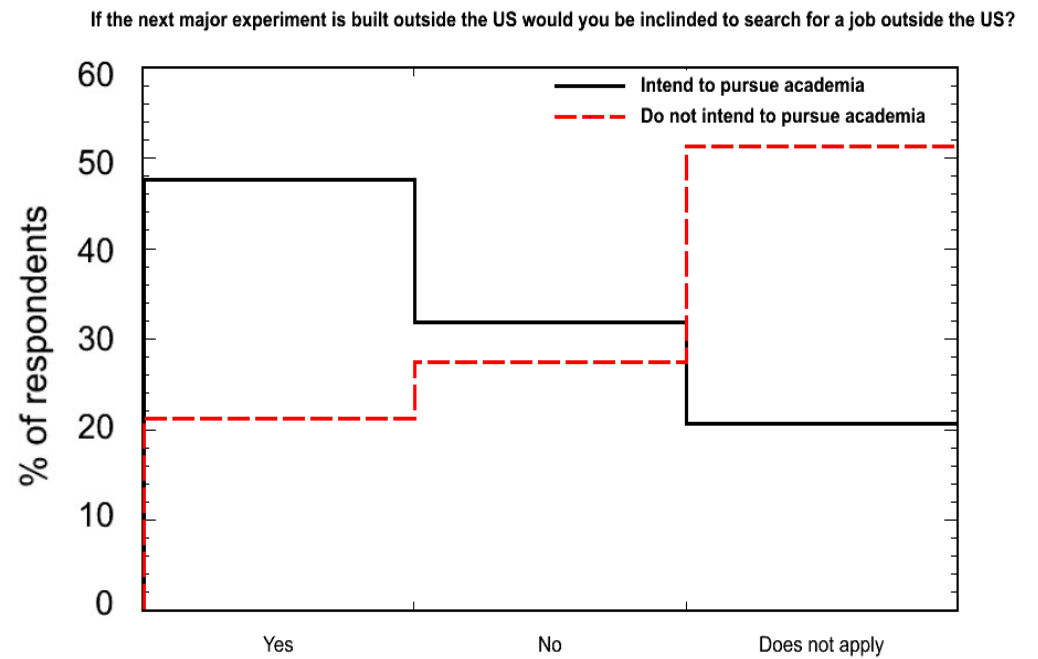
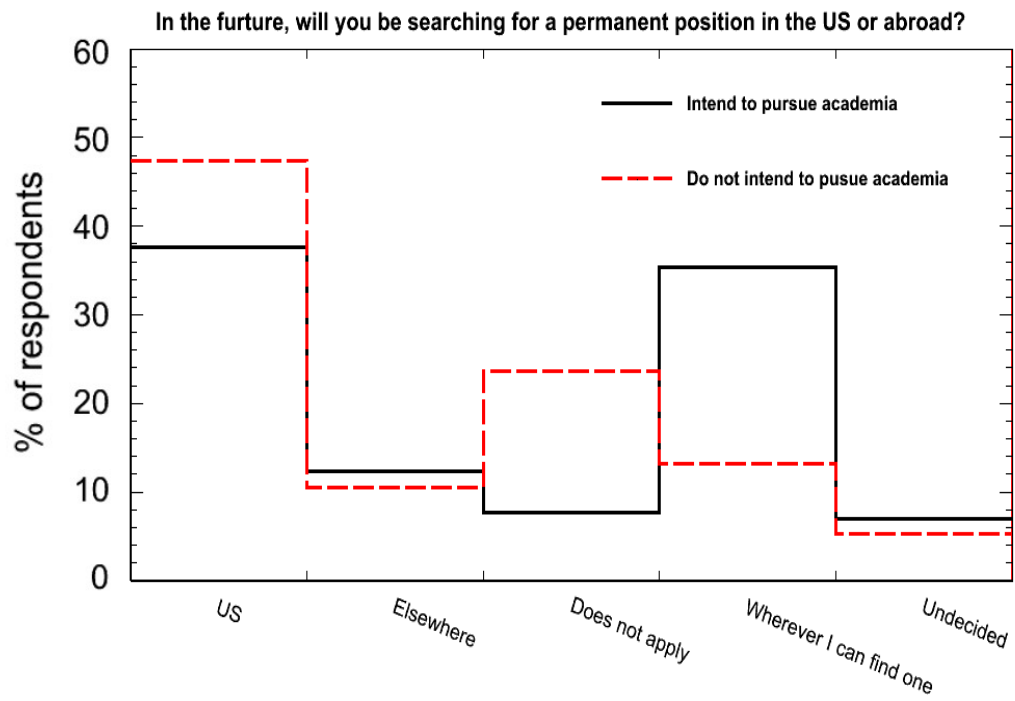
*Being worked on during Snowmass and will be submitted at the end*

# Back-up Slides

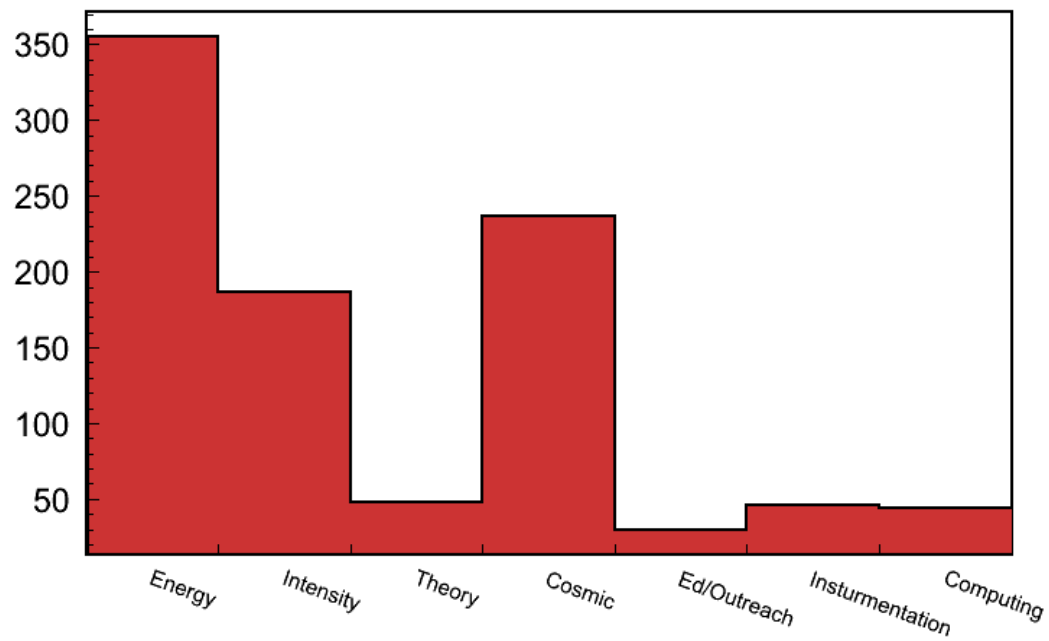


Which frontier best describes the research you primarily work on?

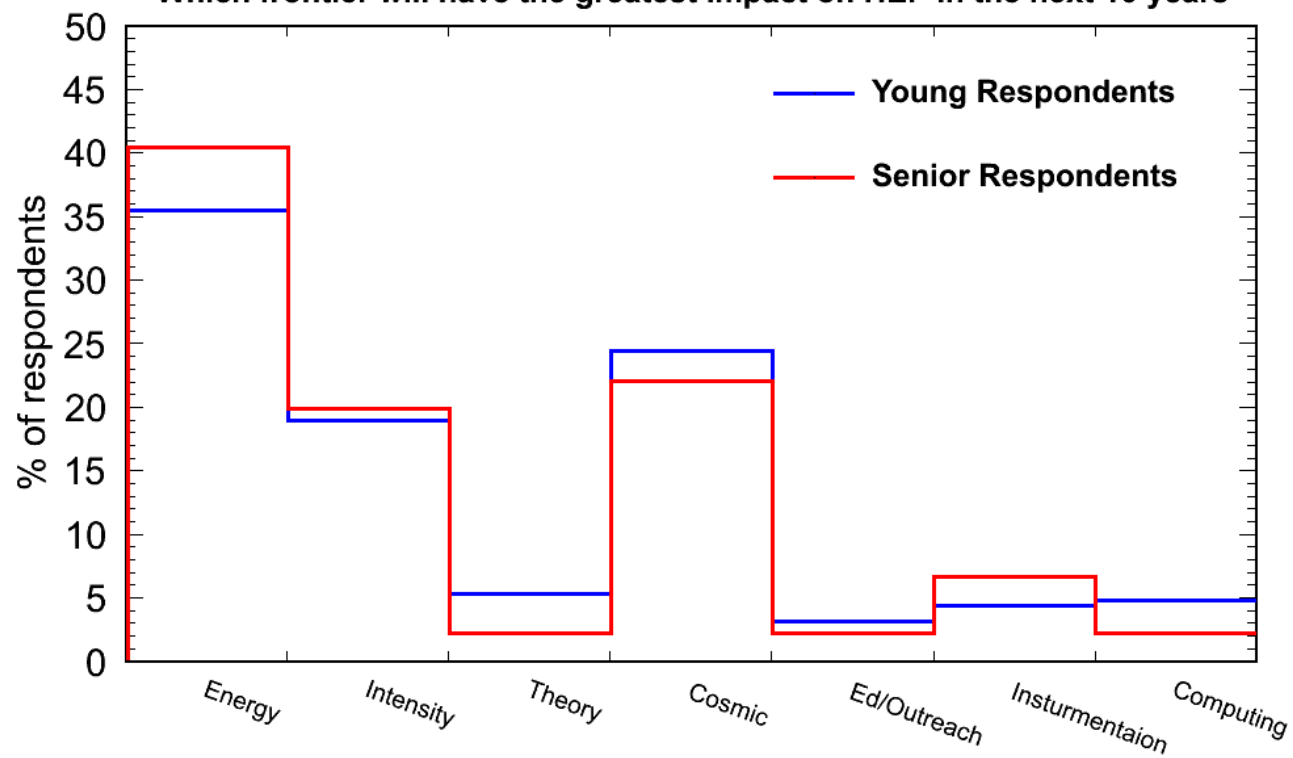




Which frontier will have the greatest impact on HEP in the next 10 years



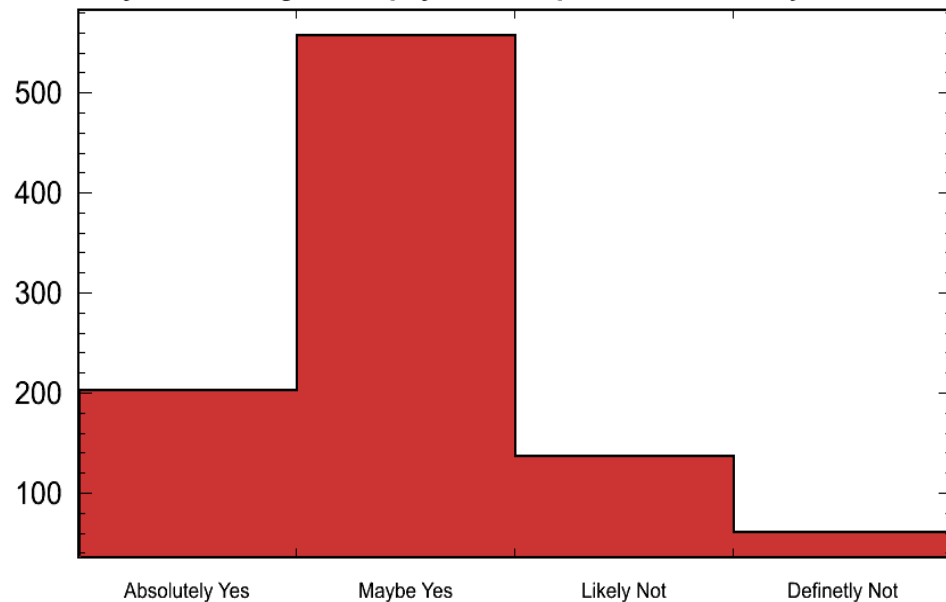
Which frontier will have the greatest impact on HEP in the next 10 years





# Would you encourage other young physicist to pursue a career in your frontier?

Would you encourage other physicists to pursue a career in your frontier?



Would you encourage other physicists to pursue a career in your frontier?

