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focus on

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Physics & Astronomy Master's Initial Employment

Data from the degree recipient follow-up survey for the classes of 2006, 2007 and 2008

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Physics master's degree recipients found employment in all sectors of the economy and in a wide variety of fields. The private sector, which employed about half of the physics master's in the workforce, offered a diverse set of career options. The vast majority of new master's employed in the private sector were working in a STEM (Science, Technology, Engineering, and Math) field with engineering representing the largest proportion (40%). Employment within the engineering field itself was quite varied and included development engineers, optical engineers and quality control engineers.

REPORTS ON INITIAL EMPLOYMENT

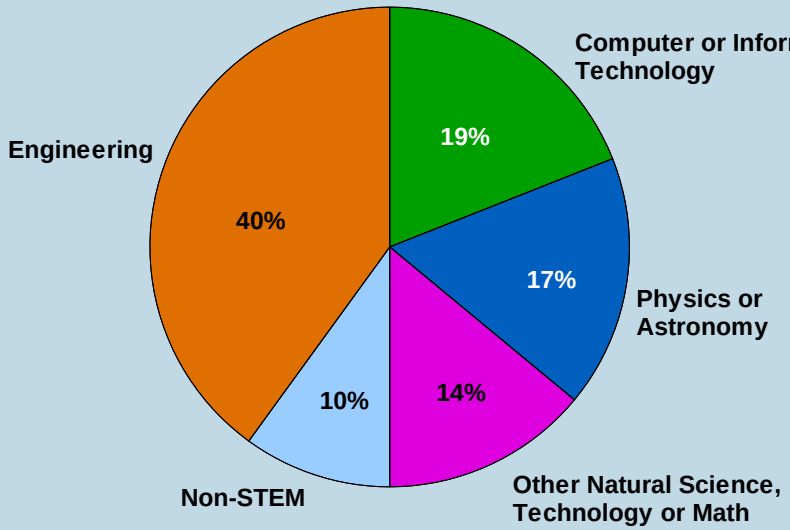
Physics Bachelor's, Initial Employment (June 2010)

Physics Doctorates One Year Later (November 2010)

Physics and Astronomy Master's , Initial Employment (April 2011)

Figure 1

Field of Employment for New Physics Master's Working in the Private Sector, Classes of 2007 & 2008 Combined.



Note: STEM refers to positions in Science, Technology, Engineering and Math. Field of employment was not asked of the class of 2006.

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The vast majority of physics master's employed in the private sector work in STEM fields. (Science, Technology, Engineering or Mathematics).

THE 2006, 2007 AND 2008 FOLLOW-UP SURVEYS OF PHYSICS & ASTRONOMY MASTER'S

Physics & astronomy master's recipients are contacted in the winter following the academic year in which they receive their degree.

Two-thirds of exiting physics master's received their degrees from a department that also offered a physics PhD.

Table 1

Department Type for Exiting Physics Master's, Classes of 2006, 2007 & 2008 Combined.

Department type	Number of departments	Number of master's (3-year average)	Percent of master's
PhD-granting	187	521	65
Master's-granting	64	228	28
Military academy	2	55	7

Note: Master's- and PhD-granting refers to the highest physics degree offered by the department. The military academies are the Naval Postgraduate School (CA) and the Air Force Institute of Technology (OH).

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The outcome data in this *focus on* are based on exiting physics master's recipients who were in the degree classes of 2006, 2007, and 2008. In this report, an exiting master's is defined as an individual who received his or her degree from a US physics department and left that department with the master's as their highest degree. Because of the relatively small number of master's conferred each year and the difficulty in tracking such a mobile group after they graduate, we have combined 3 years of survey responses. The 3 classes averaged about 800 exiting degrees in each of the years and we received initial outcome information for 39% of these individuals. In addition, physics departments reported an average of 830 master's enroute during the same 3 year period. These master's are continuing toward their PhD at the same department and are not included in this analysis.

The majority of physics master's earned their degrees from a department that also awards a PhD. A little over a quarter of the master's earned their degree from a department where the highest degree offered was a master's. The 2 physics departments at military academies that offer a physics master's comprise less than one percent of all the departments that offer a physics master's but conferred 7% of all the physics master's earned during the 3-year period covered by this *focus on*. Both military academies also have small PhD physics programs and no undergraduate physics programs.

The combined classes of exiting master's consisted of 22% women and 35% non-US citizens. The representation of women is higher among physics master's than among physics PhDs, women represented 18% of the physics doctorates during a similar time frame. Foreign citizens comprised a smaller proportion of physics master's than they did among physics PhDs which consisted of 55% foreign citizens. The median age for exiting master's was 27 with one-quarter over the age of 30. Foreign citizens tended to be slightly older than their US counterparts. Women tended to be younger than men with 61% of the women obtaining their master's by age 26, compared to 50% of the men.

A little over one-third of the non-US citizens indicated that they had completed some physics graduate study outside the US prior to enrolling in a US physics program.

Table 2

Characteristics of Exiting Physics Master's, Classes of 2006, 2007 & 2008 Combined.

Sex	Male	78%
	Female	22%
Citizenship	US	65%
	Non-US	35%
Median Age		26

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One-quarter of the exiting physics master's were over the age of 30 when they received their degree.

Table 3

Education Characteristics of Exiting Physics Master's, Classes of 2006, 2007 & 2008 Combined.

Field of bachelor's degree	Physics	68%
	Astronomy	3%
	Other	29%
Master's with a specific research field or specialty		66%
Of those with a research specialty		%
	Condensed Matter	17
	Astronomy	15
	Optics	10
	Applied Physics	9
	Materials Science	9
	Other	40

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The majority of exiting physics master's received their undergraduate degree in physics or astronomy.

For the classes of 2006, 2007 and 2008, 71% of the exiting physics master's had previously obtained a bachelor's in the field of physics or astronomy. The most frequently cited non-physics or non-astronomy undergraduate degrees were in engineering and mathematics. Women were more likely to have received their bachelor's in either physics or astronomy than men, 76% and 70% respectively.

Two-thirds of the exiting master's had a specific research field or specialty. The likelihood of having a research specialty was the same for master's receiving their degrees from a master's-granting department as for those receiving their degrees from a department that also offered a physics PhD.

The physics master's earning their degrees at one of the 2 military academies are on a very specific career track. Although a few may continue with graduate study in physics or another field, most are officers with a clear employment path ahead of them. Neither of these departments provided us with contact information for their exiting master's from the 3 academic years covered in this report. Consequently, the master's recipients from these departments are not included in the outcome analysis that follows.

Also not included in the analysis that follows are the outcomes of the exiting physics master's who left the US after receiving their degrees. Twenty-eight percent of the non-US citizens did not remain in the US after receiving their degrees, compared to only 2% of the US citizens.

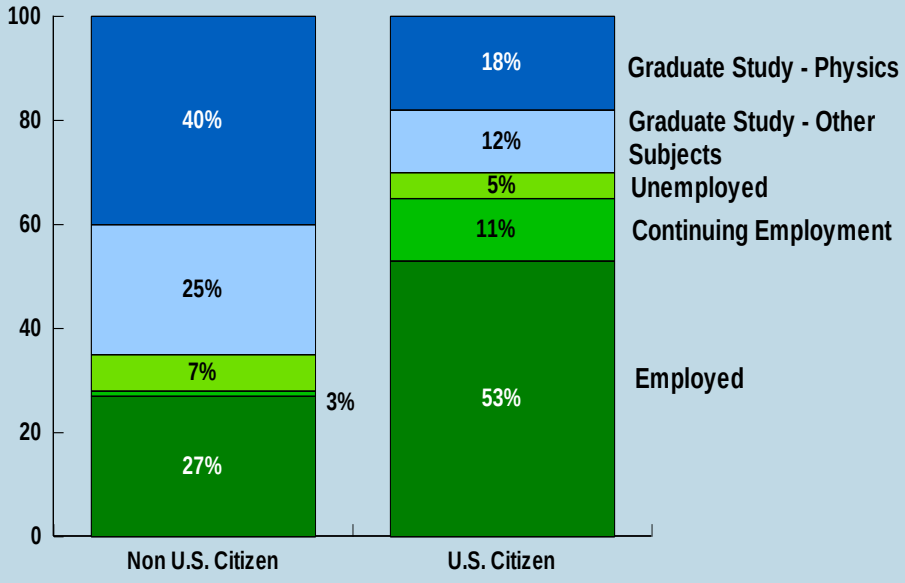
The status of exiting physics master's varied greatly by the citizenship of the degree recipient. The majority of US citizens entered or remained in the workforce after receiving their degrees; the majority of non-US citizens continued with graduate study in physics or another field. US citizens were not only more likely to hold employment after receiving their degrees, but they were also more likely to be employed while receiving their master's. Eighteen percent of the employed US citizens were in positions they held seven or more months prior to receiving their master's degree.

For master's choosing to continue with graduate study, the majority were continuing with physics studies at a different US university. The two most frequently pursued fields other than physics were engineering and mathematics.

There were no significant differences in the outcomes of exiting physics master's by sex. A larger proportion of master's from doctoral-granting departments continued with graduate school than those graduating from a master's-granting department.

Figure 2

One Year Later: Status of Exiting Physics Master's by Citizenship, Classes of 2006, 2007 & 2008 Combined.



Note: Figure includes US trained physics master's who remained in the US after receiving their degree and excludes master's receiving their degree from one of the two military academies.

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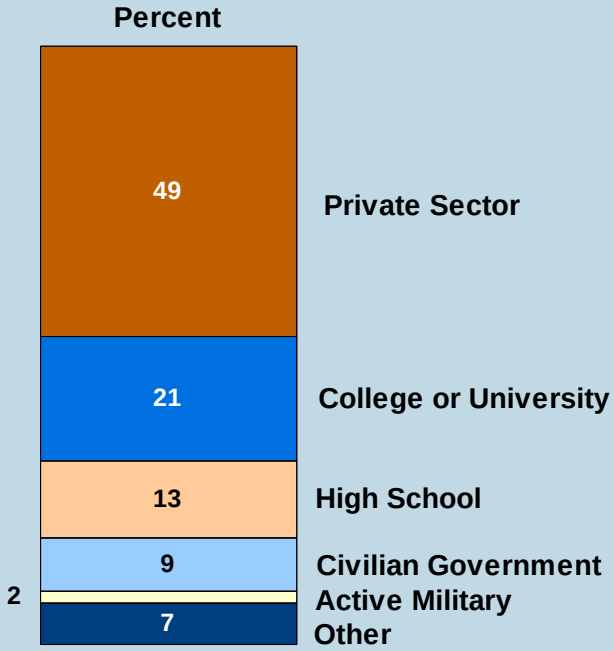
Initial outcomes for physics master's vary greatly by citizenship.

Figure 3

Employer Distribution of US Employed Physics Master's, Classes of 2006, 2007 & 2008 Combined.



Note: Figure includes master's who were employed part-time and master's continuing in positions they held while pursuing their master's.

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18% percent of all employed master's were working in positions they held prior to receiving their degrees.

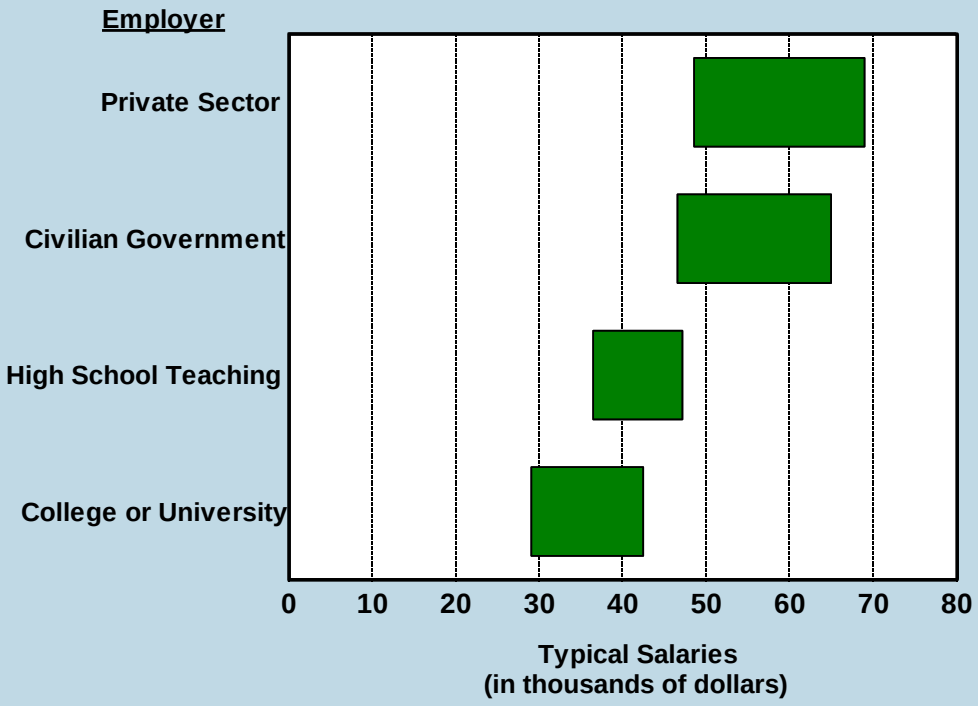
Physics master's recipients work in positions across all employment sectors. As has been historically true, the private sector continues to employ about half of the new physics master's who were employed in the winter following the academic year they received their degrees. Ten percent of the master's in the workforce indicated they were working part-time with two-thirds of them employed at a college or university.

Physics master's used many methods to find their current employment. Some of the more commonly used and effective job search methods were the use of friends, faculty, newspaper ads and internet searches.

Physics master's employed in the private sector and in civilian government positions received significantly higher starting salaries than physics master's employed in the academic sectors. The salaries in figure 4 below are starting salaries; new master's recipients continuing with employment they held prior to receiving their degrees typically received higher salaries. Master's continuing with employment at high schools had a median salary that was $13,000 more than those in newly accepted positions. Similarly, master's continuing with positions in the private sector had a median salary that was $18,000 more than their newly hired counterparts.

Figure 4

Typical Starting Salaries for Physics Master's, Classes of 2006, 2007 & 2008 Combined.



Note: Typical salaries are the middle 50%, i.e. between the 25th and 75th percentiles. Figure does not include salaries for master's holding part-time positions.

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The median starting salary for new physics master's working in the private sector was $62,400.

Sector Profiles

Private Sector: About half of the physics master's in the degree classes of 2006, 2007, and 2008 were working in the private sector. They held positions with a wide range of employers, including large hi-tech companies, defense contractors, utilities, and a diverse group of smaller companies. Eleven percent of the physics master's employed in the private sector were working in positions they held prior to receiving their degree. Ninety percent of the physics master's employed in the private sector were employed in Science, Technology Engineering and Math (STEM) occupations. The largest fraction were employed in the field of engineering and the vast majority of these master's had the word engineering in their titles. Many of the master's working in the field of computer and information technology had titles such as software and systems engineer. The most frequently cited skills and activities used by master's in the private sector were: teamwork, solving technical problems, technical writing, design and development, and programming. Many of the master's who indicted their employment was in a non-STEM field held management-level positions.

Civilian Government: Physics master's were employed in various areas of the civilian government workforce. Many were working at National Labs or for one the branches of the armed serves in a civilian capacity. Some were employed at other federal-level agencies such as the US Patent and Trademark Office or U.S. Nuclear Regulatory Commission while others were employed in state-level government positions. More than half of the government employed master's indicated they were working in the field of physics. Job titles were varied but included health physicist, patent examiner and engineer.

College/University/UARI: As a group, colleges, universities and University Affiliated Research Institutes (UARI) were the second largest employer of new physics master's. Thirty percent of these positions were part-time. The job titles of individuals working at 2-year colleges, 4-year colleges and universities were predominately instructor and lecturer with a few with the title of laboratory coordinator. The instructors and lectures were mostly teaching lower-level physics classes and lab sections as well as other math and science courses. The most frequently cited skills and activities used by master's employed at a college or university were: use of basic physics principles, teamwork, and solving technical problems. Exiting physics master's employed at UARI's and observatories held a variety of job titles including research assistant and staff scientist.

High School: Exiting physics master's employed as high school physics teachers [primarily taught physics], but also chemistry and math. A very high percentage (38%) of the high school teachers were continuing in teaching positions that they held while they were pursuing their master's. Teachers who were continuing employment had a median salary that was $13,000 more than those in newly accepted positions.

ASTRONOMY

The number of students receiving an astronomy master's degree each year is quite small. The classes of 2006 through 2008 averaged 28 exiting master's a year over the 3 academic years. These exiting master's recipients come from a total of 42 departments that offer graduate-level astronomy degrees. Three of these departments offered the master's as their highest astronomy degree and the remaining 39 were also doctoral-granting. The three master's-granting departments were responsible for producing one-third of the astronomy master's during the three academic years.

The demographic characteristics of astronomy master's differed somewhat from their physics counterparts. Astronomy master's had twice the proportion of women than physics: 45% vs. 22%; and half as many non-US citizens: 15% vs. 35%. Astronomy master's also tended to be younger, having a median age of 25, compared to 27 for physics master's.

Table 4

Characteristics of Astronomy Master's, Classes of 2006, 2007 & 2008 Combined.

		Percent
Sex	Women	45
	Men	55
Citizenship	US	85
	Non-US	15
Highest degree of graduate department	PhD-granting	67
	Master's granting	33
Age	Median	25

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45% percent of astronomy master's recipients were women. This is twice the representation seen among physics master's.

The majority of astronomy master's enter the workforce upon receiving their degree.

Table 5

Post-degree Outcome of Astronomy Master's, Classes of 2006, 2007 & 2008 Combined.

	Percent
Entered the workforce	60
Graduate study in astronomy or physics	23
Graduate study in other subjects	17

Note: Table includes astronomy master's recipients who left the department at which they received their master's and remained in the US.

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The follow-up survey was able to collect outcome data on 62% of the exiting astronomy master's from the classes of 2006 through 2008, but with so few individuals (a three year total of 82) receiving such degrees, the findings we can reliably present are quite limited.

Similar to physics, astronomy master's took their careers in a variety of directions. A few left the US after receiving their degrees, and are excluded from Table 5. Of those remaining in the US, the majority entered the workforce. Only 1 individual indicated being unemployed. About half of the astronomy master's secured employment at a college or university. The balance were split between positions in the private and government sectors, with virtually all working in a STEM field.

Survey Methodology

Each fall, the Statistical Research Center conducts its Survey of Enrollments and Degrees which asks physics and astronomy departments to provide information concerning the numbers of students they have enrolled and counts of recent degree recipients. In connection with this survey, we ask for the names and contact information for their recent master's recipients. This degree recipient information is used to conduct our follow-up survey in the winter following the academic year in which they received their degrees.

Recent master's degree recipients can be very difficult to reach because they tend to move after receiving their degrees and frequently do not keep in contact with their master's-granting departments. To assist us in determining degree recipient outcomes and to help obtain updated contact information, we contact the advisors of non-responding degree recipients.

Because of the relatively small number of individuals receiving physics master's each year and the difficulty in obtaining accurate contact information, we are reporting on three years of survey responses combined. The physics master's classes of 2006, 2007, and 2008 consisted of 799, 824, and 790 degree recipients, respectively. We received post-degree information on 39% of these degree recipients, with 58% of the information coming directly from the degree recipients.

We thank the many physics and astronomy departments, degree recipients, and faculty advisors who made this publication possible.