

PHYSICS GRADUATE ENROLLMENTS AND DEGREES

Results from the 2007 Survey of Enrollments and Degrees

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focus on series

ENROLLMENTS AND DEGREES

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[Astronomy Enrollments and Degrees \(Nov 2009\)](#)

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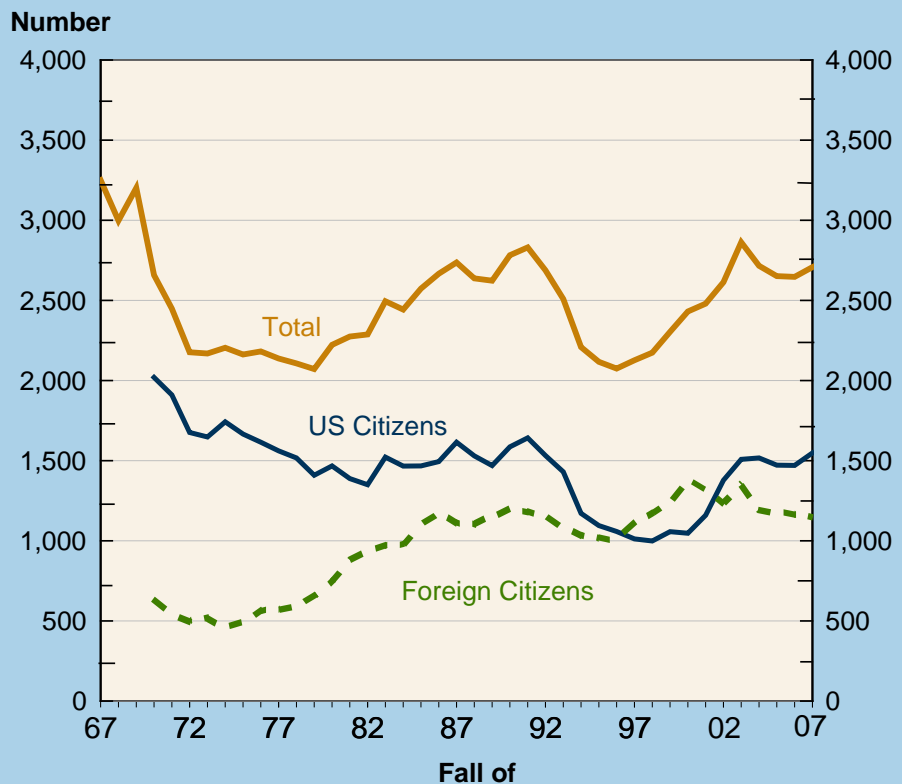
Physics Graduate Enrollments and Degrees (January 2010)

First-year graduate student enrollments at PhD-granting physics departments have leveled off at around 2,700 students.

The number of US citizens entering PhD physics programs rose sharply during the early 2000's and has stabilized at around 1,500 students. US Citizens represented 57% of the first-year students in PhD granting departments in the fall of 2007.

Figure 1

First-year graduate physics student enrollments at PhD-granting physics departments, fall 1967 through fall 2007.



<http://www.aip.org/statistics>

During the 2006-2007 academic year there were 763 departments that offered degrees in physics, of these 252 had a graduate-level program. There were 7 universities that had 2 PhD-granting physics programs, usually departments of physics and applied physics.

Thirty-seven of the physics departments also offer a degree in astronomy, 12 of which have graduate-level astronomy programs. These departments are asked to report their astronomy enrollment and degree data separately from their physics data. The data concerning the astronomy students at these departments are published in a separate astronomy “focus on” where they are combined with the data from an additional 38 departments that offer degrees only in astronomy.

Table 1

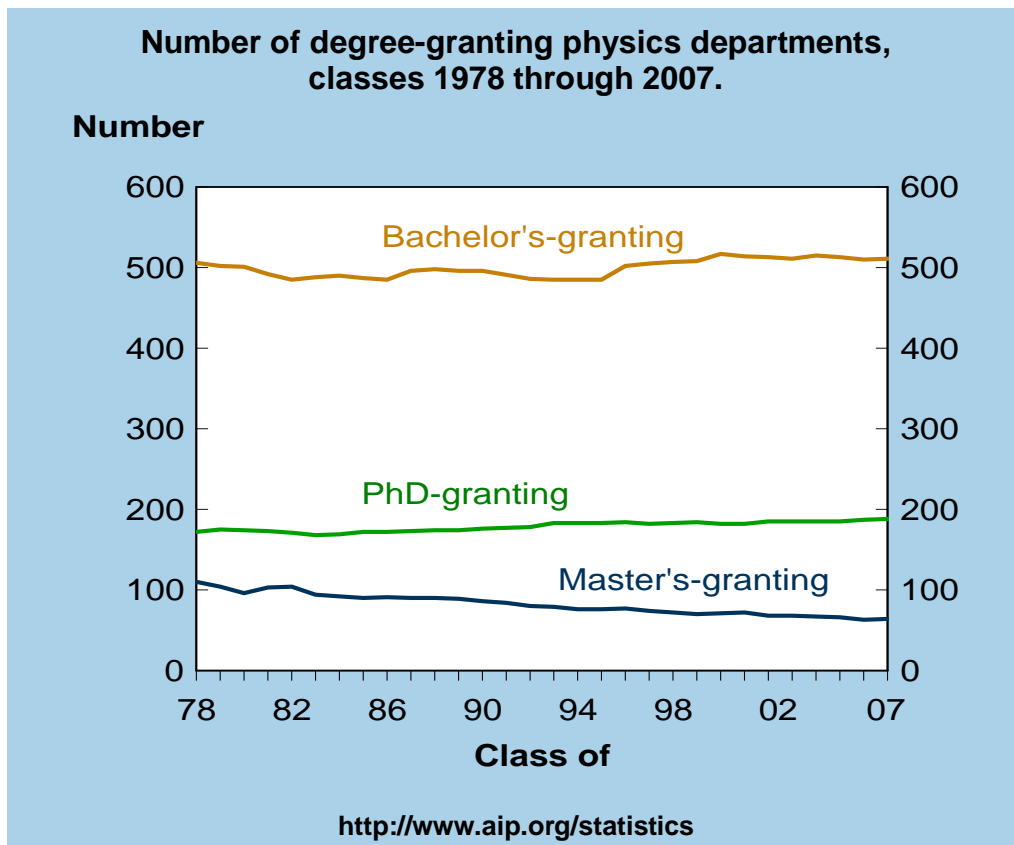
Number of degree-granting physics departments, academic year 2006-07.

Highest physics degrees offered	Number of Depts.	Percent of Depts.
Bachelor's-granting	511	67
Master's-granting	64	8
PhD-granting	188	25
Total	763	100%

One-quarter of the degree-granting physics departments in the US offer the Doctorate as their highest degree.

<http://www.aip.org/statistics>

Figure 2



During the last decade there has been virtually no net change in the total number of degree-granting physics departments.

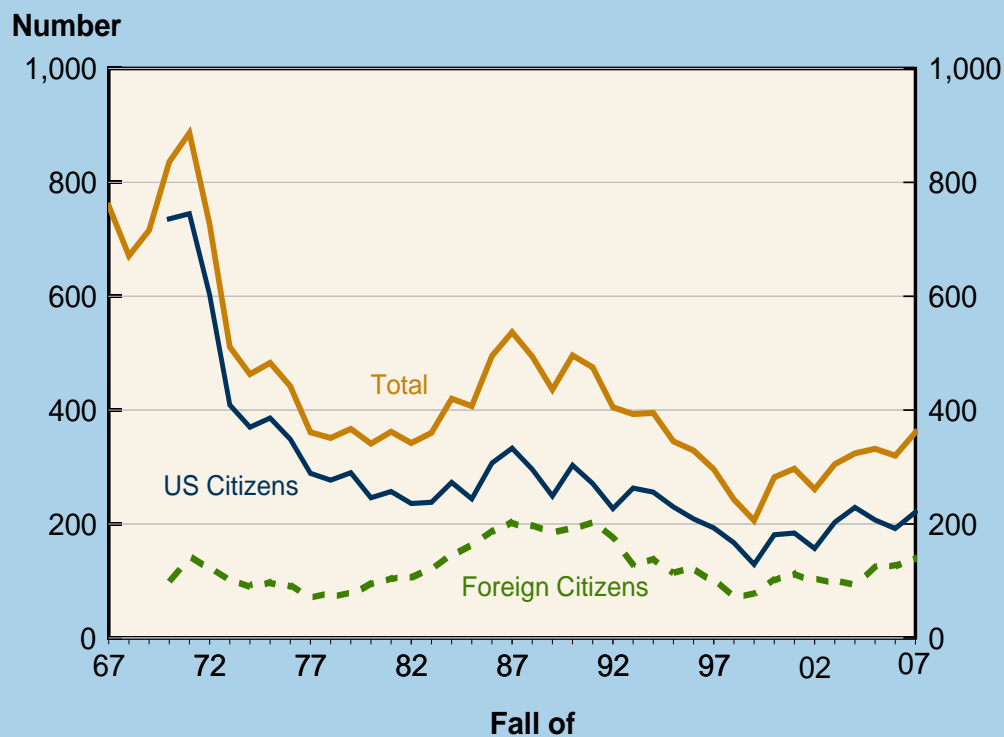
In any given year, a few programs will lose their physics degree-granting status and a few new degree programs will begin. During the last decade, 31 colleges or universities suspended or discontinued their degree program in physics. During the same time period the SRC has become aware of 32 colleges and universities that added or reinstated a degree program in physics.

In addition to starting or discontinuing a degree program, occasionally departments will change the level of highest degree offered. Although the total number of departments has remained fairly stable in recent years, the number of departments with a master's as their highest degree has been slowly declining. These departments have not been eliminated altogether. Instead, departments which previously offered a master's as their highest physics degree typically expand their offerings to include a PhD or limit their degree offering to just the bachelor's.

First-year student enrollments at master’s-granting departments have been increasing since the fall of 1999. This increase has happened during a period when the number of departments with the master’s as their highest degree has declined by 10%, from 71 to 64 departments.

Figure 3

First-year graduate physics student enrollments at master’s-granting physics departments, fall 1967 through 2007.



<http://www.aip.org/statistics>

First-year graduate student enrollments are up at master’s-granting departments.

Table 2**Characteristics of first-year physics graduate students,
fall of 2007.**

		Physics Departments	
		PhD-granting	Master's-granting
Number of Departments		188	64
		%	%
Gender	Male	81	76
	Female	19	24
Citizenship	US	57	61
	Foreign	43	39

<http://www.aip.org/statistics>

Women are slightly better represented among first-year physics graduate students at master's-granting departments than at doctoral-granting departments.

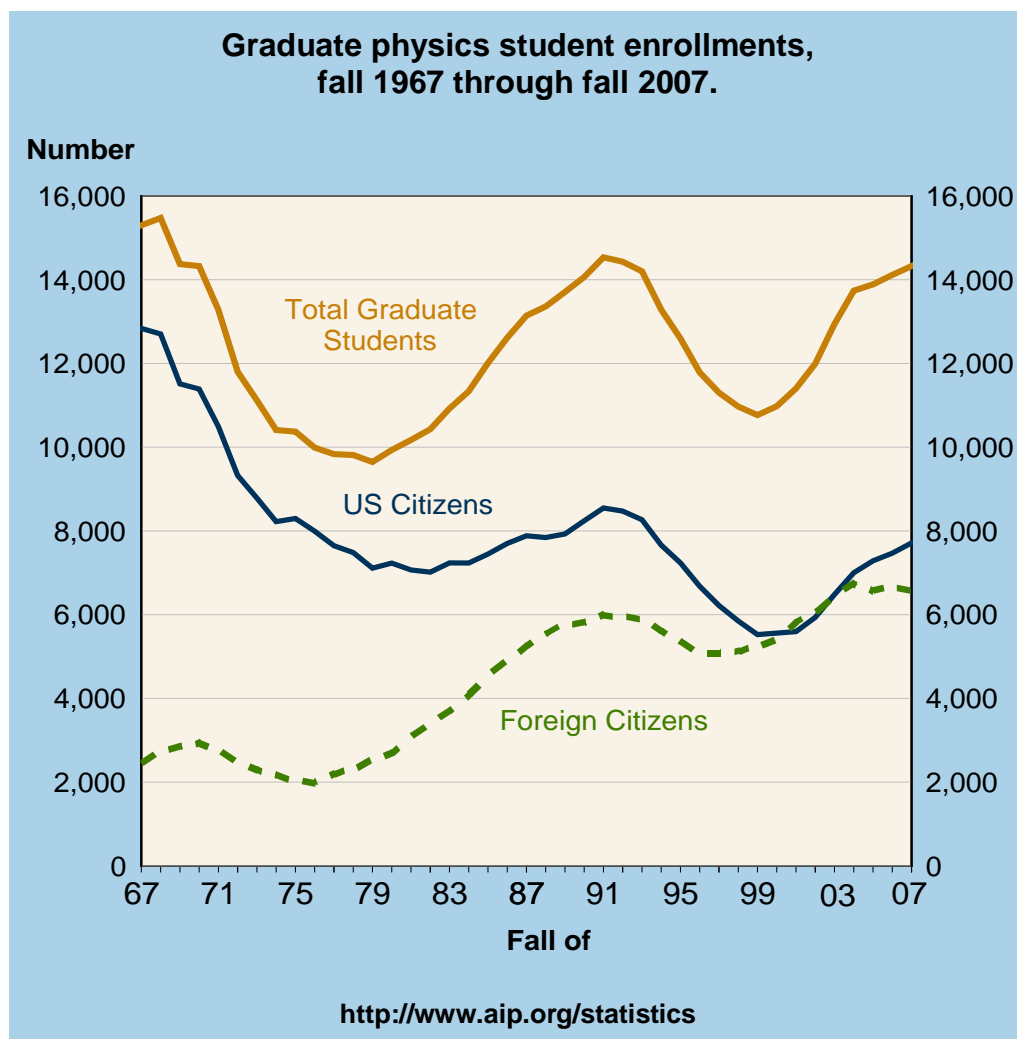
Historically, physics graduate programs, where the master's is the highest degree offered, have done a better job of attracting women than have PhD-granting programs. Conversely, a larger proportion of non-US citizens are accepted at doctoral-granting departments than at departments where the master's is the highest degree.

The majority of first-year students at both master's-granting and doctoral-granting departments are US citizens. There was a period from fall 1997 to fall 2001 where the majority of the incoming students at the doctoral-granting departments were non-US citizens (See **Figure 1**).

Total graduate student enrollments are up 33% from a recent low in the fall of 1999. During this time period the number of non-US citizens rose 26%, whereas the number of US citizens rose 40%.

The 64 departments, where the master’s is the highest physics degree offered, enroll 6% of all graduate students, averaging 15 students per department in the fall of 2007. The doctoral-granting departments are typically larger and averaged 71 graduate students per department.

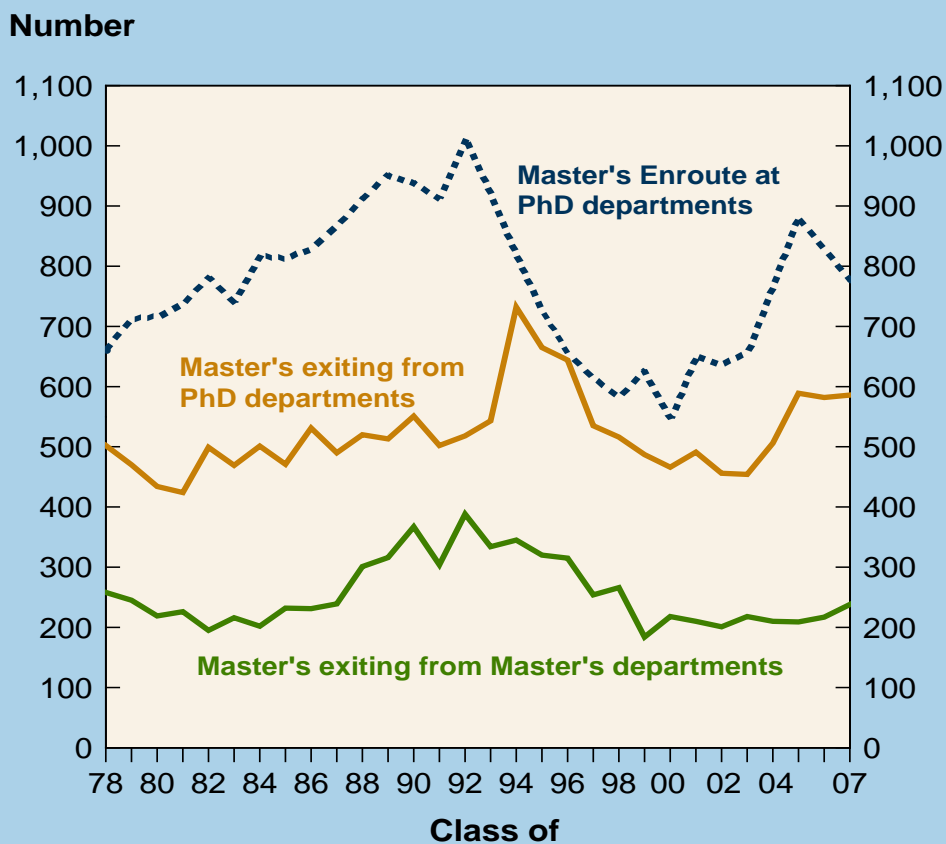
Figure 4



In the fall of 2007 there were 14,326 students enrolled in US graduate physics programs, the largest number since the early 1990's.

Figure 5

Master's degrees conferred by type of degree and department, 1978 through 2007.



<http://www.aip.org/statistics>

In the class of 2007, 29% of exiting physics master's degrees were awarded at departments where the master's was the highest physics degree offered.

The majority of students leaving their current department with a master's receive their degree from a department that offers a physics PhD. Although some of the students exiting a PhD-granting department had enrolled intending to receive a master's degree, an unknown proportion had originally aspired to receive a PhD.

Non-US citizens comprise 35% of the exiting master's, with a similar representation at both master's and doctoral-granting departments.

The physics departments at two military academies, the Naval Postgraduate School and the Air Force Institute of Technology, both offer a PhD in physics but the degree is pursued by very few students. The main focus of their physics graduate programs is awarding degrees at the master's level, mostly in applied or engineering physics. In the classes of 2005, 2006, and 2007 they averaged 32 and 27 master's degrees respectively.

Table 3

Master's-granting* departments averaging 5 or more physics master's degrees per year, classes 2005 through 2007.

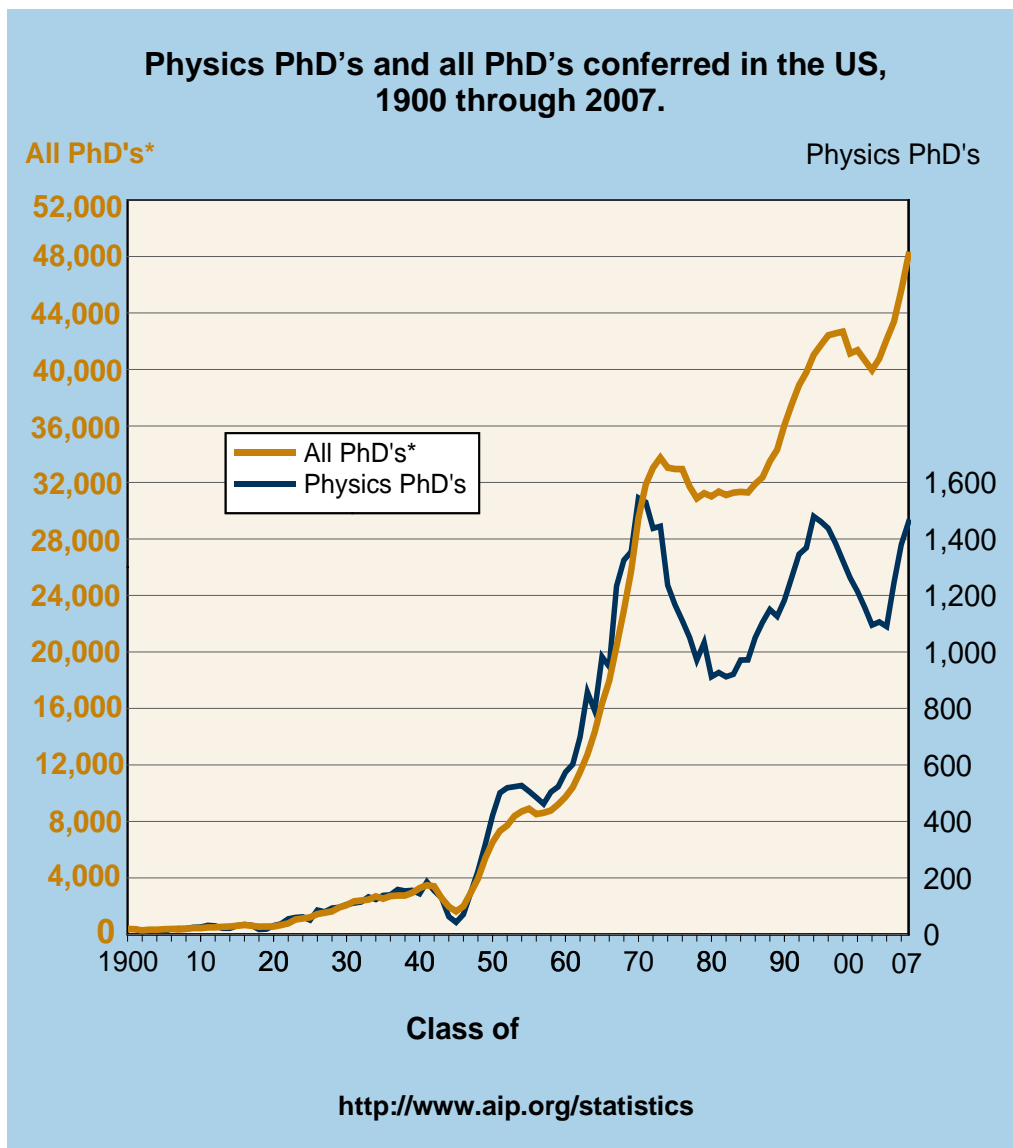
	<u>Annual Average</u>
Ball State U (IN)	10
Miami U (OH)	8
U of Louisville (KY)	8
Cleveland State U (OH)	7
San Diego State U (CA)	7
Christopher Newport U (VA)	6
Fisk U (TN)	6
U of Mass, Boston	6
U of Mass, Dartmouth	6
U of Puerto Rico, Mayaguez	6
Appalachian State U (NC)	5
CA State U, Fullerton	5
City College (NY)	5
Northern Arizona U	5
U of Louisiana, Lafayette	5
List includes only those departments who contributed degree data for all 3 years.	

* Departments offering a master's as their highest physics degree.

<http://www.aip.org/statistics>

The 15 largest master's-granting departments, (averaging 5 or more master's) represent 25% of the departments but were responsible for awarding 45% of the master's degrees conferred.

Figure 6



The 1,460 physics PhD's awarded in the class of 2007 represents an increase of 6% from the previous year and a gain of 34% from only 3 years earlier.

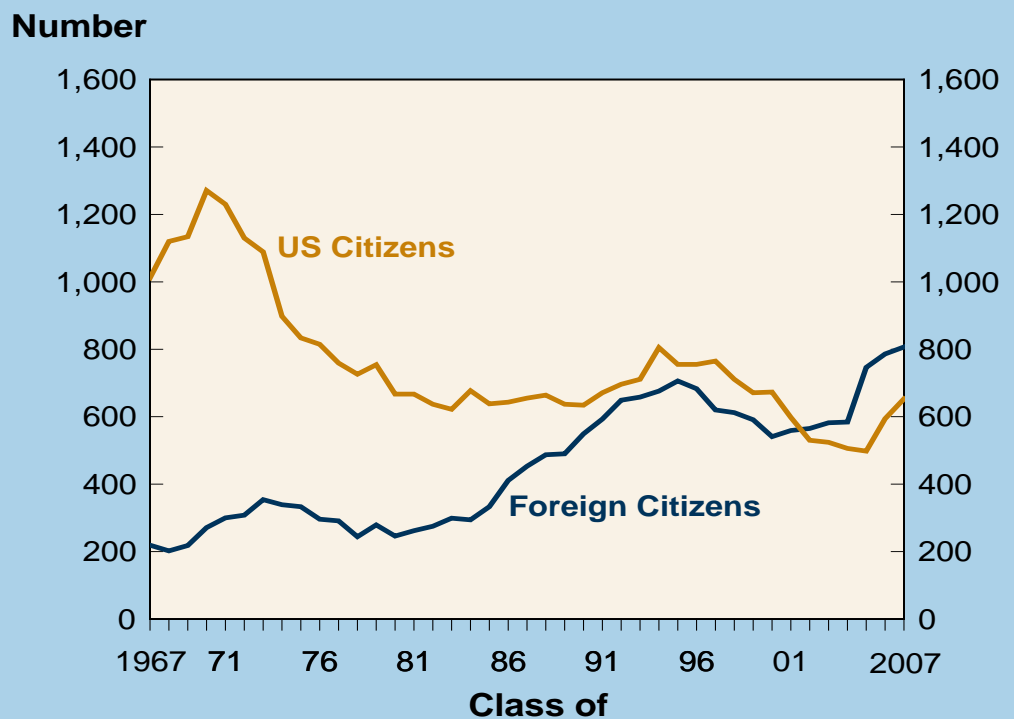
Fluctuations in the overall number of PhDs conferred, as well as physics PhDs, are influenced by economic and political changes that are occurring at the national level. It is clear from the graphic that PhD production in the US, especially physics, has rarely experienced periods of stability.

Physics PhDs in the class of 2007 represent just 3% of all the PhD's conferred at US institutions.

The proportion of non-US citizens receiving physics PhD's has declined from an all time high of 60% in the class of 2005 to 55% in 2007. Although the number of non-US citizens receiving physics PhD's has been increasing, the proportion they represent of all physics PhD's has declined due to even greater gains in the number of US citizens receiving doctorates. Reflecting the sharp increase in the number and proportion of US citizens enrolling in graduate physics programs (See **Figure 1**) in the early 2000's, we predict that US citizens will again make up the majority of physics PhD's by the class of 2010 or 2011.

Figure 7

Citizenship of physics PhD's 1967 through 2007.



Sources: NSF(1966-1991), AIP (1992-2007)

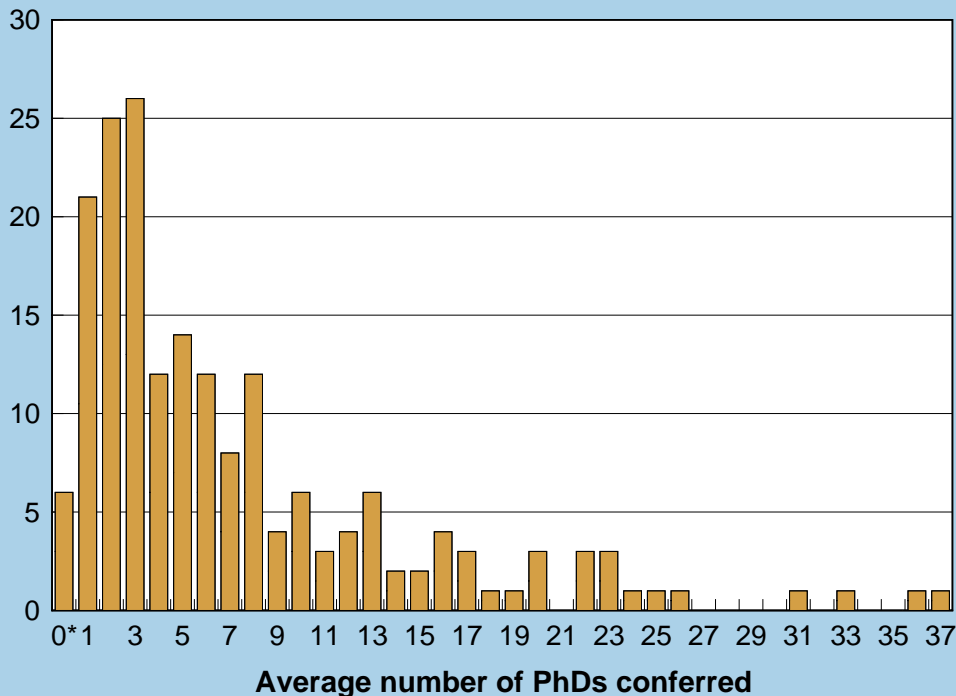
<http://www.aip.org/statistics>

*Non-US citizens
comprise 55% of the
physics PhD's awarded
in the class of 2007.*

Figure 8

Number of doctoral-granting departments by the average number of PhD's conferred, classes 2005 through 2007.

Number of departments



* Includes 2 departments who conferred one PhD during the 3 year period.

<http://www.aip.org/statistics>

The four largest doctoral-granting departments, averaging over 30 PhD's a year, represent only 2% of the departments offering a PhD but conferred 10% of the physics doctorates.

The 188 doctoral-granting physics departments had a median degree production of 5 PhD's and an average of 7.2 for the classes of 2005 through 2007. The size of doctoral-granting departments varies greatly. Seventy-eight, or 41%, of the departments averaged 3 or fewer degrees, conferring 11% of all the PhD's awarded. The 4 largest departments produced as many physics PhDs as the 78 smallest programs.

Table 4

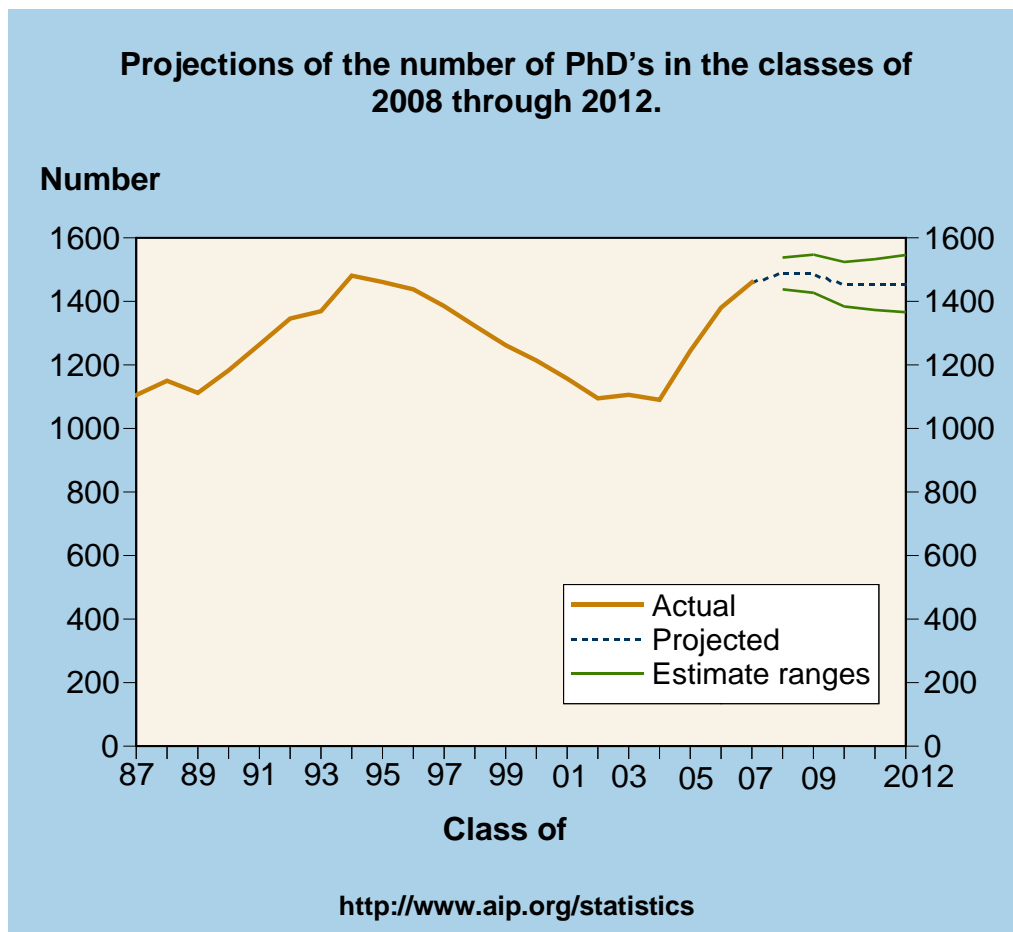
**Departments averaging 15 or more physics
PhD degrees per year, classes 2005 through 2007.**

	<u>Annual Average</u>		<u>Annual Average</u>
MA Inst of Technology	37	U of Chicago (IL)	20
U of Illinois, Urbana-Champaign	36	U of Michigan, Ann Arbor	20
U of California, Berkeley	33	U of Florida	19
U of Maryland, College Park	31	Michigan State U	18
U of Texas, Austin	26	Princeton U (NJ)	17
Cornell U (NY)	24	U of Minn, Minneapolis	17
Stanford U (CA)	23	Columbia U (NY)	16
SUNY Stony Brook U (NY)	23	Ohio State U	16
U of Wisconsin, Madison	23	U of California, Los Angeles	16
CA Inst of Technology	22	U of Washington	16
U of California, Santa Barbara	22	Rutgers U, New Brunswick (NJ)	15
U of Colorado, Boulder	22	U of Rochester	15
Stanford U – Applied (CA)	20		

Note: List includes only those departments who contributed degree data for all 3 years.

<http://www.aip.org/statistics>

Figure 9



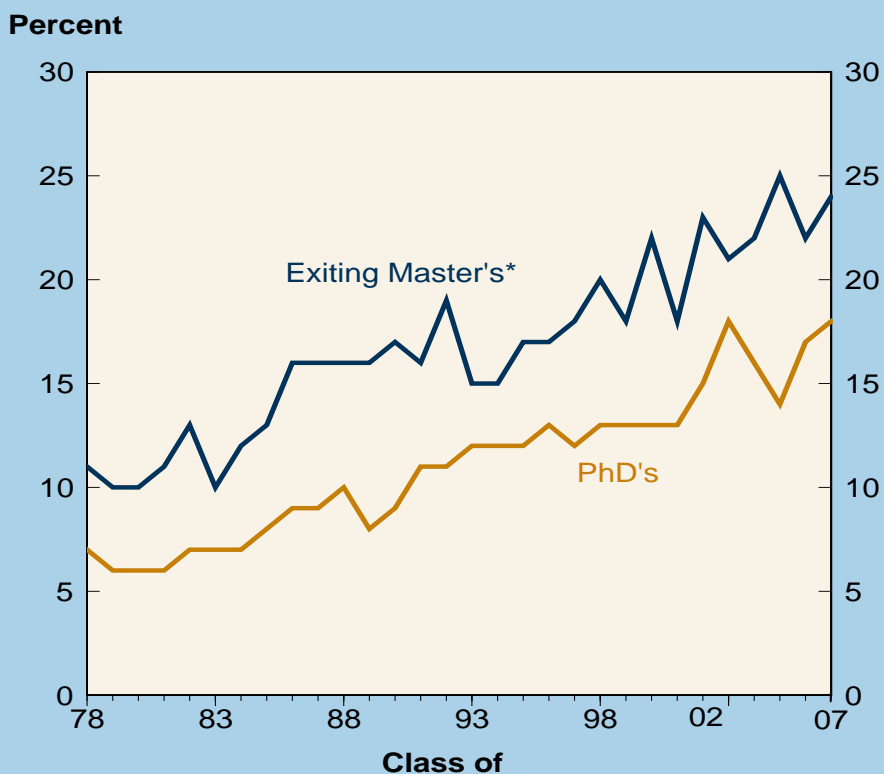
PhD production is expected to level off in the coming years.

Using first-year student enrollments at doctoral-granting departments it is anticipated that the number of PhD's awarded will remain uncharacteristically flat in the coming years. Although the overall number of degrees will remain relatively stable for the next few years, the proportion of degrees conferred to US citizens will increase. US citizens comprise 45% of the physics PhD recipients in the class of 2007 and are expected to regain the majority in the coming years.

Women represented 24% or 198 of the exiting physics master's in the class of 2007. The physics PhD recipients in the class of 2007 included 18% women, which corresponds to 265 individuals. The proportion of non-US citizens among the women at both degree levels was similar to that of the men.

Figure 10

Percent of physics master's and PhD's earned by women, classes 1978 through 2007.



*Exiting master's includes students from master's-granting departments as well as those students leaving a department that offers a PhD.

<http://www.aip.org/statistics>

The proportion of master's and PhD's in physics earned by women has been gradually increasing over time.

Table 5

Minority and ethnic break-down of physics master's*, class of 2007.

	Number	Percent of all Master's	Percent of US Master's**
White	456	55	85
Asian American	25	3	5
African American	24	3	5
Hispanic American	22	3	4
Other US Citizens	8	1	1
Non-US citizens	289	35	-
Total	824	100%	100%

* Exiting master's includes students from master's-granting departments as well as those students leaving a department that offers a PhD.

** Based on 535 US citizens

<http://www.aip.org/statistics>

There are 11 Historically Black Colleges and Universities (HBCUs) that offers a master's degree in physics. These institutions conferred 14 of the 24 African American physics master's in the class of 2007

During the last 5 years physics departments have been averaging only 11 PhD's a year to African Americans, representing less than 1% of all physics PhD's conferred. Hispanic Americans also continue to be underrepresented among physics PhD recipients, with physics departments averaging only 13 PhD's a year during the last 5 years.

Table 6

**Minority and ethnic break-down of physics PhD's,
class 2007.**

	Number	Percent of all PhD's	Percent of US PhD's*
White	572	39	87
Asian American	36	3	6
African American	13	1	2
Hispanic American	13	1	2
Other US Citizens	19	1	3
Non-US citizens	807	55	-
Total	1460	100%	100%

* Based on 653 US Citizens.

<http://www.aip.org/statistics>

There are 4 Historically Black Colleges and Universities (HBCUs) that offers a doctorate in physics. These institutions conferred 4 of the 13 African American physics PhDs in the class of 2007.

About the Survey

The Statistical Research Center of the American Institute of Physics conducts an annual census from October through February of all degree-granting physics departments in the United States and Puerto Rico. There were 252 degree-granting departments with graduate physics programs in 2007, we received responses from 94% of these departments. Estimates were derived and included in the totals for non-responding departments.

In addition to this *focus on* series there is a companion report, “Rosters of Physics Departments”, which provides a departmental-level enrollment and degree snapshot of the class of 2007. It can be found on our web site: <http://www.aip.org/statistics/>

These reports are possible because of the efforts of department chairs, faculty, and staff in providing their departmental data to the AIP year after year.