So you're thinking of going to Graduate School?

Information Seminar

Outline

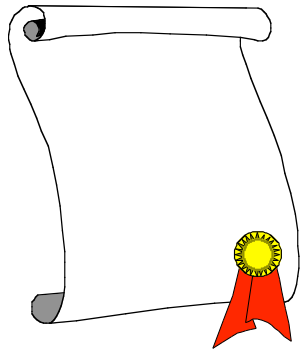
- Introductions
- A brief overview
  - Why?
  - Timeline
  - Expectations
  - Support
- Where?
- Application process
- Selection criteria
- Evaluating your options

Why?

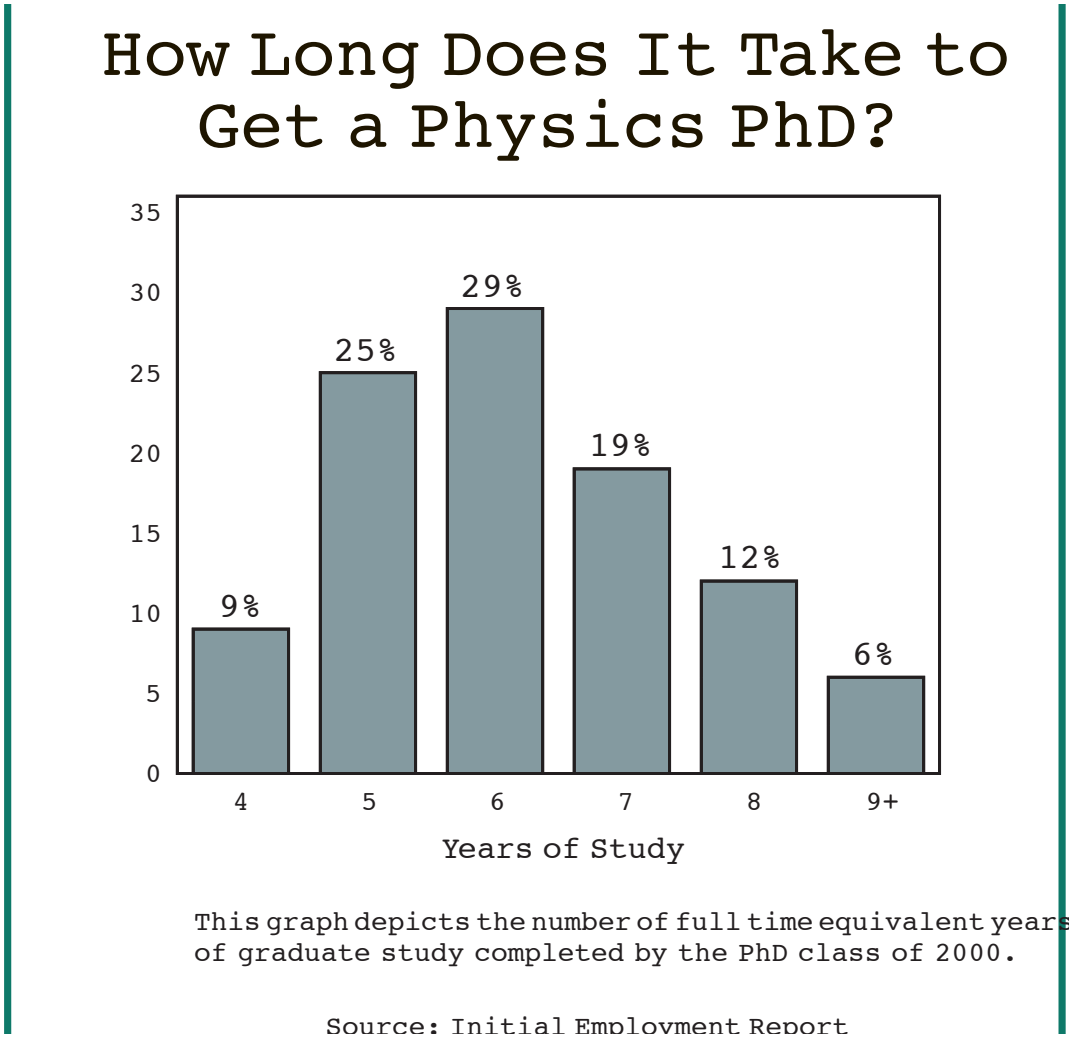
- Deeper understanding of subject
- Better job prospects
- Participate in the excitement at the intellectual frontier
- DON'T
  - Assume automatic faculty position
  - Drift into/through graduate school

Typical Timeline

- ~ 2 years courses, seminars
  - MANY problem sets
- Qualifying (Preliminary) Exam
- Pick Graduate Advisor/Research Topic
- ~2-3 yrs: Carry out research Project
- ~ 1 yr: Publish results, write dissertation



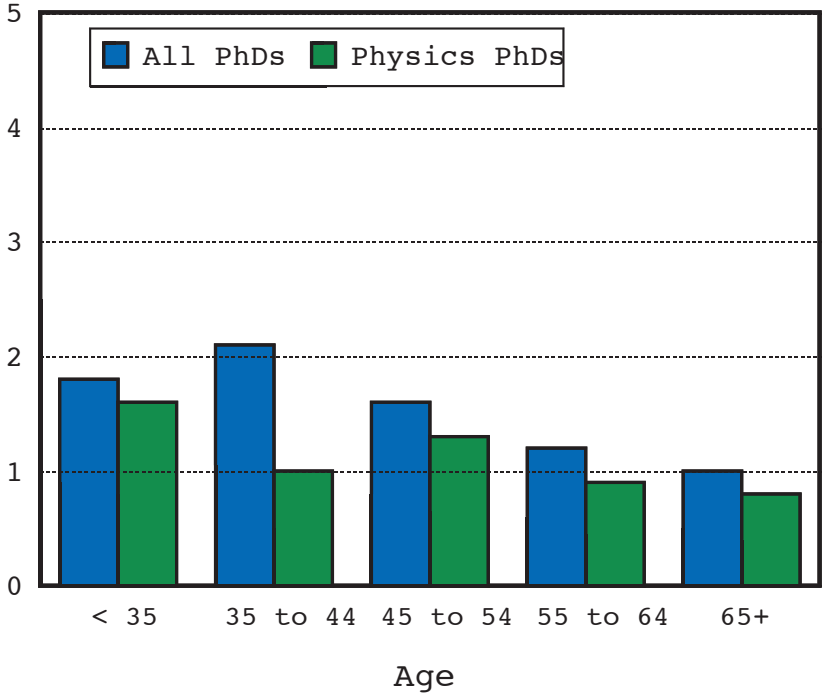
APS Statistics: Years to PhD



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

Education = Opportunity

Percent Unemployment, 2002



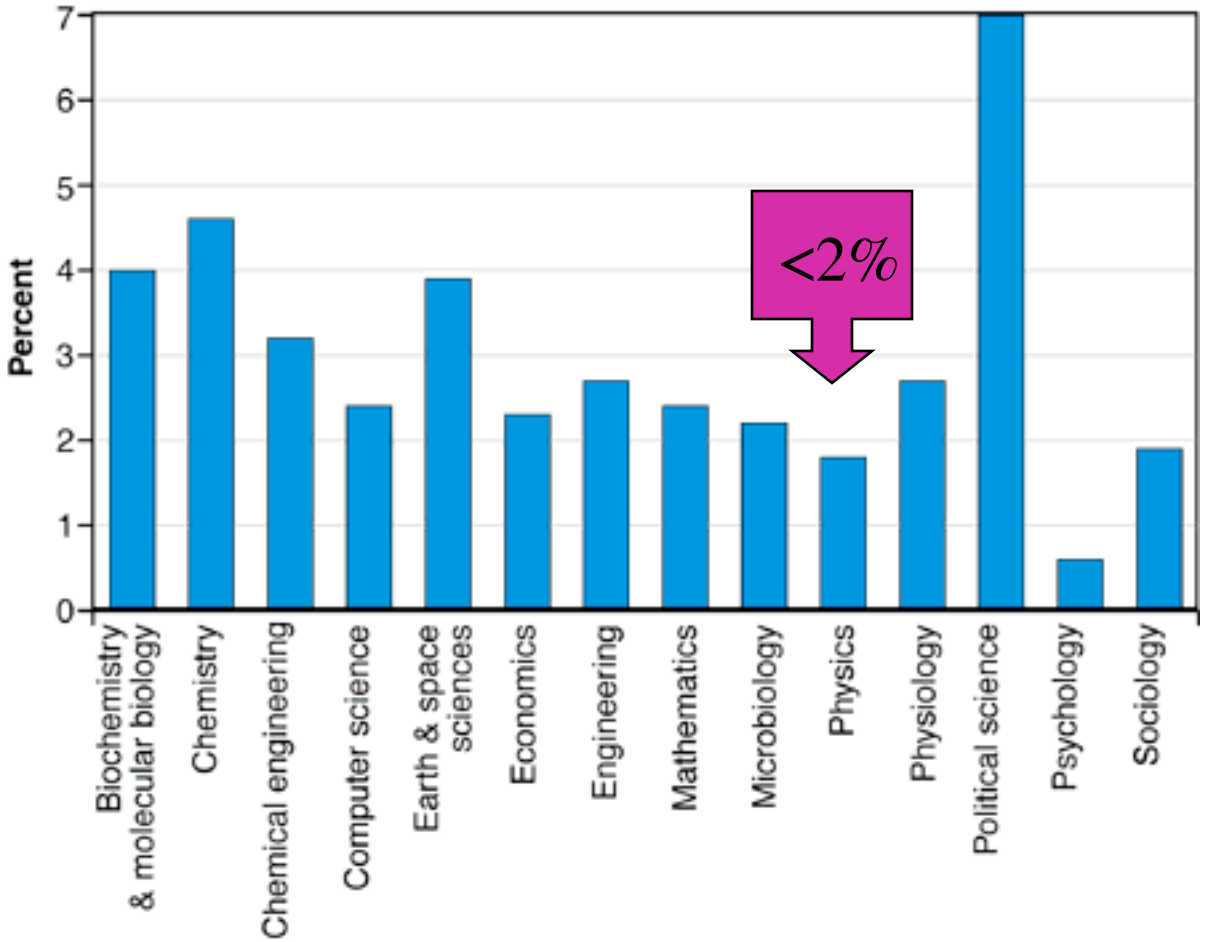
Find Current national Statistics

Bureau of Labor Statistics
1992

<HS	11.4%	
HS	6.8	
Some college	6.0	
Associate Degree		4.7
Bachelors	3.5	
Masters	2.9	
Professional	1.4	
Doctorate	1.5	

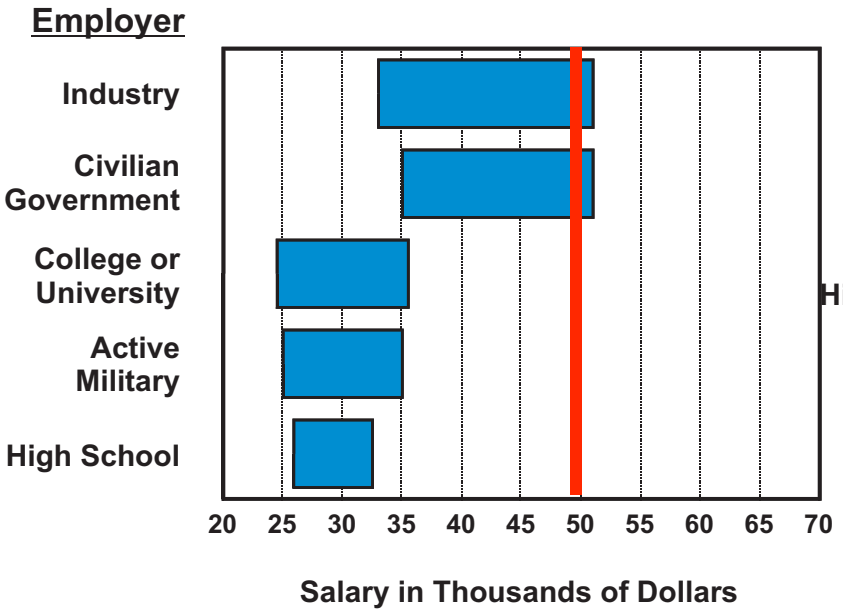
PhD Unemployment by Field

- Physics does very well
- AAAS Data:
  - 10/97 data
  - 1996-97 PhD



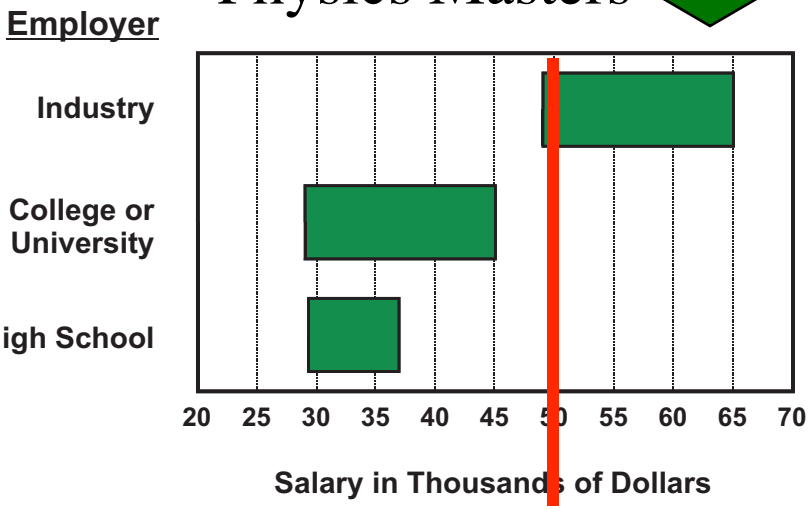
Typical Starting Salary: 2000

Red Line = $50,000/year

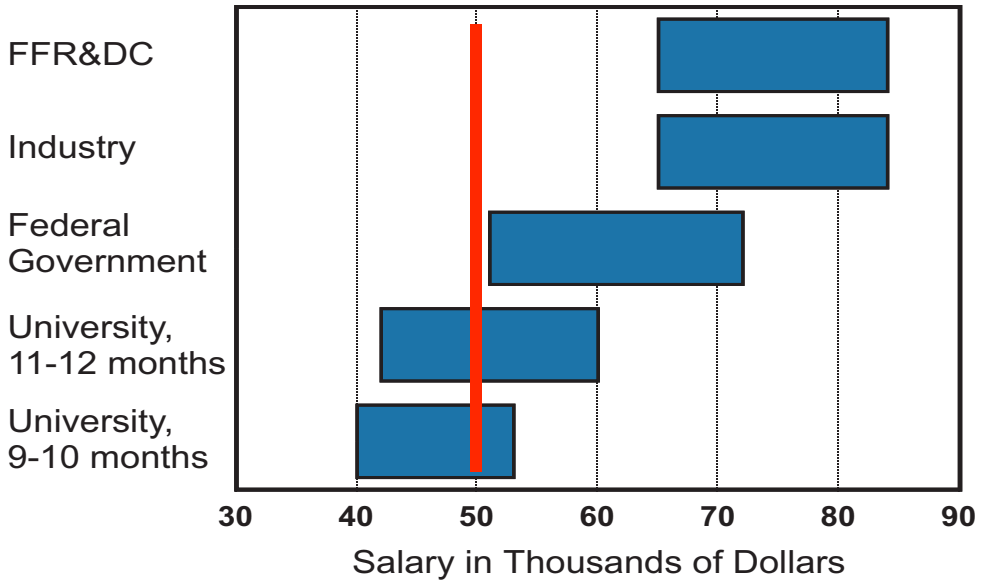


Physics Bachelors

Physics Masters

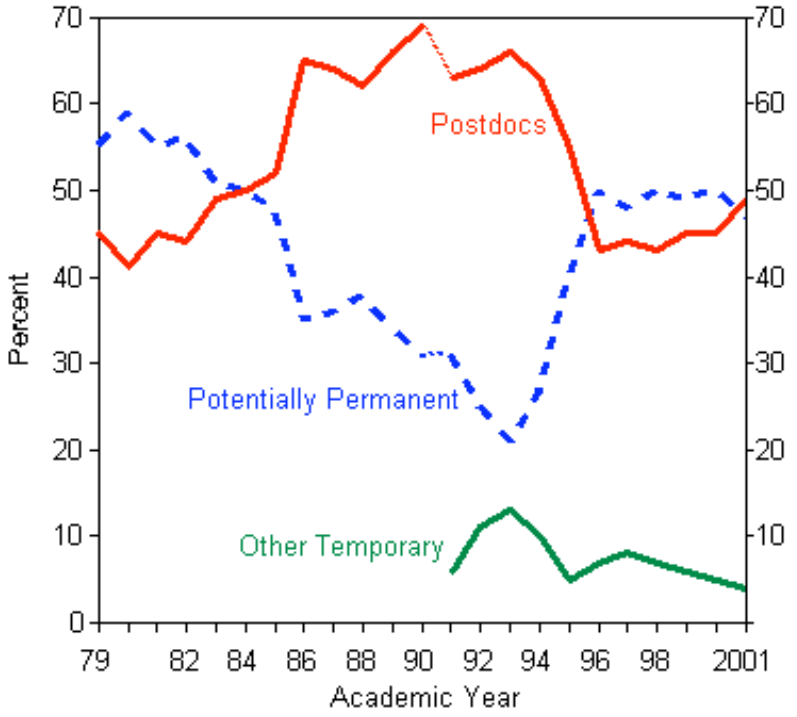


Physics Ph.D.

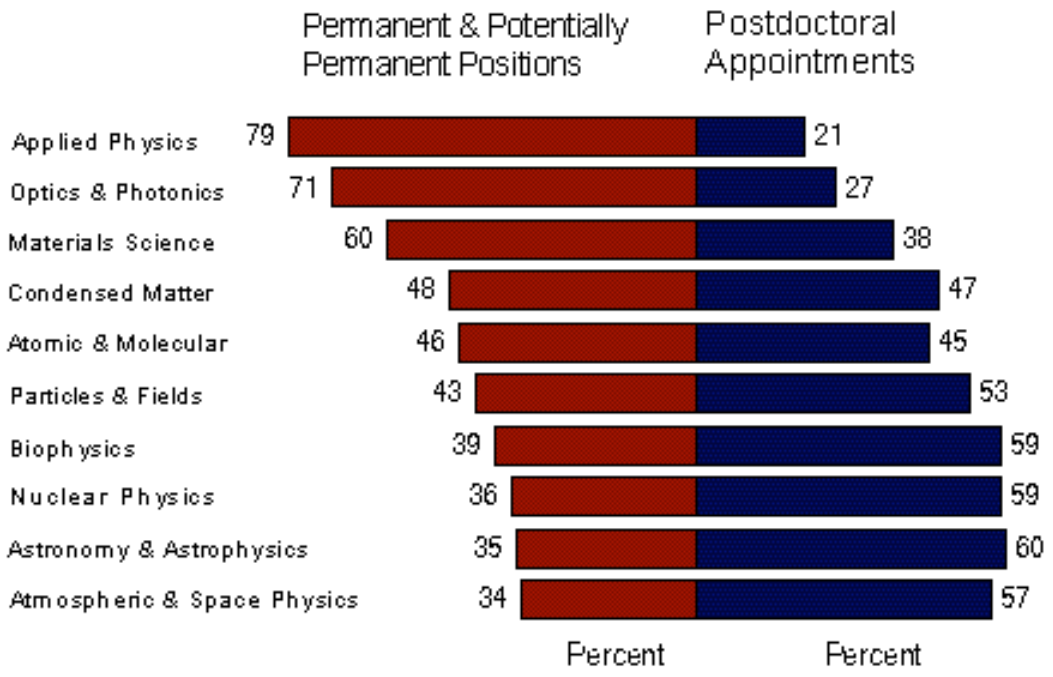


After the Ph.D. -- Year 1

- Job Permanence Cycles with Economy
- Job Permanence Varies with Subfield

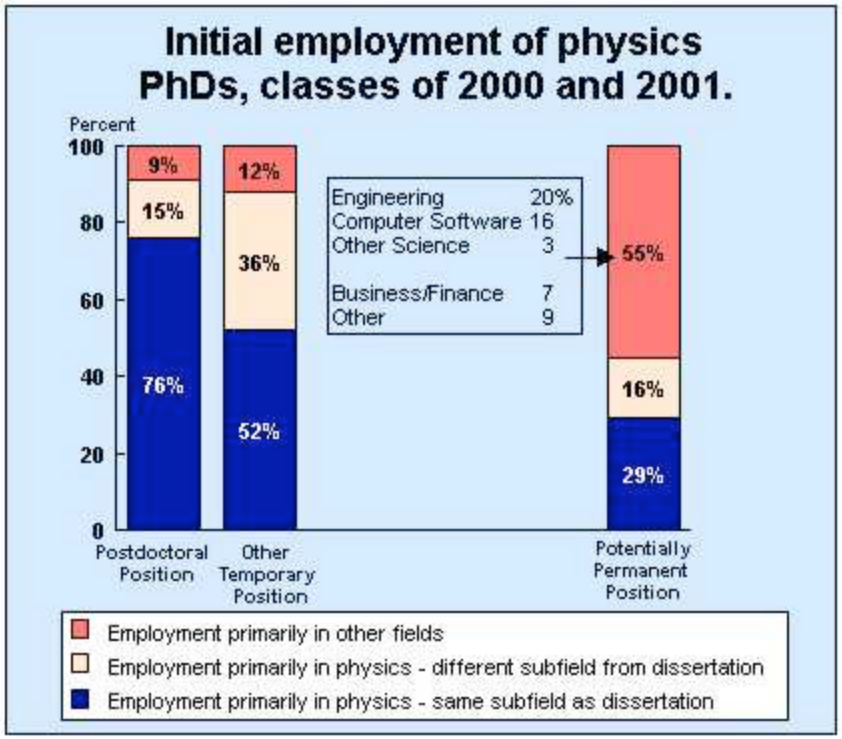


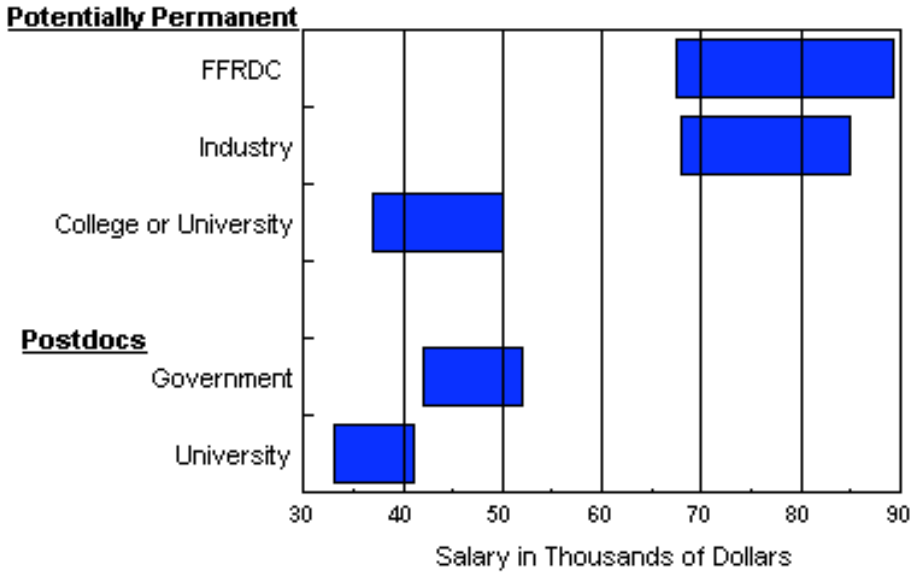
Class of 2000+2001



Timecourse data are for winter after receiving degree

Initial Employment of PhDs



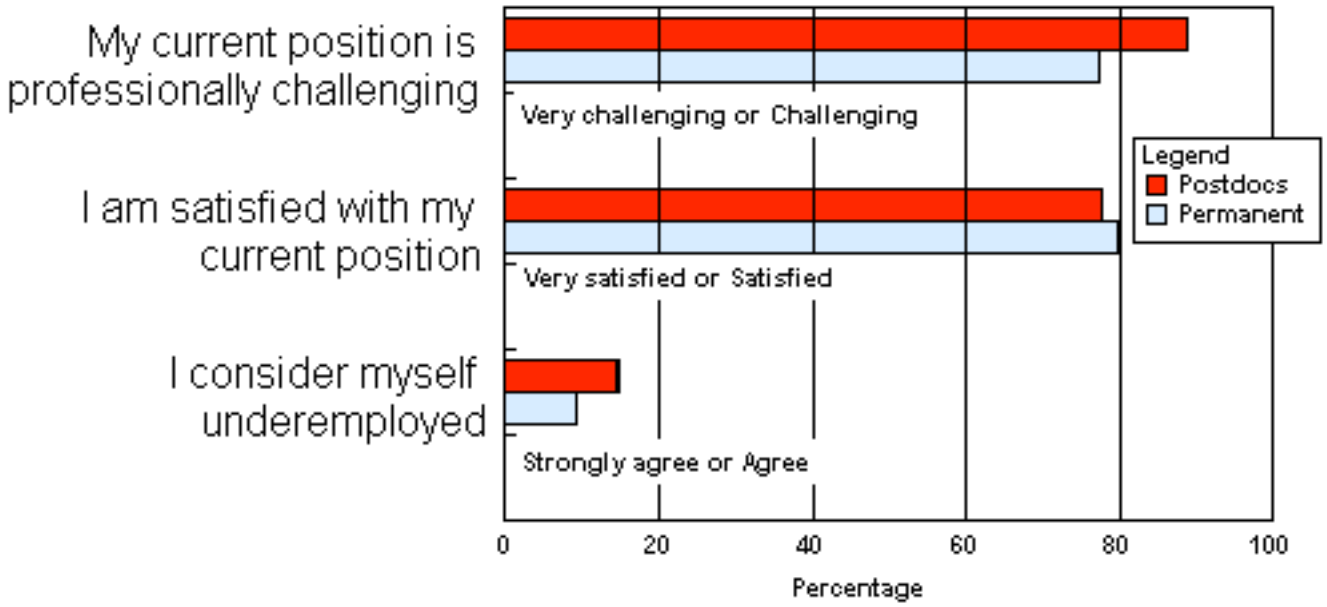


Same subfield -- more likely temporary

Permanent -- more likely Non-physics, higher pay

Job Satisfaction -- 1st Year

- Generally quite high



Ph.D. Class of 2001. Those checking choices 3, 4 on 4 point scale

Academic Job Prospects

Estimated Annual Retirement Rates for Physics Faculty During Two Academic Years, 2001 and 2002.

Type of Department	PhD	MS/MA	BS/BA	Total
Estimated % depts w/ retirements per year	55%	39%	23%	32 %
Estimated # of retirements	230	59	176	465
Estimated annual retirement rate	**2.6%**	**4.0%**	**3.9%**	**3.1%**

Estimated Tenured and Tenure-Track Physics Faculty Turnover, 2001.

Type of Department	PhD	MS/MA	BS/BA	Total
% Departments with vacancies, 2001	59%	40%	26%	36%
Estimated # vacant positions, 2001	187	50	162	399
Estimated turnover rate, 2001	**4.3%**	**6.8%**	**7.2%**	**5.4%**

Source: AIP Statistical Research Center, 2002 Academic Workforce Report

Calculation: 40 year career = 2.5%/yr retirement
20 years at one place = 5%/yr replacement

Where Faculty Come From

Backgrounds of New Physics Faculty, 2002 (tenured or tenure-track)

Type of Department	PhD	Bachelor's
Earned PhD in US within last 5 years	34	55
Earned PhD outside US, any year	30	14
Earned PhD in US > 5 years ago		
Previous Employer		
US Academic Institution	29	7
Industry, National Lab, Other	29	2

- Only about 1/3 faculty openings are filled with young, US -trained Ph.D.s
- Net Result
  - 400 positions * 34% = 133
  - Typical US Ph.D. production/yr = 600
  - ~20% go “straight” to faculty jobs

Go for it ....

- Be open-minded
- Be broad
- Be flexible
- Be opportunistic

Get a PhD and Become ...

- A scientist
- A communicator
- A visionary
- A problem solver
- ....

Where to Go

- What Subject?
  - Medicine
  - Law
  - Engineering
    (Electrical, Materials, Chemical, ...)
  - Chemistry
  - **Physics**
  - **Astronomy**

Gradschoolshopper.com

GRADSCHOOLSHOPPER.com
Your guide to graduate programs in physics and related fields

GradschoolShopper.com is the premiere site for researching graduate programs in the physical sciences and engineering. To begin your search, please choose one of the buttons below:

Search programs in the U.S., Canada & Mexico

Search international programs

Attention recruiters: GradschoolShopper Premium Listings are now available: Your department's vital information - key contacts, student and faculty facts, admission information, program descriptions, a color logo - in an attractive format that will make you stand out from the competition. Premium listings are available in two categories:

Domestic (U.S., Canada, Mexico)	**International**
show me a sample listing	show me a sample listing
order or update a listing	order or update a listing

Information Available

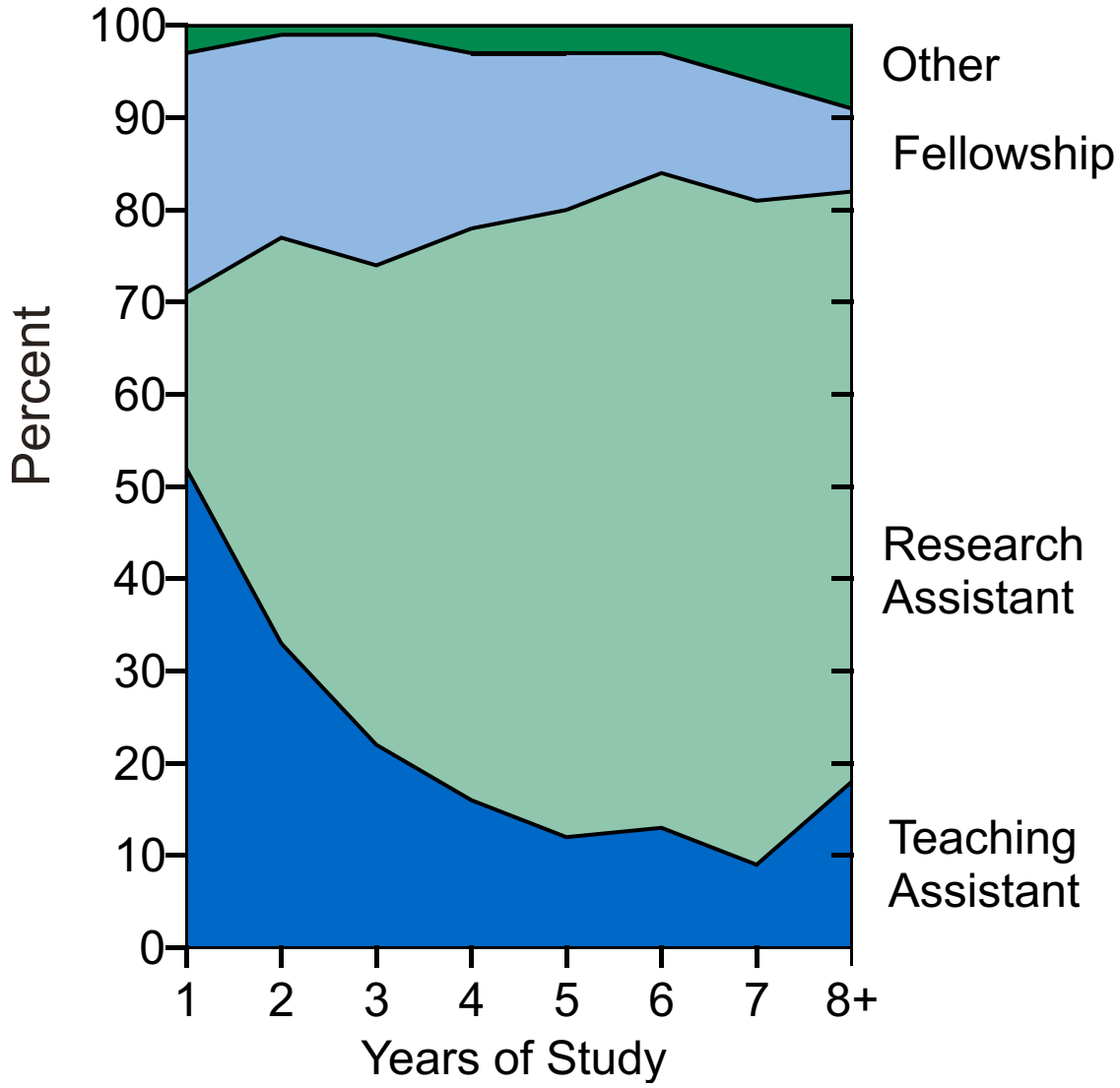
- Description of University (tuition, etc.)
- Average GRE scores, GPA
- By subfield:
  - Number of grad students
  - Number of Ph.D.'s granted
  - Number of faculty
  - Research $$$
- Fraction TA/RA/Fellowship
- Requirements
  - e.g. Qualifying Exam, Foreign Language

Financing Grad School

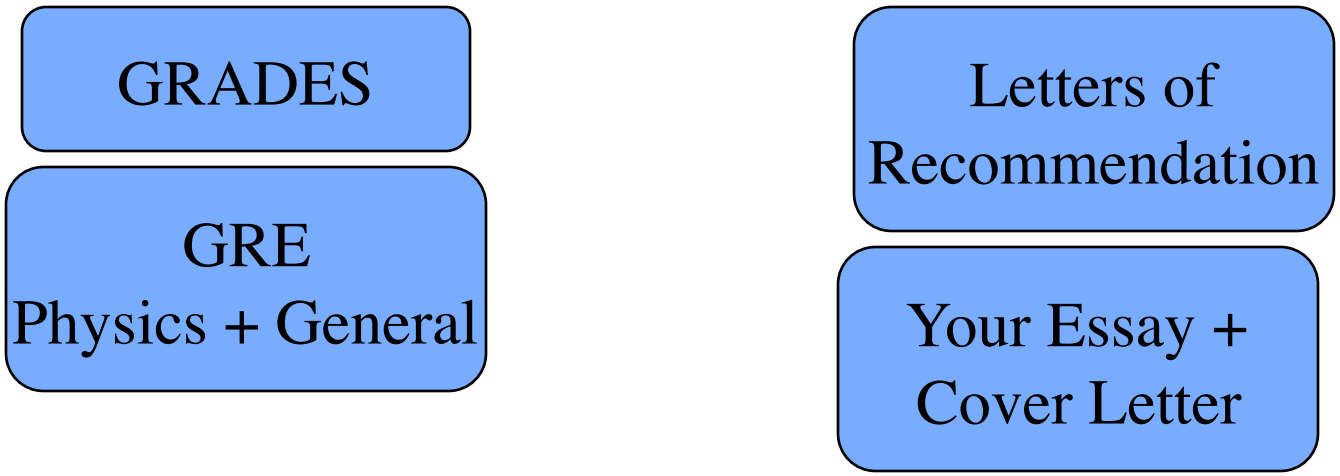
- **THEY PAY YOU!!!**
- **TA(TF):** Typically 1-2 years
- **RA:** Part of Research Grant/Project
- **Fellowship**:
  - NSF, NASA, Foundations, Internal university money, ...

Primary Source of Support

- Data for US Citizens, 1999



Application



- Weighting Varies
- Deadlines IMPORTANT -- usually January
- Schools offer by 4/1; You decide by 4/15
- FOLLOW INSTRUCTIONS
- CHECK SPELLING and GRAMMAR
- TYPE YOUR ESSAY

Grades

- Account for poor ones, if appropriate
- Point out POSITIVE GRADIENTS
- Math/Physics most important

GRE's

- Prepare for them!!
  - Can increase score >100 points
- Can take GRE multiple times, highest scores count
- Consider taking "practice" exam early
- Study with your peers!

Letters of Recommendation

- **GET TO KNOW 3-4 FACULTY NOW!!**
- Choose people who KNOW you well
- Ask if they're willing to write you a "good letter"; LISTEN to answer
- Provide background information
- Give plenty of time
- Gently verify/remind as deadline approaches

Personal Statement

- Be honest
- Be sincere
- Connect to the target department
  - Mention specific research areas, faculty
  - Get letters from people known to that department
- EDIT for grammar, spelling, coherence
- Speak to your strengths and goals
- Address any irregularities in your record

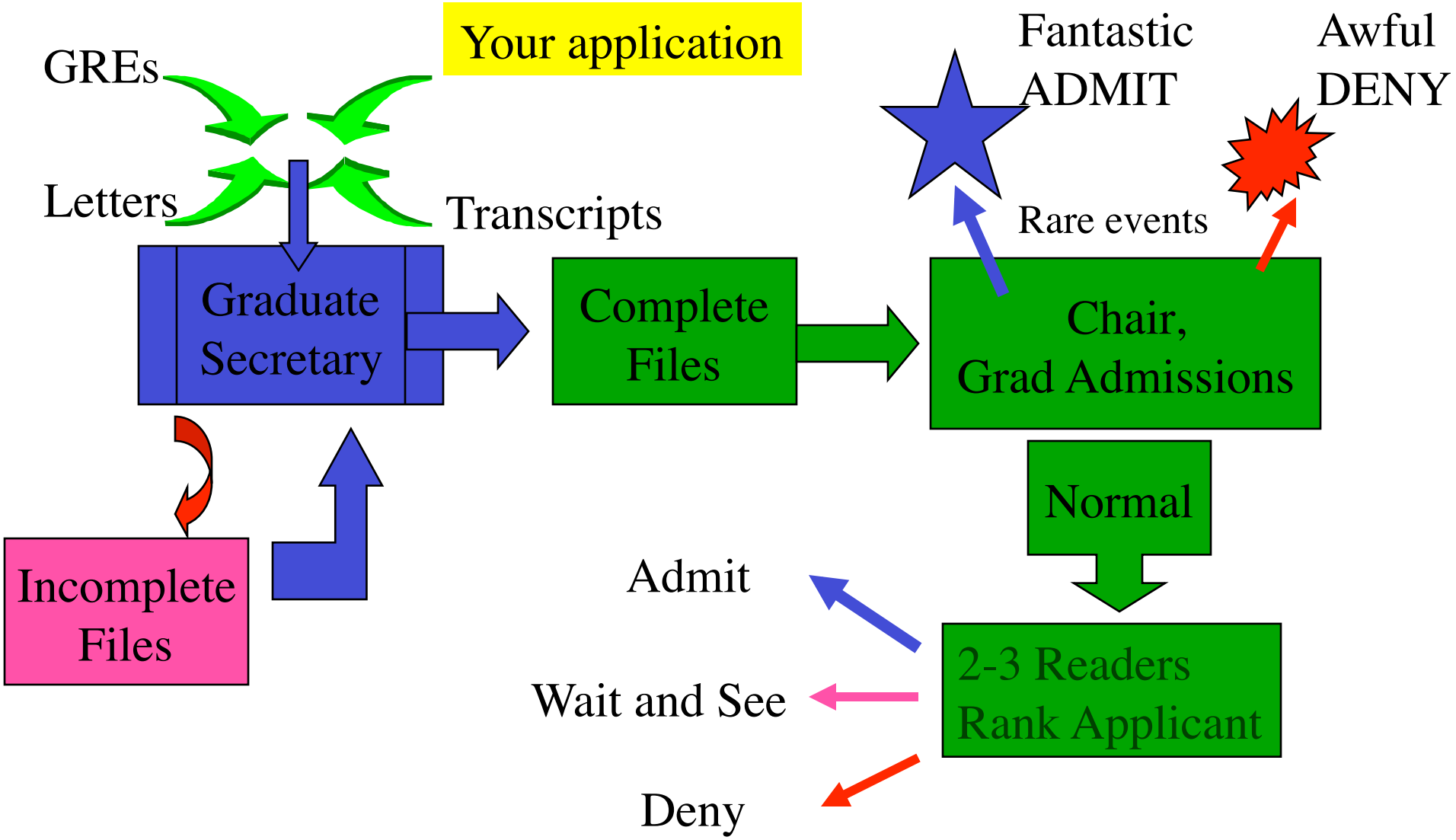
Enclosures

- Don’t weigh down your application
- Do include any published paper or its abstract/citation
- Use the cover letter to your advantage

Overall Advice

- Get application out EARLY
- Stand out from the rest
  - Visit
  - Phone call/email someone appropriate
    - (but don't bug them too much....)
- Check that file is complete
  - Contact Grad Assistant by email
  - Follow up on late letters, transcripts, etc.

What happens to it ....?



Selection Criteria

- Who will succeed here?
  - Commitment
  - Creativity
  - Maturity
  - Leadership
  - Communicative
- Good match between your goals and department
- Successful Research Experience
- Mixed interest in entering class
- Academic performance

Evaluating your options

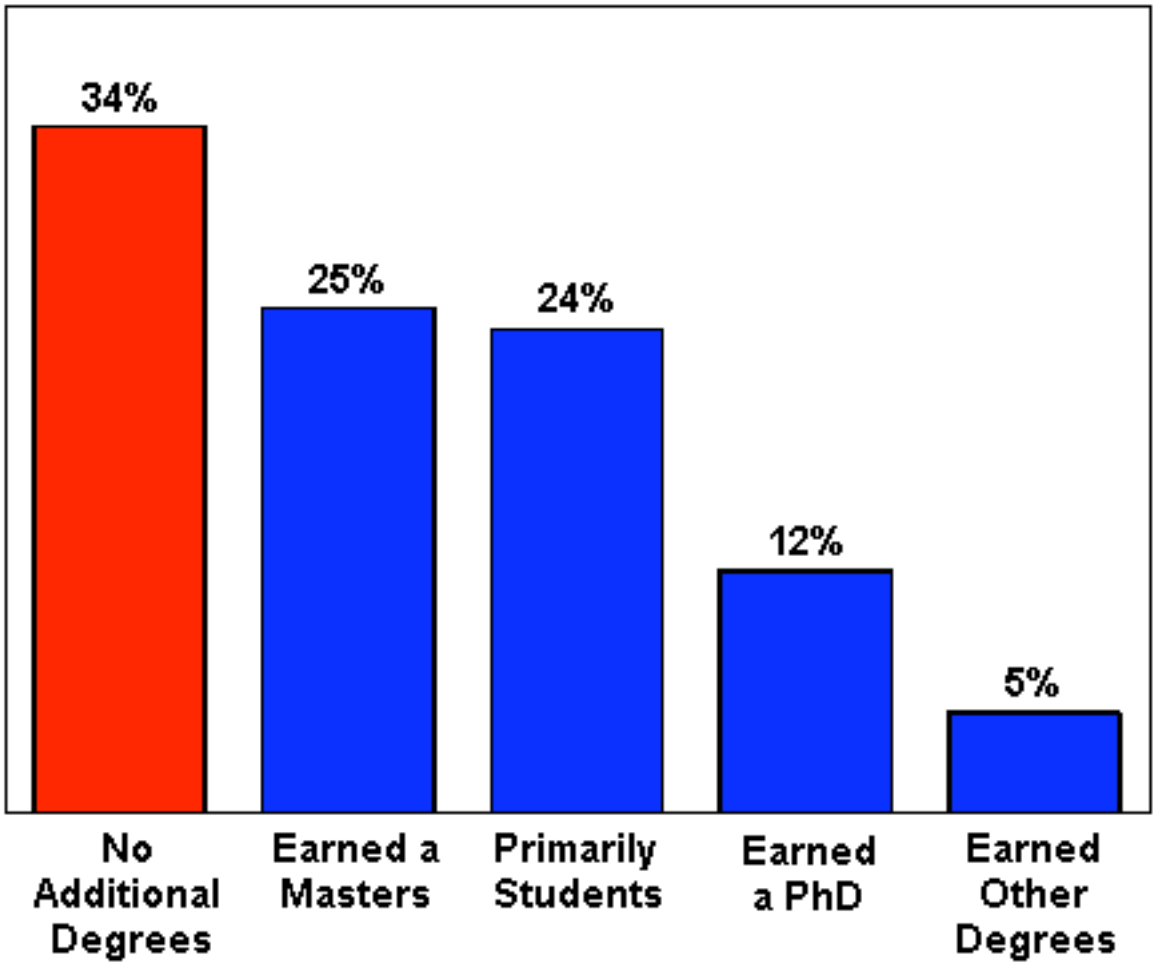
- N=0
  - Ouch
  - Did you pick schools matched to your abilities?
    - ASK and be persistent
  - Work to improve application for next year
- N=1
  - Go/No Go
  - Other options?
- N>1
  - Feel (VISIT!!)
  - Reputation
  - Opportunities (for self, significant other)
  - Location
  - Money

Summary

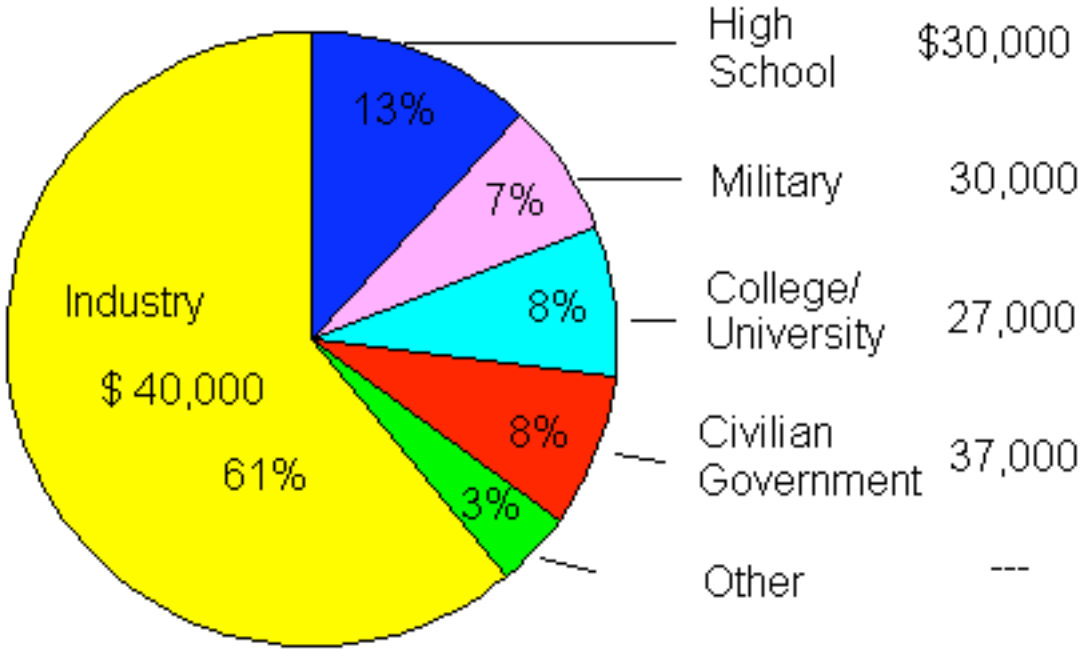
- UG preparation in physics is a solid foundation for a variety of post-graduate programs
- Grad study in physics/Astronomy is a grand adventure
- Grad school is an opportunity to acquire skills and perspective that are broadly applicable
- GO FOR IT!

Degrees Beyond Physics Bachelors

- 1998 Bachelors + 5 study (5-8 years out)

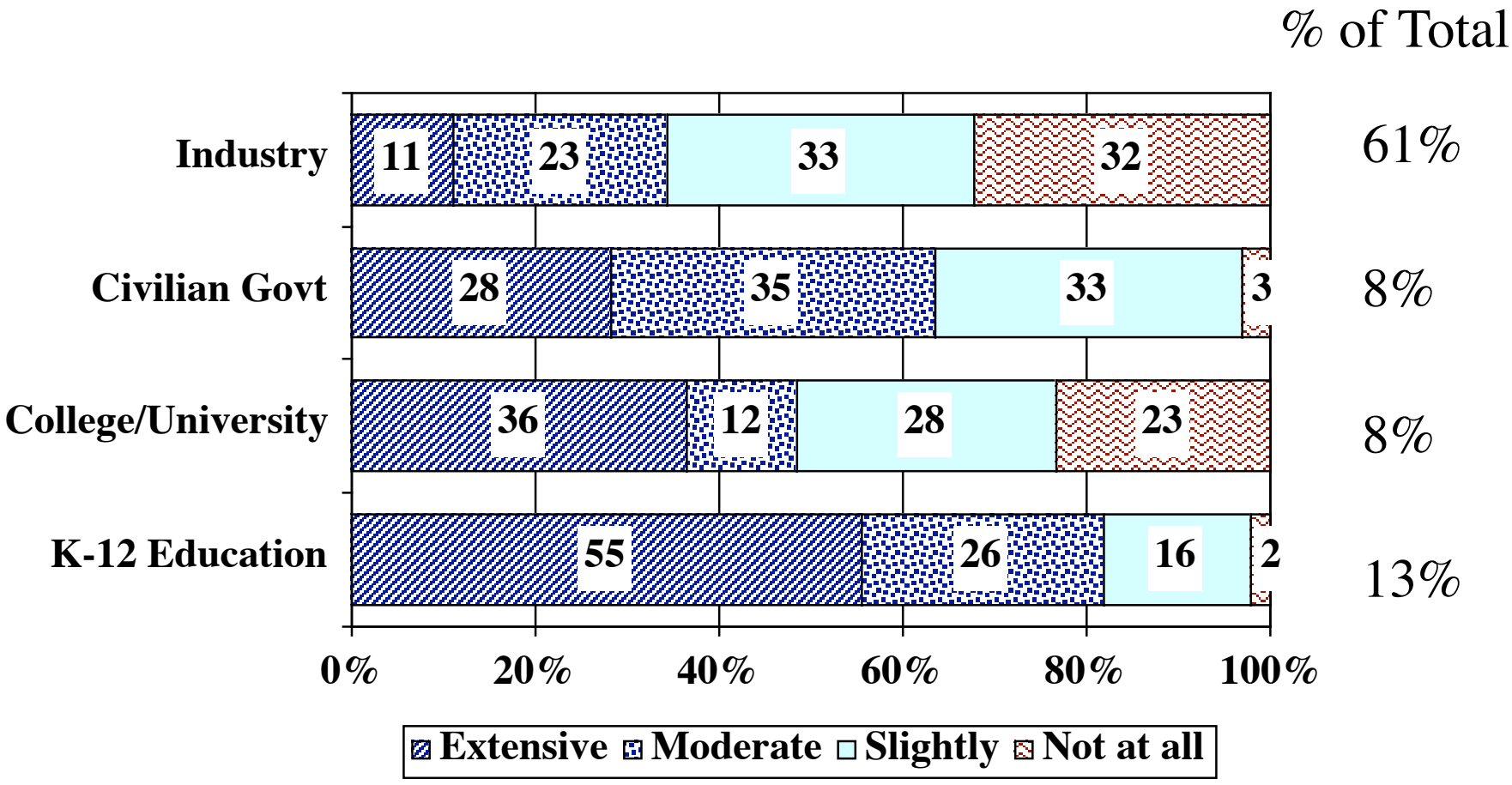


US Physics BS/BA Employment



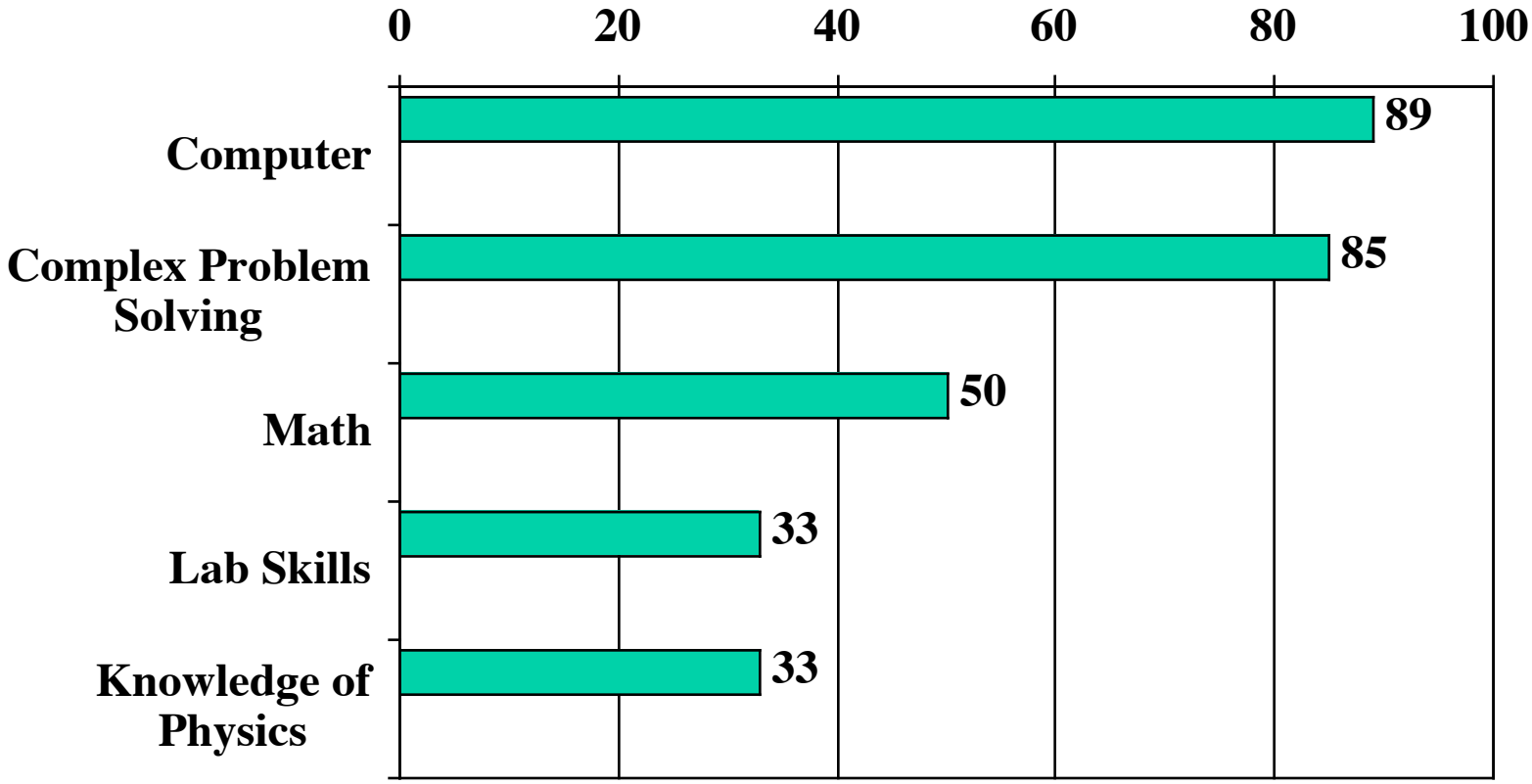
Employer distribution and median salaries for full-time US employed physics bachelors, class of 1997-98.
(Starting Salary)

Use of Physics Knowledge in Job



Bachelor's level

Use of Skills in Job



Percent of those in Industrial Employment reporting *Extensive* or *Moderate* use of skills learned as an UG