



PHYSICS CAREER HURDLES

The GRE and the Qualifying Exam



Your Graduate School Resume

Your graduate application package contains a number of elements; the better each is the better graduate school you will attend.

- GPA
- Letters of Recommendation (know some professors)
- Research (Papers are best).
- Major awards (Goldwater etc.)
- Diversity (are you an Eskimo).
- General GRE Score
- Subject GRE Score

You Do Not Have to Go to Graduate School

- The PhD is for students who want to lead the creation process as part of their job.
- It is very unlikely (6%) you will end as a professor where research is a primary component of your job.

Grades

- Generally only the top half of physics students (57%) attend graduate school of any kind, only about 30% graduate school in physics.
- Most graduate programs establish a minimum gpa of 3.0 for admission (at WVU the cut is 2.75).
- As such, you should attempt to maintain a minimum gpa of 3.5, preferably something above 3.7, if you want to get into a good graduate school.

General and Subject GRE

- The GRE comes in two pieces and most graduate schools require both.
- Many fields require the general GRE and there are quite a number of study materials for the test. You should select one and prepare.
- The general GRE changed format in the recent past so old test preparation materials may not be effective.
- The subject test is a different matter. There are almost no useful preparation materials for the Physics Subject GRE.
- Both tests are administered by ETS, the Educational Testing Service.

Beware The General GRE

- The general GRE contains a test of verbal reasoning, quantitative reasoning, and a writing component.
- Generally graduate programs ignore the general GRE because everyone does very well.
- You don't want to have a low score that stands out on any of the three parts (don't shoot yourself in the foot).
- A number of WVU students from last year scored much lower on the writing component than they should have. This definitely affected some graduate decisions. Since all physicists write for a living, a poor writing score is a bad sign.
- You have to practice the general GRE and take it seriously.

What Do You Need?

- Scores range from 440 to 990
- Less than 500 and you're probably out.
- 600 will probably get you in (somewhere).
- 700 will probably get you in someplace you want to go.
- 800 and some of your sins are forgiven and you will be accepted at more schools.

Examples

- University of Maryland – Average GRE score 740, GPA 3.79.
- University of Illinois – Typical 700-800.
- We have placed students with a score of 510. These students had an otherwise outstanding resume.

What Does this Mean?

- GRE has 100 questions.
- You lose $\frac{1}{4}$ point for every incorrect answer.
- $\text{Score} = \# \text{Correct} - \frac{1}{4} * \text{Wrong}$
- For Test 1 from my Website: After the above penalty is applied, 500 = 16 correct(13%), 700=44 correct(59%), 800 = 58 correct(78%).
- The percentile is in () above.

Arkansas Specific

Examples

- Student 1 – 4.0 gpa, 820 GRE, multiple awards, publishable honors research. Student was accepted everywhere, finally chose Illinois.
- Student 2 – 4.0 gpa, 700 GRE, summa honors research. Accepted early admission University of Rochester. Number one optics school.
- Student 3 – 3.5 gpa, 980 GRE, no honors research. Accepted Maryland, rejected Cal-Tech.
- Student 4 – 4.0 gpa, 680 GRE, no honors research. Hardship. UT-Austin.

Specific Examples

- Student 5 – gpa 3.5, GRE 560, honors research, accepted after a phone call to OU.
- Student 6 – gpa 3.2, GRE 560, honors research, Alabama – Birmingham.

You Have to be Good and Fast

- Suppose you get 30 correct and none incorrect. Scaled score = 690. You are maybe going to a good graduate school.
- Suppose you get 30 correct and 30 incorrect. Scaled score = 620. You are maybe going to an OK graduate school.
- Suppose you get 20 correct and none incorrect. Scaled score = 600. You are maybe going to an OK graduate school.
- Suppose you get 20 correct and 20 incorrect. Scaled score = 560. We are going to have to work to find a graduate school.
- Suppose you get 67 correct and none wrong. Scaled score 990. You can get in anywhere.

Its Not Enough to Read

You have to work problems to be prepared for this test.

What Does it Cover?

- Mostly it covers the introductory sequence, PHYS111-Modern but you have to know it well, including things your class did not get to.
- Some of the most important topics from Quantum, Thermo, EM, and Mechanics.

Six Published Exams

- There are only six published physics GRE exams, make sure you use them well.
- Using these exams strategically has been the key to doing well on the exam.

You Will Fool Yourself

- This exam requires substantial preparation. You need to set up a schedule for reviewing and working practice problems that sets aside a consistent amount of time preferably each day.
- Start as soon as the semester ends.
- What matters is the time you work on it yourself. Study groups are fine for support, but they have proven ineffective at producing high GRE scores.

My GRE Materials

I have placed everything I could find about the GRE at my personal website, StewartPhysics.com.

The GRE materials are under the “becoming a physicist link.”
<http://stewartphysics.com/phys-gre.html>

Qualifying Exam

- But, you're not done. After you enter graduate school, you will have to pass a qualifying or candidacy exam. This usually taken after the first year to year and a half.
- Normally, you have two chances to pass.
- It covers E+M, mechanics, and quantum and sometimes statistical mechanics at the advanced undergraduate and graduate level.
- Many schools allow a free try at the exam as you enter graduate school, called a "free shot".
- I recommending using the free shot as motivation to do some preparation in the summer before graduate school.