

Want to Go to Grad School?

Classes

Your grades are probably the first thing that you should look to in determining if you have what it takes to succeed in graduate school. Most Ph.D. programs in physics, astronomy, or other related fields have a minimum acceptance GPA of around 3.0. It is difficult to get into most programs with a GPA that is lower than this. Things that may help if you're on the borderline are very good research background and exam scores, as well as improved grades in your final couple of years. If you're a bit under this GPA, you may want to look at a Master's institution first. Some of our sister schools ([Fresno State](#), [San Francisco State](#), and [San Diego State](#) to name a few) have Masters Degree program in physics. Some of our graduates have found success going through these programs prior to entering a Ph.D. program.

Pick a variety of classes. The more elective courses that you take (in physics, math, astronomy, chemistry, etc.) the better prepared you will be for graduate school, both in terms of the knowledge that you gain, but also in the exposure to the wide range of subjects that are out there. In that regard, you should also go to as many physics colloquia as possible. We bring in speakers from a wide variety of areas of physics for this very reason.

Research

Another important area in your undergraduate preparation is research experience. Schools have begun making this a very strong consideration in their application process over the past ten years. While schools don't expect undergraduates to have a lengthy publication record before admitting them, they do like to see that students have worked independently on projects outside of the classroom. As part of the curriculum at Sac State, B.S. students are required to do a Senior Project. This is an excellent opportunity to get this experience, but be warned - if you put it off until your very last semester, it may be difficult to explain what you did in your application letter. Many of our faculty are involved in research projects that can use student help. Get involved early, rather than later. You may end up with a great experience and a publication to boot.

Another great opportunity to gain research experience is through a summer research program at another university or national laboratory. These programs, often referred to as REUs (Research Experiences for Undergraduates) after the National Science Foundation name for those that they fund, are generally paid summer internships. Most include housing, travel expenses, and a summer stipend (usually in the low kilo-\$ range). They give you the opportunity to learn about a field that you're interested in as well as seeing how things work in other environments. There are probably thousands of

positions available, we've compiled some of the most common "search engines" for these programs on our Information for Students page, under Summer Programs.

Exams

Most graduate programs require that you take the [Graduate Record Examination](#) (the GRE). The GRE has two parts. The general exam tests your mathematical, verbal, and analytical writing skills, all of which are taken on a computer at a testing center. The math and verbal scores are generated immediately, your written scores will be mailed out about six weeks after the exam. To find out about the schedule, visit the [GRE](#) website. You can register online.

The subject exam is an exam in a specific field, the most likely one that a physicist would take is, of course, the Physics Subject exam. This is generally required by Ph.D. programs and sometimes by Masters programs. It is a very challenging examination. It is recommended that you take the exam the fall of your graduating year. It is only offered a few times a year, so it is very important that you register on time for it, or you might have to wait months to take it again.

How do you study for these exams? Services like Kaplan offer courses on how to succeed in the general exam. [Educational Testing Service \(ETS\)](#), the company that produces these exams also has some guides. The biggest hurdle is usually the subject exam. There are a few recommended strategies for succeeding on it:

- **Start Early** - Don't wait until the week before the exam. Taking it in the Fall? Start studying over the summer.
 - **Work Problems** - Work lots of problems, do all of the hard problems in your freshman physics book that you skipped when you took it years ago.
 - **Dimensional Analysis** - You can gain probably 5% just by paying attention to dimensional analysis.
 - **Symmetry** - Many physics problems greatly simplify due to symmetry, learn how to use it.
 - **Tutoring** - Volunteer in the Tutoring Center. There is no better way to learn material than to explain it to others. You'll also learn if there is a particular area that you need to spend more time on.
 - **Group study** - Work together - you're not competing against your classmates after all.
-

Finding Programs

Probably the best way to find out about different graduate programs in physics is the website: gradschoolshopper.com. It is a compilation of data from the [American Institute of Physics](#). You can search by reason and/or field of research. Some of the info

contained includes: admission guidelines, numbers of students enrolled, campus information, and faculty info. It's a great collection of information. This website also contains information about astronomy programs, chemical physics programs, and some other related fields.

Another way to find out about other programs is to attend seminars. Many of our speakers are from other institutions. They are generally more than happy to discuss with you what their programs are like. Most times, we try to get them to spend some time with students before their talks, often as part of the SPS meeting.

Applying

Most [graduate programs](#) require applications that include: a résumé (or CV), a personal statement, transcripts, exam scores, and letters of reference, contact the department directly for their requirements. Most applications these days can be submitted online and many have a fee associated with the application.

The résumé, or *curriculum vitae* (CV), is a summary of your academic, research, and work experience. It should serve as a snapshot of your background. Strictly speaking, the CV is more detailed than the résumé, but coming out of college, there probably isn't much difference for the average student (the APS has a [Professional Development Guide](#) has some hints on developing an effective CV). The transcripts and exam scores give a good idea of the applicant's physics skills, but the personal statement is used by the admissions committee to get some insight into the person applying. The personal statement gives the applicant the opportunity to showcase their communication skills, explain the work ethic, and explain their motivation for going to graduate school. This essay should be personal, try not to be cliché. Remember, the committee will be reading lots of statements - you want to stand out from the others.

Most applications require that you get statements from three people that can speak to your background. Most of the time, these people will be faculty members (but could also include summer research advisors or employers). Here are a list of Dos and Don'ts.

Do:

- give them a copy of your CV. They may not be aware of all the details of your background.
- talk to them about why you're interested in a particular program. They may have some insight that can be helpful.
- be honest with them about your skills and background.
- give them all of the information they need to submit the letter. They are submitted online or directly to the program. Incorrect information may not allow them to get the letter in a timely fashion.

Don't:

- ask for things to be turned around in one day. You shouldn't be rushed and sloppy in your work, neither should they.
- assume that they will write one for you. It is their name on the letter and if they're not comfortable writing one, it is their right to decline.
- forget to say "Thank You".

A final thought: for all intents and purposes, this is a job application. Pay close attention to spelling and grammar on all parts of your application; sloppy and disorganized applications reflect very poorly. Don't be afraid to ask others to read your documents before you send them.

Deciding

It's nice when you have the opportunity to select between several programs. Give lots of thought to your decision: you will likely be there for five or more years. Make sure the program has several attractive research options. It is generally unadvisable to select a program because of a specific faculty member: that person may leave or may not be accepting graduate students into his/her group. Will you have financial support during your studies (Teaching Assistant, Fellowship, Research Assistant, etc.)? If the campus is in a place that you'd like to live? Contrary to popular opinion, you do have some time off campus - you don't want it to be miserable.

How do you find this stuff out? Once accepted, many Ph.D. programs will invite you to visit their programs (often with little or no cost to you). If you do visit, talk with lots of faculty members, visit laboratories, and above all else VISIT WITH CURRENT GRADUATE STUDENTS! The best way to get a pulse of the student lifestyle is from the current students, meeting with them away from faculty gives probably the best idea of how things are on the campus and in the department (a great excuse to check out the coffee and/or watering hole scene).