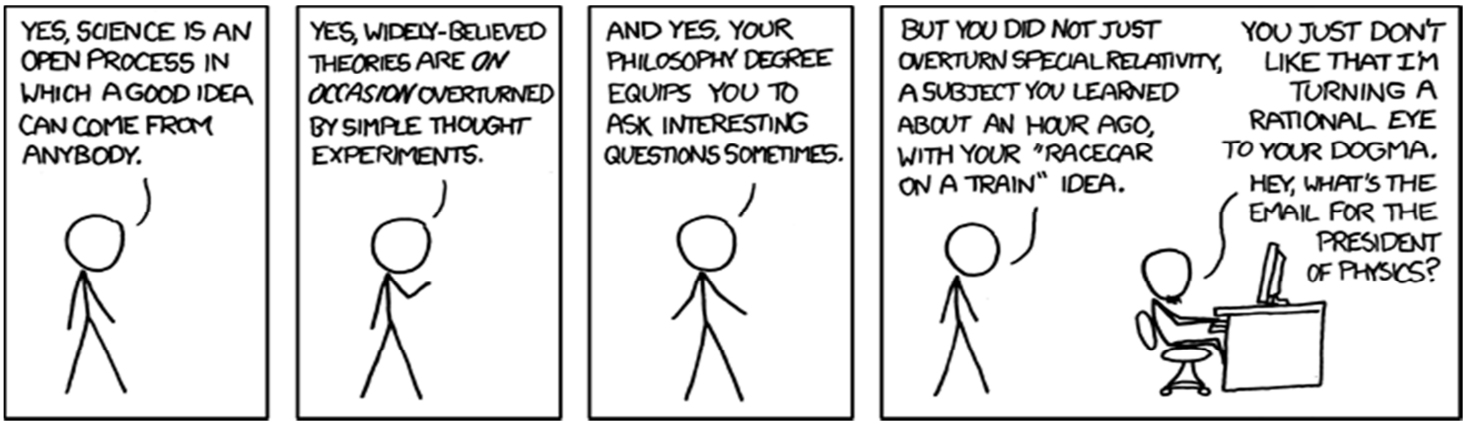
Stanford Physics Graduate Student Handbook 2011-2012



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September 2011

Dear Graduate Student,

Welcome to the Stanford Physics Department. This handbook should answer many questions you may have about the department and the program. If you have additional questions please do not hesitate to contact me. I look forward to working with you during your graduate career.

Sincerely,
Maria Frank
Student Services Officer

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PHYSICS MAIN OFFICE

Hours: 10 am - 12:00 pm & 1 pm - 4:30 pm, Monday through Friday
Closed for lunch from 12 - 1 p.m.

Below is a list of Physics Department main office staff, contact information, and a short list of areas of responsibility. If you have questions, feel free to ask any staff member.

NAME	TITLE	E-MAIL	PHONE	OFFICE
Rosenna Yau	Administrative Services Manager	rosenna.yau@stanford.edu	3-4345	Varian Main Office, Rm 110
Cindy Mendel	Office Manager	cmendel@stanford.edu	3-4346	Varian Main Office, Rm 111
	Works with faculty to process research grants and contracts and oversee the financial accounts in the department; handles HR issues, processes pay distribution and all temporary student appointments.			
Jenifer Conan-Tice	Administrative Associate, Faculty Affairs	tice@Stanford.edu	3-4347	Varian Main Office, Rm 105
	Students may contact Ms. Conan-Tice in the Physics Main Office to arrange meetings with our Department Chairman, for textbook inquiries or for general questions about the department.			
Maria Frank	Student Services Officer	maria.frank@stanford.edu	3-0830	Varian Main Office, Rm 106
	Responsible for administration of the Graduate Program; processes RA/TA stipends, tuition and fellowships, qualifying exams, graduate student progress, milestones, graduate admissions, etc.			
Elva Carbajal	Undergraduate Program Coordinator	elva@stanford.edu	3-4362	Varian Main Office, Rm 107
	Oversees undergraduate program, assigns teaching assistants; schedules courses; maintains department bulletin copy; administers the Undergraduate Program; coordinates the recruitment, hiring and placement of graduate students as course teaching assistants (TAs) for undergraduate courses.			
Violet Catindig	Administrative Associate, Main Office	vvc@stanford.edu	3-4344	Varian Main Office, Rm. 108
	Responsible for key distribution, purchasing card, petty cash, and answering student inquiries.			

For additional information on facilities, colloquium listings and other department events/services please see our department website at http://www.stanford.edu/dept/physics

YOUR CONTACT INFORMATION

All students must enter current phone numbers and email addresses into the AXESS system. The information will be used for the graduate student phone list and you will receive important program information via email. Please keep you information in AXESS current, especially emergency phone numbers.

ACADEMICS

Advising

Professor David Goldhaber-Gordon is the Chair of the Physics Graduate Study Committee for 2011-12. He will serve as the official advisor to all graduate students and is available by appointment to consult with students about any graduate student related matter including degree progress.

In addition, in their first year, students have a program advisor selected by the department to advise on courses and rotations. Sometime during the first year students select a research advisor who will direct their research program for the remainder of their graduate career.

Co-Advisors

Physics graduate students have a wide range of research choices available to them, including working on a Physics-related program in a different department, with a research advisor who is not a member of the Physics Department. **Students working with advisors outside Physics/Applied Physics/SLAC must have a co-advisor who is a faculty member in the Physics Department.** A co-advisor serves two main roles: (I) acting as an official liaison for the student to the Physics Department and (ii) insuring that the student's dissertation has a physics component that is sufficient to allowing granting of a Ph.D. in Physics. The co-advisor also serves as the student's contact to the department for any academic issues that would be more appropriately dealt with by Physics, rather than a faculty member in another department.

Students should select the co-advisor as soon as he/she is no longer on rotation and has decided on a research program with an advisor in a department other than Physics. In any case, this should be no later than the end of the second year of graduate study. Students should complete the "Advisor/Co-Advisor" form (available in the Physics Main Office) and submit it to the Physics Student Services Officer, Maria Frank.

During the third year the student submits a one-page dissertation proposal on his/her research, including a description of the physics components, to Maria Frank. The proposal should have been reviewed, approved and signed by the student's research advisor and co-advisor.

From then on, the student is required to meet with his/her co-advisor on a yearly basis, although more frequent meetings are encouraged. During that annual meeting, the student submits a one-page progress report on research for co-advisor approval and signature. The form is given to the Maria Frank for placement in the student's file.

If, during the annual meeting, the co-advisor determines that the research no longer contains a significant physics component, the student will be warned that a Ph.D. in Physics may not be merited and he/she may need to transfer to the relevant department.

Minor

A minor in another department must be approved by that department, using the "Application for Ph.D. Minor" form:
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf
Your plan must also be approved by the Chair of Graduate Studies. Please see the Stanford Bulletin http://www.stanford.edu/dept/registrar/bulletin/ for more information.

Master's Degree

The department does not offer a co-terminal degree program, or a terminal M.S. degree. However, the M.S. degree may be awarded for a portion of the Ph.D. degree work. See the Stanford Bulletin for detailed information on obtaining the M.S. degree. The Graduate Program Authorization Petition form can now be submitted electronically through AXESS. From the Academics panel in your Student Center, select "Petitions and Forms" from the drop down menu to submit the Grad Auth. electronically. You also need to submit the Program Proposal for a Master's Degree to the Physics Student Services officer. The form can be found here: http://www.stanford.edu/dept/registrar/pdf/progpropma.pdf.

REQUIREMENTS FOR THE PH.D.

COURSE WORK

The following courses are required for completion of the Ph.D. in Physics at Stanford. **All required courses, including breadth requirements, must be taken for a LETTER GRADE.**

CORE COURSE REQUIREMENTS
Physics **210** (Advanced Particle Mechanics) **or 211** (Continuum Mechanics)
Physics **212** (Statistical Mechanics)
Physics **220** & **221** (Classical Electrodynamics)
Physics **230** & **231** (Quantum Mechanics)
Physics **290** (Research Activities at Stanford)
Physics **294** (Teaching of Physics at Stanford)

BREADTH REQUIREMENTS
Students must also take at least one course in at least two of the following subject areas (outside their primary area of research) chosen from courses with numbers above 232, except 290 and 294:

Biophysics,
Condensed Matter
Quantum Optics and Atomic Physics
Astrophysics and Gravitation
Nuclear and Particle Physics

A "B" grade point average must be maintained for all departmental requirements.

All Ph.D. candidates should have math proficiency equivalent to the following Stanford courses: Math 106, 113, 114, 131, and 132. Advanced math courses are especially useful for theoretical work.

COURSE WAIVERS

Students who can demonstrate that they have taken the equivalent course elsewhere with the necessary grade may request to waive that course by submitting the following form: www.stanford.edu/dept/physics/academics/RA/GradCourseWaiver.pdf Follow the instructions, complete the form then submit the form with all supporting documentation to the Graduate Student Services Officer, Maria Frank.

Students are strongly encouraged to complete or waive course requirements as soon as is practical in their graduate careers, but no later than the end of your second year. This lessens the possibility of delays in the granting of a degree or in transferring to TGR status with its lower tuition rate. Note that most physics courses, including the core courses, are only offered once in each academic year and the more advanced courses may only be offered every other academic year. Advanced planning is to your benefit.

TEACHING

The department believes that a demonstrated ability to teach is an important part of a graduate-level education in Physics. Consequently, three quarters of teaching are a requirement for the Ph.D. in physics. Teaching duties vary from course to course but can include leading discussion sections, laboratory sections, meeting with students informally through office hours, and grading homework and exams. To meet the requirements, at least two of the assistantships must be for a lecture course in which the Teaching Assistant (TA) conducts a weekly discussion section.

A TA application form must be completed before any quarter in which a student wishes to teach. The form made is available online a few weeks prior to the end of the preceding quarter on the Physics Department website https://www.stanford.edu/dept/physics/academics/TA/index.html. The Undergraduate Program Coordinator is responsible for TA assignments and will notify students of application availability and deadlines.

First year graduate students are given first priority for TA positions, however we strongly recommend that first year Physics students NOT teach in their first term at Stanford. Next (from highest to lowest priority) are other Physics graduate students and Applied Physics graduates. On rare occasions we assign TA positions to qualified applicants from outside the Physics/Applied Physics departments.

Note that all students are required to complete the three quarter TA requirement PRIOR to committing to completing any long-term research at a location a significant distance from the Stanford University campus. Examples include CERN in Geneva, KITP at UC Santa Barbara and the Soudan Mine in Minnesota.

GRADING

Occasionally the department needs graders for courses. Grading positions provide an hourly wage, do not pay any tuition allowance and cannot be used to fulfill the teaching requirement. Graders may work a maximum of 8 hours per week, but international students may not work as graders during the academic year if they have a 50% RA or a combined RA/TA appointment. Rules are slightly different for summer quarter. See Maria Frank or Elva Carbajal if you have further questions about grading positions.

ENGLISH PROFICIENCY FOR TEACHING ASSISTANTS *(International Students Only)*

The University requires that International graduate students who wish to be appointed as TAs must first be screened by proficiency in the English language. The screening is conducted by the English for Foreign Students Program in the Stanford Language Center. The Language Center also offers courses in English as a second language (ESL) to international graduate students. More information on the screening exam can be found at http://www.stanford.edu/group/efs/tascreen.html. We strongly recommend students get screened at least one quarter prior to the quarter in which they wish to TA.

QUALIFYING EXAM

The Physics Department faculty believes that in addition to demonstrating ability to conduct original research in a specific area of concentration, our Ph.D. students should be able to demonstrate a broad understanding of Physics at the advanced undergraduate/ beginning graduate student level.

As a means of demonstrating their broad knowledge, graduate candidates are required to pass the physics qualifying examination. This is a written examination held over two days, covering Particle Mechanics, E&M, Quantum Mechanics, Statistical Mechanics and Thermodynamics, Special Relativity and General Physics.

Preparation for this comprehensive exam gives students an opportunity to review and synthesize this broad range of material, and to amend any deficiencies in their undergraduate preparation. Evaluation of this examination gives the faculty a formal method of gauging this preparation, and for recommending remedial study when appropriate. Passing the qualifying exam is a required step in advancement to candidacy for the Ph.D. degree.

The qualifying exam is intended to cover material at the level of advanced undergraduate physics classes at Stanford. The following textbooks reflect this level in each subject area covered on the qualifying exam:

Classical Mechanics: "Classical Dynamics of Particles and Systems",
J. B. Marion and S. T. Thorton

Electricity and Magnetism: "Introduction to Electrodynamics",
D. J. Griffiths

Quantum Mechanics: "Introduction to Quantum Mechanics",
D. J. Griffiths

Statistical Mechanics: "Fundamentals of Statistical and Thermal Physics",
F. Reif

Special Relativity: "Space and Time in Special Relativity",
N.D. Mermin

Or

"Special Relativity",
A.P. French

First year graduate students are required to take the physics qualifying exam in the January immediately following their arrival at Stanford. There are many ways that students can prepare for the exam:

- Reviewing your undergraduate material in the relevant area
- Reviewing previous qualifying exams at http://www.stanford.edu/dept/physics/publications/oldquals/

With appropriate preparation and study, the majority of students can expect to pass the qualifying exam on the first attempt. Students who do not pass the exam in their first year can choose from one of the following:

(1) Retake in the second year sections of the exam in which they performed poorly and pass all questions in those sections. The questions to be retaken will be determined by the Chairs of the Qualifying Exam Committee, the Physics Department and the Graduate Studies Committee. Students retaking only parts of the qual will be allowed as much time as necessary to answer the questions but that time will not exceed the maximum allowed for the qualifying exam.

(2) Retake the entire qualifying exam and correctly answer the number of questions that is considered passing for that particular year.

In exceptional cases, for example if a student is deemed to have had insufficient undergraduate preparation, students may be allowed to take one or more recommended undergraduate courses as a substitute for retaking the exam. This option is decided entirely at the discretion of the Chairs of the Qualifying Committee, the Graduate Studies Committee and the Undergraduate Studies Committee, who will also decide the courses. In this case students must receive a grade of A- or higher in the courses selected, or they will have to retake the qualifying exam at the next available opportunity.

If the student does not pass the exam the second time, he/she will be asked to leave the Ph.D. program.

UNIVERSITY REQUIREMENTS

Continuous Registration

Students must be registered for **10** units of coursework and/or research (PH 490) every term during the academic year (Autumn, Winter and Spring quarters.) Registration procedures may be slightly different during summer term, but you will receive instructions at the end of spring term on how many units to register for during the summer, depending upon the percentage of your summer RA appointment. If you plan to be away from campus for an extended period of time you need to fill out a leave of absence form officially approved by your advisor, the Physics Department, and the Degree Progress Office during the quarter before the requested leave. Note that fieldwork directly related to your thesis does not require you to take a leave of absence.

University Unit Requirements for the Ph.D.

The University requires students studying for the Ph.D. to complete 135 units of study. Students who have completed 135 units must then apply for Terminal Graduate Registration (TGR) status, which usually happens in the fourth or fifth year of study and is discussed further

on page 11. Note that your 135 units **must include** all courses required for the Physics PH.D. unless you have specifically waived them.

Registration Procedures

In fall, winter, and spring quarters, students register for 10 units via AXESS. Units are a mixture of course units and research units (course 490) as appropriate. 50% support TA and RA appointments, and NSF fellowships include a tuition allowance for the 10-unit tuition rate. Some outside fellowships include full tuition (18 units); refer to your fellowship award letter or contact Maria Frank if you have questions.

In summer quarter ONLY, students in year 2 and above can receive up to 75% RA support and in year 3 and above, up to 90% if approved by the advisor. **Students in year 1 are only eligible to earn 50% RA or RA/TA support in summer quarter.** Registration unit levels for summer quarter are slightly different than in fall, winter and spring. The amount of tuition allowance you receive depends upon the percentage of your appointment. For example, if you work as a 75% research assistant, you receive 5 units of tuition support and should only register for 5 units. Detailed information regarding summer registration is sent to students via e-mail at the end of spring quarter.

TGR students register for Physics **802** (TGR Dissertation) for 0 units.

Advancement to Candidacy

Advancement to candidacy is a very important step, with both departmental and university requirements. Departmental requirements include (i) passing the Physics Qualifying Exam and (ii) completing all required core courses. Note that financial support may be delayed if you do not advance to candidacy by July 1 of the second year. The *Application for Candidacy for Doctoral Degree* can be found here:
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/appcanddoct.pdf

Extension of Candidacy

Ph.D. candidate status is good for five years. You may see your candidacy expiration date in AXESS by viewing your unofficial transcript. If your candidacy has expired, the following form should be completed and submitted to your department for approval:
http://www.stanford.edu/dept/registrar/pdf/appcandextens.pdf . The Physics Student Services Office will contact you to remind you of candidacy expiration dates.

Leave of Absence

Leave of absence petitions can be obtained here:
http://www.stanford.edu/dept/registrar/pdf/leaveofabsence.pdf.

Length of Leave

All leaves of absences are granted for a fixed period of time, normally one year or less. Students who have completed all residency requirements (including advancement to candidacy) may request an additional year of leave if special circumstances exist. If no approved extension is on file, a hold is automatically placed on future registration. A student who wishes to return at a later date must file for reinstatement and an extension of candidacy. This applies whether it is the same major and degree program or a different one.

Status While on Leave

Students on approved leave retain their current degree program status but are not considered officially registered. No official departmental or University requirement, e.g., University oral examination, may be met while a student is on leave. However, an incomplete course grade may be submitted when a student is not registered. Also, a student may file a request to change major or degree level while on leave.

Returning Early from a Leave of Absence

Graduate students returning early from an approved leave of absence must file *the Returning Graduate Student Request to Register* form before the beginning of the quarter in which they wish to return. The form can be found here:
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/returning_student_request.pdf

Withdrawal From Program

A student who wishes to terminate study in a program should submit a *Request to Permanently Withdraw from Degree Program* form http://registrar.stanford.edu/pdf/permanent_withdraw.pdf to the Student Services Officer, who will forward the information to the University Registrar.

A student who has withdrawn and later wishes to return to the same degree program must follow the normal procedure for reinstatement. Further information on reinstatement can be found here:
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/appgradreinstate.pdf

Inactive Status

A student who has not resigned and fails either to maintain registration or to secure a formal leave of absence will be declared inactive. A student whose candidacy is not extended is also considered inactive. If a student wishes to resume study either in Physics or a different field, he/she must apply for reinstatement. Reinstatement is not automatic and must be approved by the Department.

Terminal Graduate Registration (TGR) Status

The Humanities and & Sciences Dean's office requires students with 135 units to apply for TGR status. This usually occurs in the 4th year of study. TGR tuition rates are much lower than the 10-unit rate. **Be sure to complete all required courses, including writing courses for foreign students, during the fourth year of study.** If you have fulfilled residency requirements for TGR status (i.e. completed 135 units) and still need to take courses, you may take up to three units of coursework while TGR with no financial penalty. You will be required to pay for any additional units above and beyond the approved three. While on TGR, you need to register for PH 802 for "0" units. Note, you **must** fulfill the physics department course requirements before you can go TGR.

Applications for TGR status are available at the following link:
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/tgrreq.pdf

Before applying for TGR status, please check your transcript and confirm that you have received a grade or mark (Satisfactory, for example) for **every** course you have taken at Stanford. Note that you must submit your Reading Committee Form prior to going TGR. More information on the Reading Committee Form is below.

Reading Committee

The Doctoral Dissertation Reading committee consists of the principal dissertation advisor and two other readers. At least one member must be from the student's major department. Normally, all members are on the Stanford Academic Council.

The student's department Chair may, in some cases, approve the appointment of a reader who is not on the Academic Council (via the Petition for Doctoral Committee Members form), if that person is particularly well qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree. A minimum of two Academic Council members must be on all reading committees.

Former Stanford Academic Council members, emeritus professors, and non-Academic Council members may serve on a reading committee. If they are to serve as the principal dissertation advisor, however, the appointment of a co-advisor who is currently on the Academic Council is required.

The reading committee, as proposed by the student and agreed to by the prospective members, is endorsed by the Chair of the major department on the *Doctoral Dissertation Reading Committee* form:
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/doc_diss_rdg_ctte.pdf

This form must be submitted before approval of Terminal Graduate Registration (TGR) status or before scheduling a University oral examination that is a defense of the dissertation. The reading committee may be appointed earlier if desired. All subsequent changes in the composition of the reading committee must be approved by the Chair of the Ph.D. major department prior to submission of the dissertation via the Change of Adviser or Reading Committee Member form:
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/docrdngcomm.pdf

Oral Examination

The University Oral Examination is a requirement of the Ph.D. degree. The purpose of the examination is to test the candidate's command of the field of study and to confirm fitness for scholarly pursuits. The Ph.D. candidate and his advisor will determine when, after advancement to candidacy, the exam will be given. In the Physics Department the Oral Examination is a defense of the dissertation.

The University Oral Examination committee consists of at least five members: four examiners and an out-of-department committee Chair. *See the Graduate Academic Policies and Procedures Manual http://gap.stanford.edu/4-7.html for rules in selecting a dissertation defense committee chair and the reasons why the Oral Examination Committee Chair must be from outside the department. In most cases, a SLAC faculty member would not be the best choice for Oral Examination Committee Chair because of the close connection to the Physics Department. In the interest of objectivity the examinee should strive to find a faculty member from another department to serve as Chair.* At least two examiners must be members of the Stanford Academic Council (Professor, Associate Professor, or Assistant Professor). Examiners who are not on the Academic Council may be appointed if they contribute an area of expertise not readily available from the Stanford faculty. Emeritus faculty are eligible to serve as examiners or chair of the committee. The Chair must be a member of the Stanford Academic Council and may not have a full or joint

appointment in the same department as the candidate or her/his advisor. Members of the Dissertation Reading Committee normally serve as examiners as well.

Students must be registered in the quarter in which the University oral examination is taken. Candidacy must also be valid. The Doctoral Dissertation Reading Committee form must be submitted to and recorded by the department prior to scheduling the examination. An abstract of the dissertation must be provided prior to the defense.

The University Oral Examination Schedule form is used to officially schedule the examination and includes:

- Date, time and location of the examination
- Title of dissertation
- Composition of the committee, approved by the department Chair

This form, available at
http://studentaffairs.stanford.edu/sites/default/files/registrar/files/doc_orals.pdf
should be submitted by the student to the department Student Services Officer ***at least two weeks prior to the examination date***.

Writing and Submitting the Dissertation

Students work with their advisor(s) in planning and preparing the thesis. For detailed instructions see: http://studentaffairs.stanford.edu/sites/default/files/registrar/files/docdissdir.pdf Contact the Graduate Degree Progress Office with additional questions: 723-3056.

Conferral of Degree

To be cleared for conferral of the Ph.D. or Master's degree, you must file the "Notice of Intention to Complete Advanced Degree Requirements" form via AXESS by the due date indicated on the Registrar's Office website. Check with the Student Services Officer to make sure all requirements have been met and all grades have been cleared.

Commencement Ceremony

If you wish to receive your diploma at the Commencement ceremony in June, you must file the "Notice of Intention" form. Students who do so will receive information about the ceremony from the Registrar. Please note that the deadline to file the "Notice of Intention" form changes each year. Check with the Registrar's office for the current deadline.

The Physics Department allows Ph.D. students near completion to "walk through" Commencement. This means that you may participate in the Commencement ceremonies if you plant to complete all the requirements for your degree the quarter following the commencement ceremony. To be eligible to walk through you must submit the walk-through petition, available here http://registrar.stanford.edu/pdf/walkthrough.pdf to Maria Frank at least two weeks prior to the commencement ceremony date in June.

Grades

It is your responsibility to check grades in AXESS each quarter to make sure they have been correctly reported for every term you have registered at Stanford. See your instructor about grade disputes and missing grades, and see the Student Services Officer about the procedure for

grade changes. Be sure that Incomplete ("I") and Continuing Course ("N") grades are cleared when courses are completed. “I” grades will be changed to Not Passed (“NP”) after one year.

Credit for Graduate Work Done Elsewhere (Graduate Residency Credit)

After at least one quarter of enrollment, students pursuing a Ph.D. may apply for credit for graduate work done at another institution if that work meets the established eligibility criteria. Note that transfer units cannot be used towards a Master's degree. No more than 45 units of transfer credit may be applied towards a Ph.D.

The eligibility criteria for coursework accepted for transfer credit are specified in the Stanford Bulletin. Students must complete and submit the Application for Graduate Residency Credit http://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad_res_credit.pdf which is reviewed by the department and the University Graduate Degree Progress Office.

Students enrolled at Stanford who plan to study elsewhere during their degree program should obtain prior approval of any anticipated transfer residency credit before their departure.

More Information

See the Stanford University Bulletin, http://www.stanford.edu/dept/registrar/bulletin/ and the Graduate Academic Policies and Procedures Manual http://gap.stanford.edu for further information on University requirements, grading policies, course adds, drops, withdrawals, etc.

MILESTONES

The usual schedule for physics graduate students consists of two years of course work, plus research training, leading to the dissertation and Ph.D. degree. Although there are exceptions, a well-prepared graduate student should complete the dissertation within five years after qualifying for candidacy, i.e., passing the qualifying exam, completing all course work and filing the application for candidacy.

The following are the major milestones for the Physics Ph.D. program:

First year: Pass the qualifying exam given in January of the first year.

Second year: Submit *Application for Candidacy for Doctoral Degree* by JULY 1st at the end of the second year. Candidacy is valid for five years. The Application for Candidacy is available online at http://www.stanford.edu/dept/registrar/pdf/appcanddoct.pdf .

Third year: Prepare a tentative *Proposal for Thesis Research* by JULY 1st of the third Year. There is no form for the Proposal for Thesis Research. The Ph.D. candidate may submit a 1-3 page proposal signed by the student, advisor and co-advisor (if required.) By this time all course requirements should be completed.

If a student wishes to start thesis research with an advisor outside Physics, Applied Physics, or SLAC, he/she must submit the following information to the Student Services Officer: Advisor’s name (must be an academic council member); field of proposed research and tentative thesis title; and name of co-advisor from the Physics Department. The research plan must be approved by the Graduate Study Committee. See earlier section ("Co-advisors”) for more detail).

After submitting the thesis proposal, students are required to choose a reading committee in consultation with their advisors. Reading committees consist of the principal advisor and two other readers. At least one committee member must be from Physics. See earlier section ("Reading Committee") for more detail. These three faculty members will sign the finished dissertation. Reading committee forms are available online at http://studentaffairs.stanford.edu/sites/default/files/registrar/files/doc_diss_rdg_ctte.pdf

Fourth year: Fourth-year students are required to give a 45-minute oral presentation to their Ph.D. reading committees. Generally no other people besides the student, advisor and reading committee members are present at the oral presentation.

All students must complete this requirement in the fourth year of study. Experience has proven this is an extremely reliable tool to help students stay on track to degree completion.

The purpose of the requirement is to increase contact between students and faculty members, to help students organize their thoughts, to give students practice in giving oral presentations, and most importantly to obtain feedback on the development of the thesis, approximate date of thesis completion and future plans.

These are informal meetings, and no grades are given. Students schedule the presentations themselves. By end of winter quarter of the fourth-year students should have a set date for the oral presentation.

The sessions should consist of a half-hour presentation by the student, 15 minutes of discussion between the student, research advisors and readers, and then a closed door discussion of the committee.

Fourth year oral presentation forms are available online at http://www.stanford.edu/dept/physics/academics/RA/Fourth_Yr_Oral.pdf

When 135 units have been completed, apply for Terminal Graduate Registration (TGR) status. TGR forms are available in the Physics Main Office or online at: http://www.stanford.edu/dept/registrar/pdf/tgrreq.pdf . See earlier section ("Terminal Graduate Registration Status") for more detail.

Fifth year or When Appropriate: Take the university oral exam, and file dissertation by quarterly deadline.

FINANCIAL SUPPORT

Financial Aid Information Forms

The financial aid information form is sent out via e-mail every quarter and is available at http://www.stanford.edu/dept/physics/academics/RA/PhysFinAidFormY1.pdf for first year students and at http://www.stanford.edu/dept/physics/academics/RA/PhysFinAidFormY2.pdf for students in year 2 and above.

Students use this form to indicate their intention to work as a TA and/or RA, or indicate that they have fellowship support. *There is a strict deadline by which the financial aid form must be submitted to the Graduate Student Services Officer. Late submission of forms*

may delay stipend payment and/or cause denial of the health insurance subsidy.

During the academic year, students can be paid for a 50% (full support) RA appointment which includes 8,9 or 10 units of tuition. Since it costs the same for 10 units as it does for 8, students are asked to register for 10 units every quarter in order to more quickly progress to TGR status and thus, a lower tuition rate. In Physics, students often combine smaller TA and RA appointments during the same quarter, for a total 50% appointment. U.S. citizens can work an additional 8 hours per week as graders. International students cannot work more than 50% during the academic year.

In summer quarter, students in year 2 can work a total 75% appointment and receive tuition allowance for 5 units, and those in years 3 and above can have 90% appointment and receive tuition allowance for three units, if the appointment is agreed to by their advisor. This is true for both U.S. citizens and international students.

Fellowships

Applying for fellowships is strongly encouraged. In particular, all eligible first year students who are U.S. citizens or permanent resident aliens should apply for the NSF fellowship. See the following web sites for further information on various fellowships:

National Science Foundation (NSF): https://www.fastlane.nsf.gov/grfp/
Hertz Foundation: http://www.hertzfndn.org/
Department of Defense:http://www.asee.org/ndseg/
Stanford Graduate Fellowship (SGF)*by nomination only*: http://sgf.stanford.edu/l
NASA: http://fellowships.hq.nasa.gov/gsrp/nav/
See the "Web Resources" section of this handbook for more web links to fellowship information.

Teaching Assistantships

Graduate students can apply for a position as a teaching assistant before the beginning of each quarter. We strongly recommend that first year students not teach in the autumn quarter while they are settling into Stanford, finding their first research rotation, taking classes and preparing for the qualifying exam.

The salary for 2011-12 is $4898 per quarter for 30% TA appointments, and $4082 per quarter for 25% TA appointments. Tuition allowance for a 30% TA appointment is $5034 and for a 25% TA is $4340. Head TAs, needed for the larger service courses (Physics 20 and 40 series), are paid slightly more. See Elva Carbajal, the Undergraduate Program Coordinator, for questions about teaching assistant assignments and refer to the Physics TA Handbook http://www.stanford.edu/dept/physics/academics/TA_ResponsibilitiesDoc.pdf for further information.

The department provides a teaching orientation (Physics 294) and the Center for Teaching and Learning (CTL) has an excellent orientation session in the fall, and valuable training available at any time. All TAs will receive the CTL's useful pamphlet on teaching at Stanford. See http://ctl.stanford.edu/ for more information.

Research Assistantships

Research assistant salaries in Physics for the 2011-12 academic year are as follows:

50% RA	$8132 per quarter/$1355.33 per pay period
25% & 20% RA, 1st year students	$4131 per quarter/$688.50 per pay period
25% & 20% RA, 2nd year+ students	$4681 per quarter/$780.17 per pay period
RA Supplement (for some fellowship students)	Varies depending upon fellowship

Regular graduate (non-TGR) tuition allowances for the 2011-12 academic year are as follows:

50% RA	$8680 per quarter
25% RA	$4340 per quarter
20% RA	$3472 per quarter
RA Tuition Supplement (for some fellowship students)	Varies depending upon fellowship

The federal and state governments tax salaries for virtually all current students. Foreign students may wish to consult an advisor in Payroll or at the I-Center regarding possible tax exemption based on a treaty between the US and their home countries. See the following webpage for helpful information: http://icenter.stanford.edu/taxes/tax_info.html . Foreign students receiving taxable scholarships or fellowships may claim any applicable treaty exemption by filing the appropriate forms with the Student Financial Services office.

First Year Vouchers

What are these vouchers?

A voucher is a 25% departmental research assistantship, providing 25% RA salary and tuition allowance for non-fellowship students. Students not on fellowship (NSF, SGF, etc.) can use up to two vouchers in the first year. Each voucher can be used to pay for the cost of a 25% RA for one quarter.

How long do I have to use them?

You must use the vouchers in your first year as a rotation student AND they must be used during autumn, winter or spring terms. **The vouchers are not valid during summer quarter.**

What's the purpose of these vouchers?

The vouchers are intended to help first year graduate students without fellowship support secure a rotation with the research group that he/she is most interested in and/or help relieve the financial burden for one quarter, especially the autumn quarter.

When should I use them?

The vouchers are for students without fellowship support who want to work in a research group that does not have adequate funding to support them. With a voucher, you can work as a 25% RA without having the advisor pay for your stipend if you have a 25% TA appointment for that quarter. Or if you would like to work as a 50% RA, you can have the advisor pay for a 25% RA support while using one of your vouchers.

May I use two vouchers in one quarter?

No, you may not. Each voucher must be used in combination with either RA or TA support and must be used in different quarters, during autumn, winter or spring. **The vouchers are not valid during summer quarter.**

Health Insurance Subsidy

The following enrolled grad students (who do not waive Cardinal Care) will receive the FULL health insurance subsidy, currently 50% of the quarterly cost of Cardinal Care

- Those employed as a 25% or higher RA or TA.
- Those receiving at least $2000 per quarter in fellowship stipend (non-tuition) support

Those employed as an RA or TA at less than 25%, or those who receive between $1000 and $2000 per quarter in fellowship stipend (non-tuition) support will be eligible for a PARTIAL benefit.

The FULL benefit consists of a payment of 50 percent of the Cardinal Care premium*.
The PARTIAL benefit consists of a payment of 25 percent of the Cardinal Care premium*.

Click here for a Cardinal Care Cost Table:
http://vaden.stanford.edu/pdf/CardinalCareCostandCoverageComparison2011-12web.pdf

For the purposes of calculating the amount of this subsidy, the Cardinal Care premium is defined as the cost of the 12-month coverage, divided by three academic quarters.

How does Cardinal Care subsidy work during the summer?
Students who are enrolled in Cardinal Care during the academic year will automatically be enrolled in Cardinal Care for Summer Quarter at no additional cost (whether they are enrolled as a student in the summer or not). Since in this case there is no charge for Cardinal Care during Summer Quarter, nor do students receive a Cardinal Care subsidy in Summer quarter.

In those cases, when a student was charged for Cardinal Care during Autumn, Winter or Spring but was not eligible for the subsidy during that quarter, and subsidy-eligible support (assistantship or fellowship) during the summer, the subsidy will be given to the student "retroactively" during the summer. The process for applying for a retroactive summer subsidy will be developed during summer 2010.

Visit http://cardinalcare.stanford.edu/graduate_faq.html for more detailed information about the subsidy.

Travel Reimbursement

The Physics Department offers travel fund reimbursement of up to $300 for domestic travel, or $500 for international travel, to assist Physics doctoral students traveling to professional meetings to present their research. Up to three trips are permitted using these funds during a student's academic career, **but only one trip per student may be funded each academic year**. Students who use this fund should be participating substantively in the meeting (presenting a paper or serving on a panel). Further instructions and reimbursement request forms can be found here:
http://www.stanford.edu/dept/physics/academics/RA/Grad_Travel_11_12.pdf

PAYMENT OF FELLOWSHIP STIPENDS AND TA/RA SALARIES

Fellowships

The Financial Aid Office will either directly deposit or mail checks directly to students who receive aid in the form of a University or outside fellowship at the beginning of each quarter.

Salaries

Teaching and research assistants are paid as University employees. Pay is direct deposited on the 7th and the 22nd of the month or on the preceding Friday if one of those dates falls on a weekend or holiday. The first paycheck in Autumn Quarter arrives on 10/22 for the period from 10/1 to 10/15. The 11/7 paycheck covers the period from 10/16 to 10/31. The last paycheck of the academic year comes on 7/7 for the period from 6/16 to 6/30. **Students are strongly encouraged to have paychecks deposited directly to an individual bank account. You can apply for direct deposit via AXESS. Note that students that are paid by SLAC may be subject to different rules and procedures. Check with the SLAC Human Resources Department if you have any questions.**

If you opt not to sign up for direct deposit, you can pick your check up from the main office receptionist only during regular office hours (10 a.m. - 12:00 noon and 1 p.m. - 4:30 p.m.)

All employees can view their Pay Statement online by logging in to AXESS. Holders of assistantships funded by campus (not SLAC) accounts who prefer not to pay the entire year's rent for University housing up front may sign up for Payroll Deduction. Visit the Gateway to Financial Activities for detailed information: http://fingate.stanford.edu/students/index.html

REQUIREMENTS FOR EMPLOYMENT AS AN RA OR TA

You will not receive a check for your work unless a number of requirements have been met. If you are not paid when you expect to be, the problem may be that you have failed to meet one of these conditions:

Full Time Enrollment

In order to receive pay from the university you must be registered as a full-time graduate student. This means that you must enroll in courses and/or research totaling **10** units each quarter during the academic year if not on TGR status and for the zero unit TGR course PH 802 if you are on TGR status. Enrollment levels for summer quarter will vary according to your appointment percentage.

Eligibility to work in US

- All students must have a Social Security number
- All students must have an I-9 form on file at Payroll
- Foreign students must have a current visa and passport

English Proficiency for Teaching Assistants

Foreign students for whom English is not the first language must be cleared by English for Foreign Students before they can TA. (See the "Requirements for the Ph.D." section of this handbook for further information.)

Tax declaration

All students must have submitted a form SU-32 Employee's Tax Data (includes federal and state withholding certificate).

Patent Agreement Form

If you did not complete this form via AXESS, see the Student Services Officer.

HOLIDAYS/VACATION/TIME OFF

Assistantships are "full-quarter packages" (12 weeks of either teaching or research work). Employment is for full quarters with standard start/stop dates. The start and stop dates of an assistantship are coordinated with the standard pay periods for Stanford employees, as follows:

FALL QUARTER: October 1 - December 31
WINTER QUARTER: January 1 - March 31
SPRING QUARTER: April 1 - June 30
SUMMER QUARTER: July 1 - September 30.

Note that these dates are normally different from the start and stop dates of quarters on the university's academic calendar. This timing is intended to deliver continuous salary to students appointed for multiple sequential quarters, i.e., students on assistantships are paid during the periods between quarters. **Arrangements for any variations in work hours, including time off for vacation or illness, should be made individually with the faculty sponsor.** See Administrative Guide Memo 24.2 (Graduate Student Assistantships) for detailed information:.
http://adminguide.stanford.edu/24_2.pdf

HOW TO PAY UNIVERSITY BILLS

For detailed information on the various ways to pay University bills see the University Bill Payments Methods web page.
http://fingate.stanford.edu/students/universbill/payment_methods.html#payment_plan

COMMUNITY RESPONSIBILITIES

As members of the Physics community, all students are expected to help out occasionally with special events such as our department open house, and to serve on committees. Typical physics community responsibilities are listed below by year of study:

First Year Students - Assist with open house for new admits
Second Year Students - Assist with qualifying exam preparations
Third Year Students - Assist with graduate student orientation, talk to visitors
Fourth Year and Advanced Graduate Students - Assist with various physics community events

In addition, students may volunteer or be asked to participate in:

PHYSICS GRADUATE STUDY COMMITTEE (STUDENT REPRESENTATIVES)

Three graduate students attend graduate study committee meetings and give their input concerning curriculum, teaching, and department policies.

TOWN HALL MEETINGS

These meetings are held in the fall and spring quarters to discuss student related issues and concerns.

LUNCH WITH THE CHAIR

Each year graduate students have the opportunity to meet and have lunch with the Physics Department Chair. This is your opportunity to speak to the Chair about how things are going for you. It is also a time for you to discuss the Ph.D. Program and express any concerns or suggestions for improvement that you may have.

COLLOQUIA

Colloquia are held on Tuesdays in the William R. Hewlett Teaching Center, Room 201 at 4:15pm, unless otherwise indicated.

Refreshments are served at 4:00pm in the Varian Physics Lobby. The general public is cordially invited and all Physics students are encouraged to attend.

Colloquium Speakers for Autumn 2011-12 will include:

Steve Kahn, Hideo Mabuchi	Stanford University	9/27/2011
Giorgio Gratta	Stanford University	10/04/2011
Siegfried Glenzer	Lawrence Livermore NL	10/11/2011
Mark Schnitzer	Stanford University	10/18/2011
Andrea Cavalleri	CFEL, Hamburg, Germany	10/25/2011
Hidenori Takagi	Riken, Japan	11/01/2011
Margaret Murnane	Univ. of CO, Boulder	11/08/2011
Yong-Baek Kim	University of Toronto	11/15/2011
NO COLLOQUIUM	Thanksgiving Recess	11/22/2011
TBD		11/29/2011
NO COLLOQUIUM	Finals Week	12/06/2011

Schedule may be subject to change. For up-to-date colloquium information, please check the department website: http://www.stanford.edu/dept/physics/events/ap_phys.html and/or look for the notices posted weekly in the lobby of the Varian Physics building. Email notifications will also be sent out on a weekly basis when school is in session.

BEFORE LEAVING STANFORD

- Please return all keys to the receptionist and retrieve your deposit.
- Complete a *GRADUATE EXIT INFORMATION FORM (available from Maria Frank),* submit it to the Student Services Officer and add your forwarding address and e-mail to AXESS.
- Apply for a leave of absence if you have not yet submitted your dissertation.
- File a "Notice of Intention to Complete Degree Requirements" for the quarter in which you expect to receive a degree. You may do this via AXESS

RECOMMENDED REFERENCE BOOKS AVAILABLE IN THE PHYSICS LIBRARY

The Ph.D. Process : A Student's Guide to Graduate School in the Sciences by Dale F. Bloom, Jonathan D. Karp, Nicholas Cohen, Oxford University Press (1999)

Graduate Research: A Guide for Students in the Sciences by Robert V. Smith, University of Washington Press (1998)

WEB RESOURCES

DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS
http://aa.stanford.edu/

DEPARTMENT OF APPLIED PHYSICS
http://www.stanford.edu/dept/app-physics/cgi-bin/

ASTRONOMY PROGRAM
http://www.stanford.edu/dept/astro/

STANFORD ASTRONOMICAL SOCIETY
http://www.stanford.edu/group/astronomy/

AXESS - (Requires login with SUNet ID)
https://axess.stanford.edu/

BIO-X
http://biox.stanford.edu/

BULLETIN
http://www.stanford.edu/dept/registrar/bulletin/

CENTER FOR TEACHING AND LEARNING (CTL)
http://ctl.stanford.edu/

STANFORD COURSEWORK
https://coursework.stanford.edu/portal/

DIRECTIONS FOR PREPARING DOCTORAL DISSERTATIONS
http://www.stanford.edu/dept/registrar/pdf/docdissdir.pdf

BECHTEL INTERNATIONAL CENTER
http://www.stanford.edu/dept/icenter/index.html

DEPARTMENT OF ELECTRICAL ENGINEERING
http://ee.stanford.edu/

CAMPUS EATERIES
http://www.stanford.edu/dept/visitorinfo/activities/dining.html

ENVIRONMENTAL HEALTH AND SAFETY
http://www.stanford.edu/dept/EHS/prod/ and
http://www.stanford.edu/dept/physics/facilities/safety/

EXPLORE COURSES
http://explorecourses.stanford.edu/CourseSearch/

GEBALLE LABORATORY FOR ADVANCED MATERIALS **(GLAM)**
http://www.stanford.edu/group/glam/
GINZTON LABORATORY
http://www.stanford.edu/group/ginzton/

HANSEN EXPERIMENTAL PHYSICS LAB **(HEPL)**
http://hepl.stanford.edu/

STUDENT HOUSING
http://www.stanford.edu/dept/rde/shs/

COMMUNITY HOUSING SERVICES
http://www.stanford.edu/dept/hds/chs/index.shtml

HUME WRITING CENTER RESOURCES FOR GRADUATE STUDENTS
http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/hwc_graduates

KAVLI INSTITUTE FOR PARTICLE ASTROPHYSICS AND COSMOLOGY (**KIPAC)**
http://www-group.slac.stanford.edu/kipac/

LINAC COHERENT LIGHT SOURCE (LCLS)
https://slacportal.slac.stanford.edu/sites/lcls_public/Pages/Default.aspx

LIBRARIES
http://www-sul.stanford.edu/

PHYSICS MACHINE SHOP
http://www.stanford.edu/dept/physics/facilities/shop.html

MAPS
http://www.stanford.edu/dept/visitorinfo/plan/maps.html

PARTICLE PHYSICS AND ASTROPHYSICS
http://home.slac.stanford.edu/ppap.html

DEPARTMENT OF PHYSICS
http://www.stanford.edu/dept/physics

PHYSICS DEPARTMENT EMERGENCY PLAN
http://www.stanford.edu/dept/physics/facilities/safety/PhyEmergencyplan.pdf

PULSE INSTITUTE FOR ULTRAFAST ENERGY SCIENCE
http://www.stanford.edu/group/pulse_institute/index.shtml

REGISTRAR'S OFFICE
http://www.stanford.edu/dept/registrar/

SIMPLE ENROLL
http://studentaffairs.stanford.edu/registrar/news/simple-enroll

STANFORD INSTITUTE FOR MATERIALS AND ENERGY SCIENCE **(SIMES)**
http://simes.slac.stanford.edu/

STANFORD INSTITUTE FOR THEORETICAL PHYISCS **(SITP)**
http://www.stanford.edu/group/sitp/

STUDENT FINANCIAL SERVICES
http://fingate.stanford.edu/

SLAC NATIONAL ACCELERATOR LABORATORY
http://www.slac.stanford.edu/

STANFORD SYLLABUS
https://syllabus.stanford.edu/mercury/stanford.syllabus.standalone/mercury/list_view

STANFORD SYNCHROTRON RADIATION LIGHTSOURCE **(SSRL)**
http://ssrl.slac.stanford.edu/
STANFORDWHO
https://stanfordwho.stanford.edu/lookup

STANFORDYOU - (Requires login with SUNet ID)
https://stanfordyou.stanford.edu/main/SYApp

STANFORD UNIVERSITY GRADUATE ACADEMIC POLICIES & PROCEDURES HANDBOOK (GAP)
http://gap.stanford.edu/

FELLOWSHIPS & SCHOLARSHIPS

AT&T
http://www.research.att.com/index.cfm?portal=20

DOE OFFICE OF SCIENCE GRADUATE FELLOWSHIP (**DOE SCGF**)
http://scgf.orau.gov/

HERTZ FOUNDATION
http://www.hertzfndn.org/

IBM
https://www.ibm.com/developerworks/university/phdfellowship/

NASA GRADUATE STUDENT RESEARCHERS PROGRAM (**NASA GSRP**)
http://fellowships.hq.nasa.gov/gsrp/

NATIONAL DEFENSE SCIENCE & ENGINEERING GRADUATE FELLOWSHIP (**NDSEG**)
http://www.asee.org/ndseg/

NATIONAL PHYSICAL SCIENCE CONSORTIUM (**NPSC**)
http://www.npsc.org/Applicants/Applicants/fellowshipinfo.html

NATIONAL SCIENCE FOUNDATION (**NSF**)
https://www.fastlane.nsf.gov/grfp/

STANFORD GRADUATE FELLOWSHIP (**SGF**) *BY NOMINATION ONLY*
http://www.stanford.edu/dept/DoR/Fellows/

PHYSICS DEPARTMENT DIRECTORY

Prefix for all numbers is 72 unless otherwise noted

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*PAB = Physics-Astrophysics Building

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*PAB = Physics-Astrophysics Building

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2nd Floor Conf. Room	3-0870		Varian 208
3rd Floor Conf. Room	4-6747		Varian 355
Lab, Advanced	5-2374		Varian 406
Tutoring Ctr & Lab, Beginners	736-7230	*PAP Sub-basement	S08,S12,S16,S17
Observatory	322-3579	92 Alta Road	12-070
Library - Ota, Stella	3-9763	skota@stanford.edu	Huang Eng. Ctr 2nd Flr
Machine Shop	3-2679, 5-2327		Varian 001
Hewlett Mgr-Hudges, Ryan	387-7742	rhudgens@stanford.edu	Hewlett 111D
Health & Safety Hot Line	723-8410		
Classroom Technician	3-7280	class.tech.support@stanford.edu	Registrar - ITTech
Lunch Room	736-0805		Varian 109

Physics Emergency Hot Line 5-0961 SUPolice Department 3-9633

*PAB = Physics-Astrophysics Building

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