

DEPARTMENTAL REQUIREMENTS FOR THE Ph.D.

A. *Timetable*

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 exceptions can occur, a well-prepared graduate student should complete the dissertation within five years after entering the program.

Some checkpoints during the graduate program are:

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

Second year: Admission to candidacy by July 1 of the second year.

Third year: Prepare a tentative proposal for thesis research by January 1 of the third year. Complete all course requirements.

Fourth year: Give 45-minute presentation to reading committee by June 1 of the fourth year.

Fifth year: When 10.5 residency credits have been accrued, apply for TGR status. Take University oral exam, then file dissertation.

B. *Academic Requirements for the Ph.D.*

- Course requirements

Passing the course at Stanford, or passing the equivalent course elsewhere may fulfill these requirements: Physics 210, 211, 212, 220, 221, 230, 231, and 232, 290, and 294.

Students must also take one course in at least two areas of physics chosen from courses numbered above 232 (except 290 and 294). A “B” average must be maintained for all department requirements.

To waive courses in fall quarter, meet with your first-year advisor. Provide the advisor with a copy of a transcript (or description) of the course used to replace one of the Stanford courses. After receiving approval from the first-year advisor, give the petition (plus the transcript or description) to the student services manager, who will pass it on to the Director of Graduate study for final approval. This procedure may change after fall quarter; details will be sent by email.

- Mathematics

All Ph.D. candidates should have math proficiency equivalent to the following Stanford Courses: Math 106, 113, 114, 130, and 131. Advanced math courses are especially useful for theoretical work.

- **Qualifying Exam**

Physics students are required to take the comprehensive examination given in January of the first year. The closed-book exam is given over two days. Six hours are allotted to solve four problems on each day.

The subject matter tested includes particle mechanics, thermodynamics and statistical mechanics, special relativity, general physics (related to experiments), quantum mechanics (two questions) and electrodynamics (two questions). The level will be that of Stanford undergraduate physics courses, and the objective is to test knowledge of basic principles and physical intuition.

Students are allowed to re-take the exam in the following year if they fail it the first time. If a student fails again, he/she will be required to take an oral exam one-month later. If the student fails the oral exam, he/she will be asked to complete the terminal Master's degree and leave the Ph.D. program.

- **Advancement to Candidacy**

See attached "cheat sheet." Candidacy is valid for five years.

- **Proposal for Thesis Research**

Students are required to submit a tentative thesis research proposal by January 1 of the third year, signed by the student and advisor. If a student wishes to start thesis research with an advisor outside of Physics, Applied Physics, or SLAC, he/she must submit the following information to the student services manager: 1. advisor's name (must be an academic council member), 2. field of proposed research and tentative thesis title, 3. name of co-advisor from the Physics Department. If the Graduate Study Committee approves the research plan, the co-advisor is required to participate in the University oral exam.

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 member must be from Physics. These three faculty members will sign the finished dissertation.

- **Fourth Year Oral Presentation**

Students are required to give a 45-minute oral presentation to their reading committees by June 1 of the fourth year. This is meant to be an informal meeting between the student and the reading committee to obtain feedback and ideas early in the development of the thesis. The session should consist of a half-hour presentation and at least 15 minutes of discussion.

- **Teaching Requirement**

Three quarters of teaching (included a demonstrated ability to teach) are a Requirement for the Ph.D. in physics.

- **Writing the Dissertation**

Work closely with your advisor(s) in planning and preparing the thesis. Contact the Graduate Degree Progress section of the Registrar's Office with additional questions (650-723-2041, registrar@leland.stanford.edu).

- **The University Oral Examination**

The oral examination is a defense of the student's dissertation, and in most cases is based on a relatively complete dissertation draft. Students must be registered in the quarter in which the oral exam is taken.

The oral exam committee consists of at least five Stanford faculty members: four examiners and the outside "outside" chair. All members are normally on the Stanford Academic Council, and the chair must be a member. The outside chair may not have a full or joint appointment in the adviser or student's department, but may have a courtesy appointment in that department. The chair can be from the same department as other members of the committee and can be from the student's minor department.

The student and the advisor find the "fourth member" and the outside chair for the oral exam. Although the department cannot require the candidate to approach faculty members to serve as chair, many departments invite students and their advisers to participate in the process of selecting and contacting potential chairs.

The Physics Department requires that a typed draft of the thesis, including clear sketches of all figures in proper order, must be provided to the members of the orals committee seven days before the scheduled exam. The chair must be given an abstract at least one week before the exam.

The exam will be held in the form of a one-hour public seminar followed by private questioning, covering the field of research and its associated background. A draft of the thesis must be provided to the members of the reading committee and the additional examiner seven days prior to the scheduled exam. The chair must be given an abstract at least one week before the exam.

One week before the exam, the student gives the student services manager the oral exam form signed by the chair. The student services manager will prepare a file for the chair, which must be returned to the main office as soon as possible after the exam.

UNIVERSITY REQUIREMENTS FOR THE Ph.D.

A. *Registration and Residence Requirements*

- **Continuous Registration**

Students must register for each quarter of the academic year (excluding summer) from matriculation until receipt of the degree. The only exception is for officially approved leaves of absences and the “grace quarter” described below.

No official departmental or University requirement, e.g., the University oral examination, may be met while a student is not registered. Students must be registered in the quarter in which the degree is conferred, with the following exception: You may, without being registered, submit the dissertation or file a “Notice of Intention to Complete Degree Requirements” in the quarter immediately following the last registration. If you are not able to file your dissertation during the grace quarter, you must file for a leave of absence. A lapse of registration without leave requires a reinstatement procedure with the Graduate Admissions office.