Guide for Graduate Students

University of Notre Dame
College of Science
Department of Physics

Table of Contents

Physics Graduate Program

The purpose of this guide is to explain the rules and procedures of the Department of Physics as they pertain to physics graduate students. This guide is the first source of information on department policies for both graduate students and those who work with the graduate students. The second source of information is the Director of Graduate Studies (DGS). The department office also helps with routine questions related to paperwork or forms.

The graduate program in physics is research-oriented. For that reason, the department does not normally accept students who plan to terminate their studies with a master's degree. Every beginning graduate student is considered a potential Ph.D. candidate who will complete a dissertation based on original research conducted under the direction of a faculty advisor. Thus, this guide is directed primarily to physics graduate students who are working towards a Ph.D.

The organization of this guide is as follows. A variety of topics, from general to specific, are addressed under section headings. In Part I, the guide starts with summaries of Ph.D. and master's requirements, respectively. Next, details are provided on such topics as required courses, how to take courses, schedules, advisors, and the qualifying and oral and written candidacy examinations and the Ph.D. defense. In Part II, basic policies are discussed, starting with financial support and its relationship to being in good standing as a student. Procedures for taking classes followed by general policies and procedures for the Graduate School, the university, and the department are then listed. An appendix discusses the awarding of transfer credit to students who enter the university with advanced standing.

Part I
The Program

Summary of Ph.D. Requirements

Course Work and Credit Hours

The Department of Physics requires 36 credit hours of course work for the Ph.D. degree. These credits are met through the core course requirement, the breadth requirement, and by taking research in at least three semesters (see Course Requirements).

Foreign Language Requirement

The Department of Physics does not have a foreign language requirement for the Ph.D. degree.

Residency

The minimum residence requirement for the Ph.D. degree is full-time status for four consecutive semesters (may include summer session).

Degree Eligibility

Students must fulfill all doctoral requirements, including the dissertation and its defense, within eight years from the time of matriculation. Failure to complete any of the Graduate School or departmental requirements within the prescribed period may result in forfeiture of the student's degree eligibility.

Required Examinations

There are three required examinations for Ph.D. students. First, students must pass the department's qualifying examination before the end of the second academic year. Second, students must pass the written and oral candidacy examinations by the end of the fourth academic year. Next, Ph.D. students are expected to defend their dissertations by the end of the sixth academic year. Finally, it is Graduate School policy that all students must fulfill all doctoral requirements, including the dissertation and its defense, within eight years from the time of matriculation.

A helpful way to remember the deadlines for these examinations is the "even-year" rule. Every two years there is a hurdle to clear: By two years, the qualifying examination; by four years, both candidacy exams; by six years, the defense (students lose eligibility for holding a teaching-assistant position after six years); and by eight years, the degree (students lose eligibility for a Ph.D. degree after eight years). Note that a failure to meet one of these deadlines may be severe (dismissal, loss of funding, or loss of degree eligibility).

Summary of Masters Requirements

Introduction

The graduate program in the Physics Department is research-oriented. For that reason the department does not normally accept students who plan to terminate their studies with a master's degree. Every beginning graduate student is considered a potential Ph.D. candidate who will complete a dissertation based on original research conducted under the direction of a faculty advisor.

Thus, there is no option in the Physics Department for a research master's degree. Master's degrees are earned instead through the combination of course work and the master's comprehensive examination.

Course Work and Credit Hours

The Department of Physics requires 30 credit hours of course work for the master's degree. These credits are chosen from courses taken as part of the Ph.D. core curriculum. Students in a research program may include up to 6 credit hours in research courses in their master's program.

Foreign Language Requirement

The Department of Physics does not have a foreign language requirement for the master's degree.

Residency

The minimum residency requirement for the master's degree is registration in full-time status for one semester during the academic year or for one summer session.

Degree Eligibility

Failure to complete all requirements for the master's degree within five years results in forfeiture of degree eligibility.

A master's program that is pursued during the summer and the academic year must also be completed within five years.

Master's Comprehensive Examination

The master's comprehensive examination in the Department of Physics is an oral test on material covered in the basic graduate courses. The governing board consists of the research advisor of the student and two other faculty members. A majority vote of the three examiners decides the outcome. One retake is permitted if recommended by the board. The student is immediately informed of the results of the examination.

Award of Master's Degree to Doctoral Students

A doctoral student may receive the master's degree without taking the master's comprehensive examination on the recommendation of the department and completion of: (1) the 30 credit hours

required by the department for the master's degree; and (2) all parts of the doctoral candidacy examination. (By passing the doctoral candidacy examination, the student is also considered to have passed the master's comprehensive examination.) Post-candidacy Ph.D. students should see the DGS to discuss this option.

Ph.D. Course Requirements

For new students entering the department in the Fall of 2010, the standard curriculum for the first two years of graduate study consists of eight required courses (the "core"), six mini courses on research areas found within the department (the "breadth requirement"), and one research-area course. Syllabi for these courses are available through the department web site. The courses are as follows:

Required Core

- PHYS 70003: Mathematical Methods of Physics
- PHYS 71010: Methods of Experimental Physics
- PHYS 70005: Classical Mechanics
- PHYS 70007: Quantum Mechanics I
- PHYS 70008: Quantum Mechanics II
- PHYS 70006: Electromagnetism
- PHYS 80001: Electrodynamics
- PHYS 80002: Statistical Thermodynamics

These courses are all 3-credit courses and are graded with a letter grade.

Breadth Requirement

- PHYS 70200: Introduction to Astrophysics
- PHYS 70300: Introduction to Atomic Physics
- PHYS 70400: Introduction to Biophysics
- PHYS 70500: Introduction to Condensed Matter Physics
- PHYS 70600: Introduction to Elementary Particles Physics
- PHYS 70700: Introduction to Nuclear Physics

These courses are all 1-credit courses and are graded satisfactory or unsatisfactory and will not have a final examination. These six courses will be taught sequentially during the academic year, three in the fall semester and three in the spring semester.

Research-Area Course

Six areas of research are presently recognized within the department. With the assumption that at least two new students are entering each area, the six research areas will offer at least one course per year introducing the students to the research area. While the research groups will be responsible for content, the level will typically be set by requiring pre-requisites from the core curriculum. Some groups may choose to provide two different courses, alternating years.

As of Fall 2010, the following are the options for research-area courses:

Astrophysics

- PHYS 80202: Astrophysics: Stars
- PHYS 80203: Astrophysics: Galaxies
- PHYS 80204: Cosmological Physics

Atomic Physics
- PHYS 80301: Atomic Physics

Biophysics
- PHYS 80401: Biophysics

Condensed Matter Physics
- PHYS 80501: Solid State Physics
- PHYS 80502: Soft Condensed Matter Physics
- PHYS 90503: Quasiparticles in Condensed Matter Physics

Elementary Particle Physics
- PHYS 80601: Elementary Particles Physics

Nuclear Physics
- PHYS 80701: Nuclear Physics

Transition to the New Curriculum

Graduate students who entered the program on or before January 2010 will be offered the choice of fulfilling the new breadth and research-area requirements, as described above, or the older breadth requirement, as described in the *2009-10 Graduate Guide*.

New students entering the department in the Fall of 2010 will be expected to take all six introductory breadth courses in their first year of graduate studies. In exceptional circumstances, the breadth courses can be postponed by one year or a student can seek to cover the breadth requirement by taking three research-area courses, including one from their own area of research and one each from two other research areas.

At the discretion of the DGS and with the approval of the research advisor, another course in another area (such as general relativity or a course in another department which will be helpful to the student's research) can be used to fulfill the research-area requirement in the student's chosen area. This exception can be requested when fewer than two students enter a research area in a given year or when the subject of a student's research is not covered by the standard research-area courses.

Statement on Advanced Electives

The department strongly encourages graduate students to take one or more advanced electives, e.g., General Relativity, Quantum Field Theory I and II, courses from their own and other areas of physics, and graduate electives from other departments of the university. Usually, the student should complete requirements before taking advanced electives.

Decisions on the offering of elective courses are typically made by the course offerings committee at the time when fall and spring semester course schedules are developed, typically January for the fall semester and early September for the spring semester. Graduate students can communicate their interest in physics advanced electives through petition to the course offerings committee. The signers of the petition thus indicate their willingness to take a new course if offered.

Graduate students who are interested in taking an extra elective course should discuss their interest with the DGS and their research advisor. The DGS's written approval must be obtained before the department will approve the use of tuition credit for any extra elective course.

Research Courses

Research must be taken on at least three separate occasions. (Most students take a research course every single semester after their first.) Only 1 credit can be counted towards course requirements per semester. The total credits required are 3. Choices for research courses include:

- PHYS 98698: Research and Dissertation
- PHYS 98699: Research and Dissertation
- PHYS 98700: Non-resident Research and Dissertation

(The differences between these three courses are discussed under the section on schedules below.)

Course Schedule

Schedule for First- and Second-Year Students

The following is the course schedule for most physics graduate students for the first two years of graduate study:

First Year, Fall Semester

Colloquium	0 credit
Mathematical Methods of Physics	3 credits
Classical Mechanics	3 credits
Quantum Mechanics I	3 credits
Introduction to Astrophysics (S/U)	1 credit
Introduction to Atomic Physics (S/U)	1 credit
Introduction to Biophysics (S/U)	1 credit
Total	**12 credits**

First Year, Spring Semester

Colloquium	0 credit
Electromagnetism	3 credits
Quantum Mechanics II	3 credits
Methods of Experimental Physics	3 credits
Seminar	2 credits
Research and Dissertation	1 credit
Introduction to Elementary Particle Physics (S/U)	1 credit
Introduction to Nuclear Physics (S/U)	1 credit
Introduction to Condensed Matter Physics (S/U)	1 credit
Total	**15 credits**

Second Year, Fall Semester

Colloquium	0 credit
Electrodynamics	3 credits
Statistical Thermodynamics	3 credits
Research-area course or elective	0-3 credits
Seminar	2 credits
Research and Dissertation	1 credit
Total	**9-12 credits**

Second Year, Spring Semester

Colloquium	0 credit
Research-area course or electives	0-9 credits
Seminar	2 credits
Research and Dissertation	1 credit
Total	**3-9 credits**

Students who enter with advanced standing will follow a modified schedule and generally take at least three 3-credit classes per semester until the core curriculum requirements are met.

Notes on Courses

(1) Every semester students will register for (and are expected to attend) the weekly general physics colloquium, PHYS 73000. No course credit is given for this.
(2) All of the three-credit courses listed above are part of the required course curriculum for the Ph.D. degree (see Course Requirements list above).
(3) Starting in the spring semester of the first year, students will take at least one credit of graded research, PHYS 98698, per semester. The appropriate research course to take is the section of PHYS 98698 assigned to the student's research adviser.
(4) Please note the distinction between PHYS 98698 and PHYS 98699! PHYS 98698 is *graded* research and is taken by *pre-candidacy* students. Students are permitted to register for *no more* than a total of six credits of Physics 98698. (Students who have exceeded this limit or who have passed their candidacy exams take PHYS 98699 and receive grades of either satisfactory or unsatisfactory (S/U).)
(5) Once a student starts taking research, then the student is also required to take the corresponding research-seminar course. Choices include:

PHYS 83200:	Astrophysics Seminar	2 credits
PHYS 83300:	Atomic Physics Seminar	2 credits
PHYS 83500:	Condensed Matter Seminar	2 credits
PHYS 83600:	Elementary Particles Seminar	2 credits
PHYS 83700:	Nuclear Seminar	2 credits

Schedule for Third- and Fourth-Year Students

In the third and fourth year of graduate study, most physics graduate students have completed their core requirements and then take courses according to the following schedule:

Fall or Spring Semester

PHYS 73000: Colloquium	0 credit
PHYS 83X00: Seminar	2 credits
PHYS 98699: Research and Dissertation	1 credit
Total:	**3 credits**

Also scheduled in the third or fourth year is the student's candidacy examination. (For details, see the section entitled Ph.D. Candidacy.)

Schedule for Fifth-Year and Beyond Students

In the fifth year of graduate study and beyond, students only take 1 credit of PHYS 98699 or PHYS 98700 with their research adviser.

Fall or Spring Semester

PHYS 98699: Research and Dissertation 0-1 credit
or

PHYS 98700: Nonresident Research and Dissertation	0-1 credit
Total:	**1 credit**

PHYS 98700, Nonresident Dissertation, is taken by those students who are not residing in the area -- for example, by students living near and working at CERN. PHYS 98700 must be taken if a nonresident student wishes to retain degree status.

Also scheduled in the final semester is the student's Ph.D. defense. (For details, see the section entitled Doctoral Dissertation and Defense.)

Summer Session

Continuing physics graduate students typically do not enroll in or register for physics courses in summer session. The University continues to allow them access to facilities and services from May to August without enrolling in and registering for academic credit in the summer session. Summer tuition support for extra classes (e.g., English as a Second Language) can be requested through the Graduate School.

Note: Terminating master's or Ph.D. students who expect to obtain their degree during the summer session must register and enroll for at least one credit (usually PHYS 98699) in the summer session.

Advisors and Research Committees

Research Advisors and Co-Advisors

Research advisors are chosen from the list of the regular teaching and research (T&R) faculty of the department, including concurrent T&R faculty. A list of eligible faculty is posted on the student section of the department web site. Of course, the likelihood that someone on that list will accept a graduate student will depend on their research funding and activity level and their assessment of the qualifications of the graduate student.

It is expected that all students will make at least a tentative choice of a research advisor by the start of the second semester of graduate study. To facilitate the choice of a research advisor, in the fall semester, the DGS organizes a series of talks, the "research orientation seminars," in which professors in the department describe their research to the first-year class. Attendance of this program is mandatory. Students are also encouraged to talk individually to professors about research opportunities in the group and future opportunities for research assistant positions. Recognizing the importance of the research advising relationship, the department requires the student and the advisor to commit to each other by signing a research advisor contract (Appendix A), which is given to the DGS for the department's record. For first-year students, no research advisor contract may be signed until after the presentation of all of the research orientation seminars.

An increasingly common option is for the student to select two research advisors, or "co-advisors." The two advisors may both be regular T&R faculty in the department, or may include one T&R faculty from the department plus a second researcher chosen from the physics research or emeritus faculty, from the faculty in another department or unit of the university, or a researcher chosen from outside the university. In the latter case, the external co-advisor must also be approved by the Committee on Advancement of Promotions (CAP). The DGS will initiate the approval process by requesting a CV and passing it on to the CAP. If a co-advisor is chosen, all parties (that is, both co-advisors and the student) must sign the research advisor contract.

Research advisor responsibilities include the suggestion of possible research problems and guidance and direction in the chosen problem. Research advisors will also advise the student on courses to supplement the required curriculum. They are expected to guide the student in professional development and to seek or provide the funding required to support the student (in the summer and also as soon as possible after the student's course work is complete). Research advisors give feedback to the student through regular research meetings and grades in the research and dissertation course. If the student has co-advisors, the co-advisors will determine a system for jointly grading the student (e.g., a joint decision on the research grade or perhaps alternation of research sections between the two research advisors).

A frequent question with co-advisors concerns the roles and responsibilities of the two advisors. The following terminology is introduced to discuss this. At least one of the two advisors must be on the T&R faculty in the student's department; this advisor is denoted the "home-department

advisor." The second advisor may also be a "home-department advisor," but if the second advisor is not on the T&R faculty in the student's department, then this person will be called an "external advisor." A second designation, "primary advisor," is used to denote the advisor primarily responsible for the student's research. The primary advisor is generally the one who provides office or laboratory space and funding to the student. Primary advisors can be either home-department advisors or external advisors. There is no requirement that a primary advisor be designated, that is, it can be the case that the co-advisors take near equal roles in supporting and mentoring the student. Questions of research attribution should follow normal standards in research, e.g., papers submitted to journals and presentations at conferences should only include those who were actually involved in the research work. The home-department advisor always must assume the role of making sure that academic requirements are completed by the student according to the rules of the department. An external advisor should clearly understand that the jointly shared student is a Physics graduate student, following the requirements and policies of the department as described in this guide, e.g., the student's required physics curriculum should be completed before electives are taken from the external advisor's department. Both co-advisors will be equal partners in the students written and oral candidacy exams and the PhD defense, e.g., both ideally would contribute questions to the written candidacy exam. Both advisors will sign the final dissertation, so both will need to be in support of the work presented in the dissertation. And if there is a recognized primary external advisor, then the student's department chair may ask that advisor to assume responsibility for the support of the student, e.g., in the summer and after courses are complete. Clearly, both co-advisors should thoroughly discuss their roles before signing a co-advisor research contract.

The following are anticipated situations where the research contract may need to be re-negotiated or broken:

Voluntary change of research advisors or research area by the student. The initial choice of research area and an advisor by a student is considered to be somewhat tentative, requiring evaluation by all for an initial period of time. A six-month trial period is common; for theory students, the trial period might go through the end of the second year. If during this period, the student decides to change areas and/or advisors, common courtesy demands that the student first notify the current research advisor that they are thinking of a change. Changes of research advisor sometimes occur after the second year, but the new advisor and the student must both recognize that the student's "clock" does not restart after the change; a prime consideration should thus be how to accomplish the change without impacting greatly the student's time to degree. After the third year, if there is serious difficulty with a research advisor, a change can still be made, but a change of research groups will be problematic. It will be at the discretion of the DGS, chair, and new research advisor whether previous invitations to take candidacy or results of previous candidacy exams still hold for the new research situation. It is extremely important that funding opportunities be considered when making a change, since the department will not be obligated to provide support beyond what was promised when the student was first admitted. In all cases, after a new research advisor has been found, a new research advisor contract should be signed and filed with the DGS. The new research contract must include a releasing signature from the previous research advisor. This signature indicates that the change of research advisor has been discussed.

Termination of a research advisor contract by a research advisor. The research advisor contract implies significant responsibilities for the advisor, including mentoring in research and the securing of some sort of funding for that student (TA, RA, or fellowship). For the student, the research advisor contract implies a work commitment and a sacrifice of time and energy for the goal of obtaining research experience and an expected future PhD. So if there is a situation where the research advisor contemplates the termination of the student's contract, this must be handled in a professional way. This includes a history of clear communication of expectations by the advisor to the student. If there is dissatisfaction with the student's research performance, the student must be told how to improve and be given time to improve. It is recommended that the research advisor document the warning in writing. If the student has not been performing adequately in research, the student's research grades should reflect this. If the advisor ultimately decides to terminate the student, a notification of the breaking of the research advisor contract must be given to the chair and the DGS so that the student's future in the department can be discussed.

The "Divorce" of Co-Advisors. Either the student or the co-advisors may decide to terminate the co-advising contract. In the case that co-advisors decide to divorce, the first question to address is which co-advisor assumes sole responsibility for the student. Generally, this will be the primary advisor, but, of course, the student has a strong say in this. If the primary advisor is also external, a breaking of the research advisor contract would then leave the student without a home-department advisor. A solution to this dilemma is that the external advisor can request that either the DGS or the department chair assume the role of the home-department advisor. It is best if all "divorces" can be amicably solved, but if this is not possible, the organizational chart of the university and its reporting lines will be used to find an arbitrator for the problem (department chair, dean, or provost or perhaps an officer in the Office of Research).

Research Committees

In the course of Ph.D. studies, students will be assigned committees to assist them in the different phases of graduate work. During the first two years of study, the student may consult periodically with an informal committee consisting of the DGS and the current instructors in the Physics core. These people will help place students in appropriate courses, monitor their progress in them, and assist them, especially during the first semester.

Each post-candidacy student will be assigned to a research committee consisting of the research advisor and at least two other faculty members able to discuss the research problem chosen for the dissertation. The research committee is generally the same as the oral candidacy examination committee. These faculty members will also normally be among the readers of the completed dissertation, and thus will also be the examination committee for the Ph.D. defense.

The research committee will meet annually with the student to monitor progress and to aid in advising when research difficulties are faced. (Attempts should be made by the student to schedule the meeting with the entire committee, but in the event of scheduling difficulty, the meeting can be held with just two of the three members of the research committee present.) The purpose of the meeting is to give the research committee information on the student's progress in research. Topics to be covered include: (1) The student's achievements for the year; (2) The goals for the student for

the next year; (3) What the advisor(s) and students will be doing to achieve the goals; (4) Whether there is anything that the research committee can do to help; and (5) What is a realistic goal for finishing the Ph.D.? In the last part of the meeting, the advisor will be asked to leave the room, giving the student an opportunity to discuss possible advising problems with the committee without the advisor being present. A summary of the research meeting (a form is being developed in Fall 2010) will be given to the DGS for the department's records.

The student or the research advisor can request that the research committee meet more frequently than annually and can ask the DGS to sit in on the research meeting. Twice-a-year research committee meetings are recommended for students in their sixth year and beyond.

Qualifying Examination

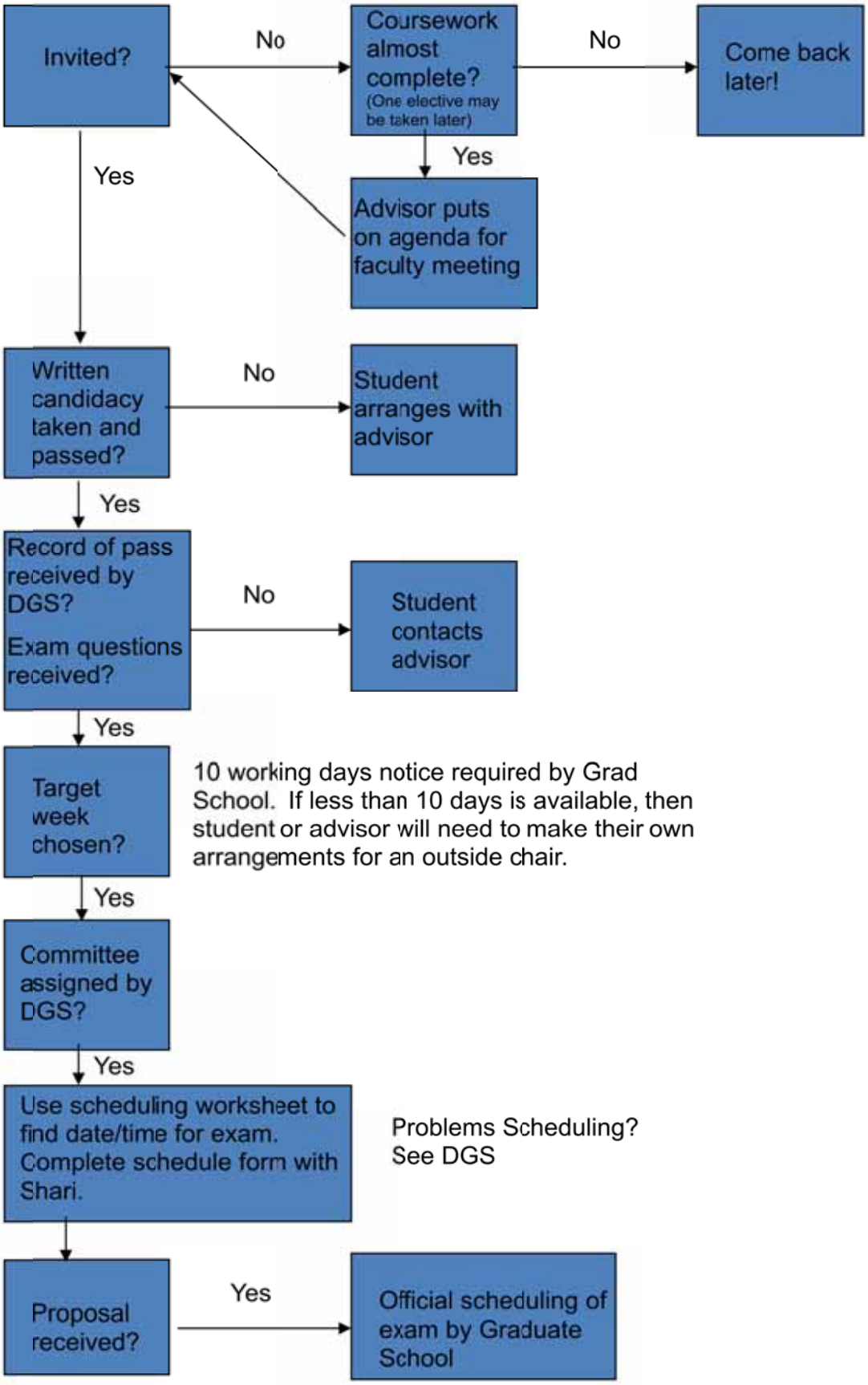
Students are required to pass a written qualifying examination on undergraduate physics prior to being invited to take the Ph.D. candidacy examination. This examination is in two parts. Each part will be offered once on different Saturdays in the fall and spring semester. Each failed part of the examination must be taken each time it is offered until the student has passed the entire qualifying examination. The student must pass both parts of the qualifying examination by the end of the second year of residence in order to continue in the program.

The first part of the examination contains questions similar to or from volume 1 of the text *Physics* by Halliday, Resnick, and Krane, 5^{th} edition; the second part is based on volume 2 (extended) of the same text. These texts are available through the publisher, John Wiley and Sons (2002), ISBN 0-471-32057-9 and 0-471-40194-3. They are also stocked in the bookstore on campus.

Each part of the qualifier is a four-hour written examination. Each question is graded independently by two faculty members on a scale of 0.0-4.0, with 3.0 being a Ph.D. pass. Scores on the examination are reported to the DGS, who then notifies each student of his or her results.

On an experimental basis, in the summers of 2003-2005, graduate students (including new students) were offered the chance to take a qualifier preparation course, PHYS 77031-77032 (information available through the department's web site). This course was not offered in 2006 but was offered to new domestic and continuing graduate students in 2007-2010. Students who participate in these courses were given one "free" chance to take a section of the qualifying examination. These examinations were given at the end of each course. Depending on interest, resources, and availability of faculty, this course may or may not be offered again.

Candidacy Exam Scheduling Flow Chart



Ph.D. Candidacy

Invitations to Candidacy

Students normally take the Ph.D. candidacy examination in the fall of the third year, although arrangements may be made to take the examination at other times during the year if circumstances dictate this. Students who, without good cause, delay taking the candidacy examination may find themselves without stipend or tuition support.

Students must be invited by the department to take the candidacy examination. The following are the Department of Physics requirements that must be completed before students can be invited by the department to take this examination:

- The student must have passed both parts of the qualifying examination;
- The student must have passed the courses in the core curriculum
- The student must have a grade point average (GPA) of at least 3.000. This GPA will be the average of the core courses, plus a maximum of 6 credits of PHYS 98698 (Research) for which a letter grade was given. If the student entered the department with advanced standing, those courses from which the student was exempted will be deleted from the above set. For an advanced-standing student, the GPA for invitation to the candidacy examination will be computed on the basis of the remaining required courses taken in the department plus 6 credits of PHYS 98698;
- The student must have a positive recommendation from the research director.

The faculty of the department meets at least once a year to consider invitations to candidacy for the graduate students. Research directors of candidate students are expected to attend this meeting. Students who have completed almost all requirements, except 3 credits of breadth course(s), will still be considered for invitation for candidacy, contingent on completion of the requirement. The primary faculty meeting for invitations to candidacy occurs in early May, after spring grades are available. Invitations to candidacy may also be considered at September and January faculty meetings.

Written and Oral Candidacy Examinations

The Ph.D. candidacy examination consists of two parts. The written examination is given first. This examination, which is four hours in length, is confined to the student's area of specialization. Once the candidate has completed the written examination, copies of the questions are made available to all faculty members and to interested graduate students. (Starting fall 2003, after a written examination is administered, a copy of that examination is filed in a notebook. This notebook is made available to students through the department office.) Each question is graded independently by two faculty members on a scale of 0.0-4.0, with 3.0 being a Ph.D. pass. Scores on the examination are reported by the advisor to the DGS and the student.

After the student has passed the written examination, then the student can take the oral examination. Prior to taking the oral examination, the student must submit an outline (consisting of about two single-spaced typewritten pages) of the proposed dissertation research problem. The contents of this

research proposal must be mutually agreed upon by the student and the research director. The research proposal should clearly and concisely state the research problem, the research methods to be applied for its resolution, anticipated difficulties (and techniques for coping with these), and conclude with a few citations to the relevant research literature. Since the fall 2003, copies of research proposals have been filed in a notebook available to students through the department office. Recent copies of research proposals are also made available to the department at the office's front desk.

The DGS helps the student in scheduling the oral candidacy examination. The DGS also consults with the research advisor and the student on their preferences for faculty for the oral candidacy examination, and then makes the final choices of members. A typical committee includes two faculty from the same research area as the advisor plus one faculty from outside the research area. For interdisciplinary students, one of the two faculty members from the student's research area can be from outside of the department. Committee members are normally chosen from the teaching and research faculty of the university, although if approved by the department's CAP, a faculty member from another institution may also be appointed to the committee.

The Graduate School finds the outside chair for the examination and then officially schedules the examination. Note, the Graduate School requires a minimum of ten business days to schedule the examination. If less that 10 days are available, then the student or advisor will need to make their own arrangements for an outside chair. Since the outside chair represents the Graduate School, it is expected that the advisor will apply the same standards for finding the outside chair as the Graduate School would, e.g., the outside chair should not have a collaborative relationship with the student or research advisor.

The oral examination takes approximately two hours. It starts with a 30-minute presentation by the student of the research proposal. The student or advisor may invite guests to this presentation, but the guests are excused from the examination once the questions begin. The student is first questioned on the research proposal by the examining committee. General questions from other areas of physics will also be asked during a second round of questions during the oral.

Only one committee member is allowed to participate in the examination from a distance (e.g., by web cam or teleconferencing). Arrangements for distance participation must be cleared in advance of the examination with the DGS.

The purpose of the oral candidacy examination is to certify that the student has sufficient command of background material and techniques to ensure successful completion of the proposed dissertation. The oral examination is voted upon (pass/fail) by the four-member examining committee immediately after the examination, with a simple majority deciding the outcome of the pass/fail vote. If the committee has five members (e.g., including the co-advisor), four votes are required to pass. A passing of this examination constitutes approval of the dissertation proposal.

In case of failure in either or both parts of the doctoral candidacy examination, the department chair, on the recommendation of a majority of the examiners, may authorize a retake of the examination. An authorization for retake must be approved by the Graduate School. A second failure results in forfeiture of degree eligibility and is recorded on the candidate's permanent record.

Admission to Candidacy

Once the student has satisfactorily completed all course requirements, and passed the written and oral candidacy examinations, the student is admitted to candidacy. A student who has not completed the physics breadth requirement before taking the candidacy examinations will not be formally admitted to candidacy until requirement is complete.

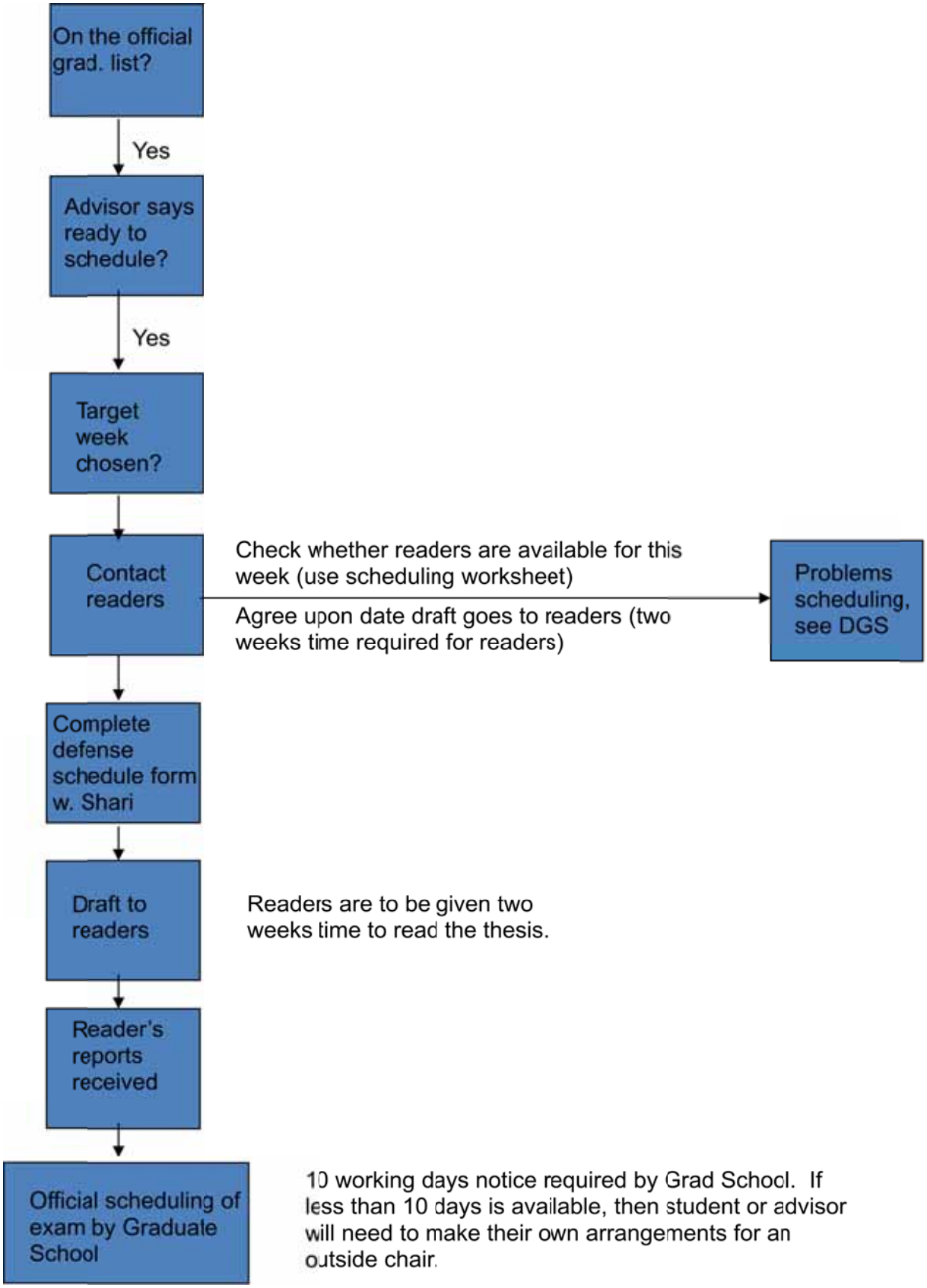
Admission to candidacy for a physics graduate student implies that all formal requirements for the Ph.D. have been completed with exception of the dissertation.

Admission to candidacy is a prerequisite to receiving any graduate degree. To qualify for admission to doctoral candidacy, the student must:

- Have provided proof of the conferral of an undergraduate degree;
- Be in a doctoral program;
- Have been continuously enrolled in the program;
- Have passed the qualifying examination;
- Have completed the required core curriculum with a cumulative average of 3.000 or better;
- Have passed the written and oral parts of the doctoral candidacy examination.

There is a form for applying for admission to candidacy. The DGS and Physics Department office will help students prepare this form after the oral candidacy examination has been passed.

Defense Scheduling Flow Chart



Doctoral Dissertation and Defense

Doctoral Committee

The DGS will appoint a dissertation committee consisting of the dissertation director and three readers. Normally, the committee is drawn from the membership of the student's oral candidacy committee and is the same as the student's research committee.

In the event that the candidate's dissertation director departs the University, an additional co-director from among the regular teaching and research faculty will be appointed to the dissertation committee. In exceptional circumstances, the department, by faculty vote, may recommend to the Graduate School that the former faculty member remain the sole advisor. Note, co-directors cannot serve as readers, so if there are co-directors, the student's committee's size is increased by one in number.

Doctoral Dissertation

The candidate delivers typed copies of the finished dissertation to the three readers.

The Graduate School will check dissertations to ensure that they conform to the UMI guidelines for formatting. (See the Graduate School website for details.) Beyond these minimum requirements, the Graduate School requires that students use the formatting guidelines of their discipline. Since the Department of Physics does not yet have its own established formatting guidelines, the department will continue to follow the guidelines in the *Graduate School's Guide for Formatting and Submitting Dissertations and Theses*. The Guide, plus a sample LaTeX document, are available at the Graduate School office or through its web site.

Readers normally have two weeks to read the dissertation, decide whether it is ready to be defended, and so indicate on the reader's report form to the Graduate School. Reader approval of the dissertation for defense does not imply reader agreement or support; it implies reader acknowledgment that the dissertation is an academically sound and defensible scholarly product. Only a dissertation which has been unanimously approved for defense by the three readers may be defended.

Even though the dissertation has been approved for defense, revisions may be required. If defects in the dissertation come to light at the defense, the student may be asked to revise the dissertation before it is accepted by the Graduate School and the degree is conferred. In that case, it will be the responsibility of the dissertation director, or such person as the committee may appoint, to report to the Graduate School that such revisions have been completed satisfactorily.

Once the three readers' reports have been submitted to the Graduate School, the Graduate School finds the outside chair for the examination and then officially schedules the defense. Note, the Graduate School requires a minimum of ten business days to schedule the examination. (If less that 10 days are available, then the student or advisor will need to make their own arrangements for an outside chair. Since the outside chair represents the Graduate School, it is expected that the advisor

will apply the same standards for finding the outside chair as the Graduate School would, e.g., the outside chair should not have a collaborative relationship with the student or research advisor.) Thus, generally students will need to provide a complete copy of the dissertation to the readers by approximately *four weeks* ahead of the intended defense date.

Deadlines for Commencement

Most students schedule their defenses in order to graduate by a particular date. The University has three official graduation dates per year: May, August, and January. The official graduation dates are set by the University Registrar. Each graduation date is associated with the semester (or summer session) that precedes it. Only the May graduation has a commencement associated with it; graduates from the prior August or January receive invitations to participate in the May commencement ceremony.

For each of the three graduation dates, the Graduate School sets its own internal deadlines for those who intend to graduate. The first important deadline is the one for the graduation list. The DGS constructs the graduation list in consultation with the research advisors and the graduate students. The second important deadline is the last allowed date for Ph.D. defenses. Finally, there is a deadline for the final date when dissertations can be submitted to the Graduate School. These deadlines (and others) are all advertised by the Graduate School on its web site.

Thus, a student who wishes to graduate in a particular semester will need to go through the following steps in order to meet all deadlines:

(1) Find the Graduate School's last allowed day to defend;
(2) Consistent with this deadline, identify a set of days that a defense could be held;
(3) Ask the DGS's help in tentatively scheduling the defense (physics faculty are notoriously difficult to schedule);
(4) Count backwards a minimum of *four weeks* from the intended defense date in order to determine a date when the dissertation must be given to the readers;
(5) Make sure that the completed dissertation will be available to readers by the date calculated in (4).

If deadlines are missed, then typically the graduation date shifts to the next semester (or to summer session).

Finally, Ph.D. students who expect to obtain their degree during the summer session must register and enroll for at least one credit (PHYS 98699) in the summer session.

Doctoral Defense

In defending the dissertation, the student supports its claims, procedures and results. The defense is the traditional instrument that enables the doctoral candidate to explore with the dissertation committee the dissertation's substantive and methodological force. In this way, the candidate and the committee confirm the candidate's scholarly grasp of the chosen research area.

The format of the defense is determined by the department with the Graduate School's approval. The defense is chaired by a faculty member who is appointed by the Graduate School from a department other than the candidate's department. This chair represents the Graduate School and does not vote. At the defense, the student starts by giving a 30 minute presentation of his or her research. The time

and location of the first 30 minutes of the defense will be advertised, with the talk open to all interested parties. Guests are excused from the examination once the questions begin. The student will be questioned on the research by the dissertation committee. A dissertation defense must last at least 90 minutes. After the examination is completed, the chair calls for a discussion followed by a vote of the dissertation committee. At least three votes out of four will be required to pass a candidate, and four votes on a five-person committee. The chair sends a written report of the overall quality of the defense and the voting results immediately to the Graduate School.

Only one committee member is allowed to participate in the examination from a distance (e.g., by web cam or teleconferencing). Arrangements for distance participation must be cleared in advance of the examination with the DGS.

In the case of failure of the defense, on the recommendation of a majority of the examiners, another opportunity to defend may be authorized. An authorization for a second defense must be approved by the Graduate School. A second failure results in forfeiture of degree eligibility and is recorded on the candidate's permanent record.

Submitting the Dissertation

The Graduate School has a dissertation submission checklist on its web site. The steps include an online payment, uploading one clear print-quality PDF, electronic submission to two printed title pages with the advisor's original signature, completion of some survey information, and completion and submission of the UMI/ProQuest Microfilming and Copyright Agreement. The deadline for this is published in the Graduate School Calendar, available through the Graduate School web site.

Part II
Basic Policies

Financial Support

In order to be eligible for University funding, the student must be enrolled full-time, seeking a graduate degree at Notre Dame, and be in academic good standing. (See the following sections for definitions of fulltime and good standing.)

Financial support allotted by the Graduate School for distribution by the department includes academic year tuition scholarships, graduate assistantships, and departmental fellowships, as well as summer session tuition scholarships and University fellowships.

All entering graduate students and some continuing students in good academic standing are awarded graduate assistantships (or fellowships) from the University. All graduate assistantships (GAs) are teaching assistantships (TAs) and have duties and responsibilities as discussed below.

Advanced graduate students are often supported by research assistantships (RAs). Some advanced graduate students are supported by the department as teaching assistants. These teaching assistants are either GAs or, in a few special cases, department TAs. The only distinction between GAs and department TAs is the source of the funding (Graduate School or the department, respectively), so both are referred to generically as TAs.

The department honors support commitments made in admissions letters to students as long as the student remains in good standing. Typically, students are supported as graduate assistants until the candidacy examination is passed. Then the department expects that the research advisor will pick up the student's funding through Research Assistant (RA) support. For research advisors without external research support, the department has typically committed TA support through the student's fifth year. Technically, continued TA support is through a Graduate School GA or a department TA.

It is Graduate School policy that students beyond six years of enrollment are ineligible to receive a GA stipend. Appeals to this policy are heard by the Graduate School on a twice-a-year basis (February 15 or April 15). The DGS can be petitioned to make the appeal for the student to the Graduate School.

General Rules

Assistants and fellows who receive a full stipend should not be employed elsewhere either on or off campus. Graduate students are provided stipends so that they can devote full time to their studies. Therefore, they are discouraged from taking part-time employment. If students have a personal or professional reason to claim exception, part-time work must be approved by the graduate advisors (the DGS and research advisor), the primary employer, and the Graduate School.

Graduate assistants and research assistants are restricted to a maximum load of nine credit hours (three 3-credit classes) in formal course work per semester. Exceptions to maximal registration must be approved by the DGS and by the Graduate School.

Recipients of federal financial aid must comply with the standards of progress set by their respective departments for their particular programs of study. The director of financial aid will notify students in writing when failure to maintain progress will result in the loss of financial aid. Appeals indicating mitigating circumstances must be made in writing to the director of financial aid.

Tuition Scholarships

All entering graduate students and all continuing students in good academic standing are awarded academic year tuition scholarships. A graduate student cannot receive more than eight academic years of tuition support from the Graduate School or from funds allotted by the Graduate School to departments.

Teaching Assistantships

Graduate students who are teaching assistants (TAs) assist in undergraduate and graduate laboratories, tutorial sessions, or with grading problems or examinations. The time required for these duties is normally 15 hours per week, but no more than 17.5 hours per week. Detailed TA information is posted on the department web site.

Before teaching assignments are made, the supervisor of teaching assistants will ask the faculty their needs and preferences for TAs and also ask the TAs for their preferences for teaching duties. Preferences are considered, and honored when possible, subject to the constraint of meeting the department's needs. Minimal revisions to assignments are made during the first week of classes when scheduling conflicts occur. Problems with the teaching assignments, the supervisor, the TA, or the TAs teaching load should be called to the immediate attention of the supervisor of TAs.

At the end of each semester, every teaching assistant is rated by the faculty on the manner in which he or she has performed these duties. A student who has performed his or her assigned duties poorly will receive a letter of warning. If his or her performance has not improved by the end of the semester, then that person risks losing the TA stipend or having the TA stipend reduced.

Each spring, the Kaneb Teaching Center honors students who have demonstrated a history of exceptional performance as a TA.

Research Assistantships

Post-candidacy students may be supported by research grants made to their research advisor from agencies outside the University. The duties required for such grants are defined by the research director and the continuation of such support is subject to the availability of funds and the advisor's discretion. Not all professors have such grants.

Fellowships

The department and University also award fellowships to a number of highly qualified graduate students. Notification is by letter.

Information on fellowships available from inside and outside of the University is shared periodically with the students and advisors via the department e-mail list-servs. Students and advisors are also urged to do their own searching for academic-year and summer fellowship opportunities. Information is also posted on the Graduate School and the department websites.

Summer Funding

Summer funding is provided primarily through external funding obtained by the research advisors. A limited number of TA positions and fellowships exist for summer. The department develops a list of those graduate students desiring summer TA support. In consultation with the chair, the department administrator and DGS then make the summer TA assignments.

Student Health Insurance Subsidy

Starting in the fall of 2004, the Graduate School has implemented a student health insurance subsidy for eligible students who receive a full stipend from Graduate School funds and choose the University (MEGA) policy. The 2010-11 payment made by the subsidy is at the 75% rate, **$929.25**. The subsidy is a non-reportable taxable benefit (no income taxes will be withheld).

Information on the University AETNA policy is available through the Notre Dame Health Center.

Students on department graduate assistantships or fellowships who choose the university policy will also receive the insurance subsidy. Subject to funding availability and approval by the external funding agency, students on research assistantships who choose the university policy will also receive the same insurance subsidy.

Medical Separation from Academic Duties

It is possible for students who experience serious medical conditions to take a 6-week separation from the university. Qualifying students will receive a stipend equal to their normal stipend during the period of separation. For details, see the Graduate School website.

Definition of Full Time

In the first two years of graduate work, students must be registered for at least nine credits of required course work to be considered full time.

Entering advanced graduate students are those who have studied physics at graduate level prior to entering Notre Dame. These students will follow a modified schedule and generally will take at least three 3-credit classes per semester until the core curriculum requirements are met. The DGS will notify the Graduate School of the student's advanced status and modified schedule.

Once the student has completed the credit hour and course requirements for the degree, the student will register for 1-3 credits per semester. With this course load, students will still be considered full time.

Definition of Good Standing

The department and the Graduate School are both charged with monitoring the progress of each graduate student towards the completion of the graduate degree. For the Graduate School, to be in academic good standing, the student must maintain a grade point average (GPA) of 3.000 or higher, have a dissertation proposal approved within eight semesters, and must have been enrolled as a graduate student at Notre Dame for sixteen semesters or less. For the department, to be in good standing also requires that the student be making appropriate progress towards completion of the degree.

Whenever there are significant concerns about a student's progress towards the degree, the DGS or department chair will send that student a warning letter. After warnings, in cases where the student has failed to meet the department's or Graduate School standards, the student will be terminated from the program.

The department, through the instructors in the core curriculum and its research advisors, continually monitors the performance of each graduate student. Concerns are brought to the attention of the DGS and the chair. Additionally, once a year (at the conclusion of the spring semester), the entire physics faculty meets to review formally the performance of each graduate student. Generally, if warning or termination letters are to be sent, they are sent after this meeting.

The following is a description of the evaluation standards applied by the department to each student at the end of each academic year.

For a pre-candidacy student, the department monitors the grades in the first- and second-year course work and in the qualifying examination. At the end of the first academic year, the DGS will formally evaluate each first-year student.

At the end of the first year, to be in good standing, the student should have a minimum GPA of 3.0, have completed a minimum of 18 credits in the core curriculum, and should have made a preliminary selection of a research advisor. (Students who entered with advanced standing will take three 3-credit classes per semester until core curriculum requirements are met.)

For a second-year student, to be in good standing, he/she should have a minimum GPA of 3.000, should have completed a minimum of 33 credits in the core curriculum, should have passed the qualifying examination, and should have taken at least two credits of research with the research advisor. If the student is on track with course work and grades, normally this is the first time when he or she will be considered for candidacy. But if the student has not passed the qualifying examination by the end of the second year, the student will not be continued in the Ph.D. program.

Ideally, the student should complete candidacy requirements by the end of the third year. To be in good standing, the student must have maintained the 3.000 GPA and had a continued record of satisfactory performance in research with a research advisor.

For a fourth-year student to be in good standing, the student must have passed the candidacy examination before the end of the fourth academic year. Students who have not passed this examination will lose the possibility of Graduate School support until the examination is passed.

For post-candidacy students, the department reviews the written reports of the research committees during the last faculty meeting of the academic year. These research committees are asked to continue to monitor progress and to aid in advising the student when research difficulties are faced.

After eight years (or sixteen semesters) of graduate study, a student is no longer in good standing with the department or the Graduate School. This means that the student is no longer eligible for financial support from the Graduate School. In order to continue as a graduate student beyond the eighth year, an extension of degree eligibility must be granted by the Graduate School. These extensions are only granted in cases where there has been genuine progress towards completion of the doctoral dissertation. However, all Graduate School funding terminates at the end of the eighth year.

Stipend Policy

Loss of GA Stipend

The following are examples of situations where the student will lose Graduate School (GA or fellowship) stipend support:

- The student has a cumulative GPA of 3.000 or less, and thus is not in good standing;
- The student has not passed the candidacy examination by the end of the fourth year, and thus is not in good standing;
- The student exceeds six years (twelve semesters) of enrollment.
- The student has a history of performing his or her assigned TA duties poorly.

For pre-candidacy students with a cumulative GPA falling below 3.000, continued stipend support by the department will be determined on a case-by-case basis. Continued stipend support by the department is also made on a case-by-case basis for students past the fifth year.

Support by the department is generally a temporary situation for the student, ending typically in one of the following scenarios:

- The student returns to good standing (and returns to GA support);
- The student fails to return to good standing (and is dismissed);
- The student or the research advisor finds alternate support (fellowship or RA);
- The student graduates.

Note, it is possible for a student to be in good standing, but not be supported financially. It is also possible to be not in good standing, but to be supported (for a short period of time) by the department or other sources (e.g., RA).

In all cases, awarding of stipends by the department is subject to the availability of funds.

Procedures for Taking Courses

The following assumes a full-time, degree-seeking graduate student. Note, only full-time, degree-seeking graduate students in good academic standing are eligible to receive financial support supplied by the University.

Pre-registration

Students can pre-register for courses according to a schedule and procedure established by the Registrar's Office. Pre-registration is also an option for summer session. Tuition must be individually requested for summer session. The department will advertise the procedures to be used for requesting summer session tuition through the graduate student list-serv.

Registration and Enrollment

Students must register and web enroll before each semester (and summer session) at the time and locations announced by the University Registrar. They are required to register each semester for the courses required as listed in the course schedule (see below). Instructions for how to register and enroll are found through the Registrar's web site.

Any admitted student who fails to enroll for one semester or more must apply for readmission upon return.

Total Number of Credits

In the first two years of graduate work, students must be registered for at least nine credits of required course work per semester to be considered a full-time student. Deviations from the standard course schedule must be approved by the DGS.

Once the student has completed the credit hour and course requirements for the degree, the student will register for just 1-3 credits, as described above. With this course load, students will still be considered full-time.

During the academic year, a graduate student may not register for more than 12 credit hours of graduate courses each semester, i.e., 60000-, 70000-, 80000- and 90000-level courses. An additional three credit hours of 40000- and 50000-level courses may be taken if authorized by the DGS or department chair and approved by the Graduate School. Graduate and research assistants are restricted to nine credit hours per semester. They may, however, take an additional three credit hours of seminars or research. Exceptions to maximal registration must be approved by the DGS and by the Graduate School.

Auditing a Class

With the permission of the instructor and the DGS, the student may also audit courses. A recorded audit is graded V. Incomplete audits are not recorded. The audit grade of V cannot be changed to a credit grade. In the academic year, full-time graduate students may audit courses without charge. In the summer session, there are no free audited courses. Any course taken or audited in the summer session will be charged at the full price.

To declare a course as an audited course, the student first registers and then asks the Graduate School to convert the course into an audited one. This must be done on or before the 7th class day of the semester. A course may also be converted into an audited one when it is dropped from the student's schedule (see below).

Changes in Class Schedule

Once the semester begins, students may add courses only during the first seven class days of the semester. After this time, students may add courses only on the recommendation of the department and with approval of the Graduate School.

Students may drop courses during the first seven class days of the semester. To drop a course after this period and up to the mid-semester point (see the Graduate School Calendar for the exact date), students must have the approval of the department offering the course, the physics DGS, and the Graduate School. A course may be dropped after the mid-semester point only in cases of serious physical or mental illness. Courses dropped after this date will be posted on the student's permanent record with the grade of "W."

Warning: The consequences of dropping and adding a course in the first seven days of the semester may be serious. Students should consult with the DGS to discuss any changes in schedules.

General Policies

Physics graduate students are students in the Department of Physics, in the Graduate School, and also in the University. Students are bound by a series of codes, rules, and policies which regulate student life at Notre Dame. Some of these are rules and policies created by the Department of Physics. Others are rules and policies of the Graduate School. And others are rules of the University itself.

A primary source of information for Graduate School rules and regulations is their web site and the *Bulletin of Information of the Graduate School*, also available through the Graduate School web site. If there is any contradiction in policy between this guide and the Bulletin, then the Bulletin's statement of the rule takes precedence.

Another primary source of information for the University's rules is *du Lac*, which is available through the web site of the Office of Residence Life and Housing, 305 Main Building. If there is any contradiction in policy between this guide and the Grad Handbook, then the Grad Handbook's statement of the rule takes precedence.

This guide is the primary source of information for rules and policies specific to graduate students in the Department of Physics.

Students are bound throughout their stay by the version of these regulations in effect at the time they were first admitted for graduate work. However, if a new regulation is adopted which is less stringent than the one previously in effect, the new regulation applies also to the graduate students currently enrolled in the department. If, in unusual circumstances, a student's program or status is at variance with these regulations so that an exception must be made, such an exception must be approved by the physics faculty upon the recommendation of the DGS.

University Policies

The first important section of *du Lac* is the section entitled "University Standards of Conduct and Disciplinary Procedures." This section starts with a description entitled "Student Life Policies." Two important subsections include the "Discriminatory Harassment Policy" and the "Sexual Harassment Policy." Other sections include the "University Smoking Policy" and a section describing the alcohol policy.

Students should become familiar with this entire section of *du Lac*. Unless otherwise noted, the policies and procedures of *du Lac* apply to all students, undergraduate, graduate, or professional, on or off campus. In reading these sections, please remember that these policies are in place for the benefit of the University community as a whole. For example, harassment policies list types of behaviors that could get a graduate student into trouble (e.g., when acting as a teaching assistant) and provide steps to follow if he or she believes that he or she is the victim of either discriminatory or sexual harassment.

A second important section of *du Lac* is the section entitled "Selected Policies Related to Academic Life." The first subsection is on the Academic Code. The Academic Code is the set of "policies and regulations governing the student attainment of academic credit and degrees from the University of Notre Dame." Here are found the academic rules for both undergraduate and graduate students. Also found here is the Academic Code of Honor. (This honor code applies to undergraduate students; the Academic Integrity section of the Bulletin describes the code that applies to graduate students. Teaching assistants working with undergraduate students will need to be familiar with the undergraduate's honor code.)

Finally, there are many helpful sections in *du Lac* describing university services that are available to graduate students.

Communication

Formal Communication

The department communicates important decisions to students via letters. The actual offer of admission comes to the student from the Graduate School, but is always associated with a letter of intent, sent first by the department to the student. Fellowship notifications are also sent by letter.

Generally, results of examinations are sent to students by letter. Qualifying examination results are sent by the DGS to the students. The result of oral candidacy examinations, the master's comprehensive examination, and the Ph.D. defense is sent to the student by the Graduate School.

For students who are not in good standing, or for those in danger of losing good standing, warning letters are sent by the Graduate School and/or the department.

Support Notification

For the first-year of graduate studies, support notification occurs through the student's admission letter. After the first year, the student is required to have a research advisor. It is the responsibility of the research advisor to communicate support commitments for a given year (e.g., RA or TA) directly to his or her students.

Due to the cyclical nature of external funding, support arrangements can change for a student through the course of a year. If an advisor gains a source of new external support, the appropriate time to change the student from TA to RA is before the next semester begins. The department assumes that the advisor discusses this change in funding directly with the student. Questions on support status should be brought to the Business Manager, the research advisor, the DGS, or the chair, as appropriate.

General Communication

Much of the department's day-to-day communication is done by electronic mail sent to the student's Notre Dame email address. Students are expected to check their Notre Dame email on a daily basis during the academic year.

The department maintains a list-serv of all of its graduate students. Regular messages will be sent using this list-serv by the department chair, the Business Manager, Graduate Student Coordinator, and the DGS. These emails will include reminders of deadlines and special opportunities for graduate students.

A request for the distribution of a list-serv message to the graduate students can be made by sending a message directly to the list-serv. The message will be distributed if it is judged to be in the best academic interests of the students.

Occasionally, students do not receive email due to mistakes in email configuration or forwarding. It is the student's responsibility to ensure that the department's email can be received.

Important messages to graduate students will also be distributed in written form to graduate student mailboxes in the Department of Physics. Students should also check their mailboxes on a daily basis during the academic year.

The chair and DGS will hold "town hall" meetings with the graduate students once or twice a year. General questions and concerns of graduate students should be discussed at these meetings. Additionally, students are urged to bring individual questions and concerns directly to the attention of the DGS or chair.

The bulletin board outside the main Physics Office is exclusively for Graduate Students. Please refer to the bulletin board for information on job opportunities, career training opportunities, course information, upcoming events, etc.

Problems and Grievances

Problems

Students should feel welcome to contact the DGS in the event that they experience difficulty in coping with the course work or other aspects of graduate student life. Likewise, instructors in graduate courses, research advisors, and research committees are urged to contact the DGS if they observe that a graduate student is having difficulties.

The DGS will help the student explore options for the resolution of these difficulties.

Grievance Procedures

In the event that a student has an unresolved complaint or grievance with the department, he or she may appeal in writing to the department chair and/or the DGS. The department chair (or DGS) will then appoint a committee of three faculty members to investigate the complaint. The department chair (or DGS) will then write in response.

Graduate Student Appeal Procedure

If a student is unsuccessful in resolving a complaint at department level, the student may choose to take the complaint to the associate dean of the Graduate School. The student should not make an appeal until after exhausting available procedures within the department. Information on the appeal procedure is available at the Graduate School web site.

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Appendix A

Physics Research Advisor Contract

The signatures below indicate an agreement between a physics graduate student and research advisor (and, if appropriate, co-advisor) for a trial period/renewal [pick one] of _____ months.

Initial commitment: Potential research directions and the possibility of future support as a research assistant for the next summer and after class work or after candidacy exams should have been discussed.

Renewed commitment: Indicates that the advisor(s) expect(s) there to be a likelihood that the student will be eventually invited to take candidacy with them.

Student: _____
(Name) (Date) (Signature)

New or renewed agreement

Research Advisor: _____
(Name) (Date) (Signature)

Co-Advisor: _____
(If applicable) (Name) (Date) (Signature)

Release from previous agreement (if a change)

Research Advisor: _____
(Name) (Date) (Signature)

Co-Advisor: _____
(If applicable) (Name) (Date) (Signature)

Return to the DGS for the department's record

Appendix B: Transfer Credit

The Physics Department makes the following distinction between the transfer of credit and the waiver of a requirement:

Transfer credits are entered by the Registrar's Office onto a graduate student's University transcript. The awarding of transfer credits by the University is a formal acknowledgment that a student has previously taken graduate course(s) that can count in the place of Notre Dame graduate course(s). The awarding of transfer credit follows rules established by the Graduate School and the University. This is the normal and preferred mechanism to be used by the department to indicate the acceptance of a core course requirement taken elsewhere.

On occasion, and as an exception, a student may request that a requirement in the Physics core curriculum be waived. This will occur when the student believes that he or she has a course background equivalent to one of the Notre Dame core courses, but the course taken does not meet the requirements for transfer credit. In this case, the student may ask the department to waive the requirement of the course. If a waiver is granted, the record of this waiver is maintained by the DGS. No record of the waiver appears on the student's University transcript.

Transfer Credit Evaluation

The following applies to incoming graduate students to Physics who have already taken one or more graduate courses elsewhere.

For a course to be eligible for transfer:

- The student must have had graduate student status when he or she took the course;
- The course must have been completed within a five-year period prior to admission to the physics degree program;
- Grades of "B" or better must have been achieved;
- It must be a graduate level course.

Additionally:

- If student is transferring from an unfinished master’s program, the student will not be allowed to transfer more than six semester credit hours into a Notre Dame Physics Ph.D. program;
- If student has completed a master’s or Ph.D. program, the student will not be allowed to transfer more than 24 semester credit hours to the Notre Dame Physics Ph.D. program.

The above is a partial summary of the transfer-credit rules of the Graduate School and the University (see the Graduate Bulletin of Information for more complete information).

The Physics Department's role in transfer credit decisions is to make recommendations on the suitability of a graduate course as replacements for Notre Dame's physics core course requirements.

Review Process

At the time of student's orientation to the department, an initial meeting will be scheduled with the DGS. Prior to that meeting, the DGS will have reviewed the student's transcript in order to generate the list of possible transfer courses.

The student and the DGS will decide together which courses should be reviewed for possible transfer credit. The student may decide to forgo the transfer credit and take the Notre Dame course.

The student then makes an appointment with a designated recent professor(s) of the course(s). A list of these professors will be made available at orientation. This "review panel of professors" is responsible for making recommendations for particular courses in the Notre Dame physics core. The review panel professor will evaluate the suitability of the course taken as replacement for one of the physics core requirements.

The professor will ask to examine material related to the course taken, e.g., the syllabus, textbook, and tests taken as part of the course. The professor may ask the student to answer orally basic questions on the material studied in the course. If the student is unable to answer these questions satisfactorily, then the course will not be transferred.

The professor will report his or her recommendations on transfer credit back to the DGS. Final decisions on courses to be taken in the fall and on courses to be transferred will be made by the DGS after a second discussion with the student. The DGS has the responsibility of making the department's recommendations on transfer credit to the Graduate School. At the end of the fall semester, the DGS forwards transfer credit recommendations to the Graduate School.

Waiver of Required Course

As described above, at the time of the student's arrival in the department, the DGS will have reviewed the student's previous transcripts looking for courses that are eligible for transfer credit. If the student believes that he or she has course background equivalent to one of the Notre Dame core courses, but the course taken does not meet the requirements for transfer credit, then the student may request that a requirement be waived.

After a discussion with the student, the DGS will send the student to the appropriate member of the review panel for transfer courses. The professor will evaluate the suitability of the course as a replacement for one of the Physics core requirements. If there appears to be a good match, then the professor will arrange to give a written exam comparable to past finals in the course. This final will be graded on a scale of pass/fail. There are no allowed retakes of this exam. A report of the grade and a recommendation on the waiver will be made by the professor to the DGS.

The student must discuss possible waivers of credit with the DGS before contacting any of the faculty on the review panel.

Written examinations on first-semester courses must be taken before the fourth class day, and graded before the seventh class day. Written examinations on all other core courses must be taken and graded before the end of the first semester.

The DGS maintains discretion on the number of courses that may be waived for a particular student. Generally, for students following a Ph.D. program, no more than six courses will be waived. If a student following the Ph.D. program has a combination of waived and transferred courses, the total of the two categories generally will not exceed eight courses (or 24 credits).

Similar restrictions on waived and transferred courses exist for master's students. A student may not transfer more than six credits or two courses towards a Notre Dame master's degree. Additionally, for master's students, the combination of waived and transferred courses will not be allowed to exceed two courses (or 6 credits).