

Student Handbook  
2013–2014  
Graduate Program in Physics  
Yale University

Prepared by Graduate Physics Office  
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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Who's Who in the Physics Department</b>	<b>2</b>
<b>3</b>	<b>Academic Requirements</b>	<b>4</b>
3.1	Academic Requirements Overview . . . . .	4
3.2	Typical Time Line for Academic Requirements . . . . .	5
3.3	First and Second Years . . . . .	7
3.3.1	Course requirements and suggested sequencing . . . . .	7
3.3.2	Choosing an adviser . . . . .	8
3.3.3	Research over the summer between Years 1 and 2 . . . . .	9
3.3.4	Registration information . . . . .	9
3.3.5	Taking courses outside the department . . . . .	9
3.3.6	Grades . . . . .	9
3.3.7	Incomplete grades . . . . .	10
3.3.8	Language and teaching requirements . . . . .	10
3.3.9	Course waivers . . . . .	10
3.3.10	Qualifying Exam . . . . .	11
3.3.11	Degrees . . . . .	11
3.4	Third Year . . . . .	11
3.4.1	Admission to candidacy . . . . .	11
3.4.2	Core Thesis Committee . . . . .	11
3.4.3	Preparing a prospectus . . . . .	13
3.4.4	University teaching fellowships . . . . .	14
3.5	Fourth Year and Beyond . . . . .	14
3.5.1	Annual dissertation progress report . . . . .	14
3.5.2	Disseration Requirements . . . . .	15
3.5.3	Forming a dissertation committee . . . . .	15
3.5.4	Dissertation First Chapter . . . . .	15

3.5.5	Dissertation defense . . . . .	16
3.5.6	Submitting your dissertation . . . . .	16
3.5.7	Petitioning for Extension . . . . .	17
3.5.8	Preparing for the job market . . . . .	17
3.6	Teaching . . . . .	17
3.6.1	Graduate Teaching Center . . . . .	17
3.6.2	Requirements . . . . .	18
3.7	Qualifying Exam . . . . .	18
3.8	Degrees . . . . .	19
<b>4</b>	<b>Registration information</b>	<b>21</b>
<b>5</b>	<b>International student issues</b>	<b>22</b>
<b>6</b>	<b>Absences</b>	<b>23</b>
6.1	Leave of absence . . . . .	23
6.2	Parental Support and Relief . . . . .	23
<b>7</b>	<b>Vacations and Summer Funding</b>	<b>25</b>
<b>8</b>	<b>Financial Matters</b>	<b>27</b>
8.1	Loans . . . . .	27
8.2	Paychecks . . . . .	27
<b>9</b>	<b>Departmental facilities and resources</b>	<b>28</b>
9.1	Room assignments and laboratory facilities . . . . .	28
9.2	Keys . . . . .	28
9.3	Facilities . . . . .	28
9.4	Telephones . . . . .	29
9.5	Computers and Printers . . . . .	29
9.6	Laptop Computer Program . . . . .	29
9.6.1	For 2010 entering students: . . . . .	29
9.7	Copy Machine . . . . .	30
9.8	Mail . . . . .	30
9.9	Security . . . . .	30
9.10	Kitchen Facilities . . . . .	31
9.11	Department Directory . . . . .	31
9.12	Department Calendar . . . . .	31
9.13	Forms . . . . .	31
9.13.1	Registration and Academics . . . . .	31
9.13.2	Degree Requirements . . . . .	32

9.14 Graduate School Calendar . . . . .	32
9.15 Classes Server . . . . .	32
9.16 Software Library . . . . .	32
9.17 Yale Info . . . . .	32
<b>10 Life as a Physics student</b>	<b>33</b>
10.1 Departmental colloquia and seminars . . . . .	33
10.2 Graduate Student Assembly . . . . .	34
10.3 McDougal Graduate Student Center . . . . .	35
<b>11 Taking Care of Yourself</b>	<b>36</b>
11.1 Payne Whitney Gym . . . . .	36
11.2 Yale events calendar . . . . .	36
11.3 New Haven events . . . . .	36
11.4 Yale Health Plan . . . . .	36
<b>12 Resources</b>	<b>38</b>
12.1 Library resources for Physics . . . . .	38
12.1.1 Physical Library Resources . . . . .	38
12.1.2 Electronic Library Resources . . . . .	39
12.1.3 Research Assistance . . . . .	39
12.2 Professional resources . . . . .	39
<b>13 Departmental Forms</b>	<b>40</b>
<b>Appendix</b>	<b>41</b>

# Chapter 1

## Introduction

Welcome to the Yale University Department of Physics Graduate Program. The purpose of this handbook is to provide you with a summary of the important information you will need as you make your way through the graduate curriculum, carry out your research and complete your thesis. Graduate school, especially in the initial years when you are learning to teach and carrying a heavy load of classes is, to say the least, an intense experience. The faculty and the Director of Graduate Studies (DGS) encourage you to feel free to communicate frequently and freely with them, and to collaborate with your fellow students in learning the vast amount of material that you need to acquire in reaching the forefront of research. You will do much of your learning outside of the classroom in conversations and problem solving sessions with your colleagues. Physics study and research is a collaborative experience that should be both fun and exciting.

This handbook provides an unofficial summary of some of the administrative requirements you will have to fulfill. If you encounter any errors or have any questions, please do not hesitate to contact the Physics Registrar and/or the DGS. For more detailed official information please refer to the Graduate School of Arts and Sciences Annual Programs and Policies Bulletin.

## Chapter 2

# Who's Who in the Physics Department

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## Chapter 3

# Academic Requirements

### 3.1 Academic Requirements Overview

#### Course Requirements

9 Term Courses; 1 Lab Course; Phys 590 Responsible Conduct in Research  
(For core courses: if you've already taken a comparable class, sign-up for Pass Out exam on Classes\*v2)

#### 6 Core Courses

- Phys 500a Advanced Classical Mechanics
- Phys 506a Math Methods
- Phys 508a Quantum Mechanics I
- Phys 502b Electromagnetic Theory
- Phys 512b Statistical Physics I
- Phys 608b Quantum Mechanics II

(a = fall term; b = spring term)

#### Lab Course

Phys 504b Modern Physics Measurements - OR - Phys 990 Special Investigation

**Advanced Courses** One from the following:

- Phys 538 Intro to Relativistic Astrophysics & General Relativity



- Phys 609a Relativistic Field Theory I
- Phys 610a Quantum Many Body Theory
- Phys 628b Statistical Physics II
- Phys 630 Relativistic Field Theory II

**Two additional electives**

### **Teaching Requirement**

4 semesters as a Teaching Assistant at the TA 2 level (10 hrs/week)

### **Grades**

Yale Graduate School grade format: Honors (H); High Pass (HP); Pass (P); Fail (F)

- 2 grades of Honors Grad School requirement
- High Pass average Physics Dept requirement

### **Qualifying Exam**

Required at the beginning of 3rd semester; optional for new first years; sign up at Classes\*v2

## **3.2 Typical Time Line for Academic Requirements**

Year 1:

- First semester
  - Required core courses (PHYS 500a; PHYS 508a; PHYS 506a)
- Second semester
  - Required core courses (PHYS 502b; PHYS 512b; PHYS 608b)
  - Advanced laboratory course (PHYS 504Lb) or experimental Special Investigation (PHYS 990a,b)

- Summer
  - Summer internship — Appointment as Assistant in Research
  - *For international students* — English language training to prepare for SPEAK test

Year 2:

- First semester
  - Qualifying Exam at beginning of first semester given on the first Thursday and Friday of the semester
  - Continue with required course requirements (PHYS 609a or PHYS 610a/b or PHYS 628b); and one or two electives
- Second semester
  - Complete courses (one or two additional electives)
  - Finalize thesis advisor
  - Start dissertation research
- Summer
  - Work as an Assistant in Research with advisor

Year 3:

- Establish “Core Thesis Committee” of 3 faculty including the thesis advisor
- Admission to Candidacy, including written Thesis Prospectus and oral defense of thesis prospectus to core thesis committee
- *For international students* — must pass SPEAK test
- Dissertation research

Year 4–5:

- Continue dissertation research
- Annual Oral presentation of research

- Annual meeting with core committee to review progress towards dissertation
- Yearly Dissertation Progress Report due by May 1

Years 5–6:

- Continue dissertation research and prepare dissertation draft
- Thesis Defense and oral examination by committee of four
- Submission of written dissertation
- Reader's reports due after submission
- Award of degree

### 3.3 First and Second Years

#### 3.3.1 Course requirements and suggested sequencing

To complete the Physics Department's course requirements, students are required to take nine one-term classroom courses and a one-term lab course. A set of six core courses (PHYS 500 Advanced Classical Mechanics, PHYS 502 Electromagnetic Theory, PHYS 506 Mathematical Methods of Physics, PHYS 508 Quantum Mechanics I, PHYS 512 Statistical Physics I, and PHYS 608 Quantum Mechanics II) and a laboratory course (PHYS 504Lb or PHYS 990a,b) serve to complete a student's undergraduate training in classical and quantum physics. Three advanced courses, including a required course in one of either Relativistic QFT, Many-Body Theory or Statistical Mechanics II, provide an introduction to modern physics and research. For students already familiar with the material, the department implements "pass-out" examinations for the core courses, to be given at the start of each course, to determine whether a student has sufficient mastery of basic material to be excused that particular core course. To be eligible to take this exam a student must have had a more-or-less equivalent-level course elsewhere. The exam will be administered by the DGS and the previous year's lecturer of the course in question. Students passing out of a core course must instead take an elective to make up the total number of required courses, unless the student has taken an equivalent course while registered as a graduate

student elsewhere, in which case the student may at the discretion of the DGS petition the Associate Dean to be entirely excused that course. All first-year graduate students must take either PHYS 504Lb or a laboratory-based Special Investigation (SI) (PHYS 990a,b), supervised by a particular faculty advisor who must have an appointment in Physics. Either course must be completed in the first year of graduate study. To be able to choose the SI option, the student must have previously taken an advanced undergraduate laboratory class, and is required to write a brief proposal specifying what the SI project is. (A cover page for the proposal is here.) The SI project must be approved by the DGS. In addition, a 40-minute Powerpoint or similar presentation on the SI is required at the end of the semester to a 3 faculty panel. The SI grade is assigned by the SI advisor and written feedback to the student should be given on this form. Additional SIs may be carried out after Year 1, but a proposal is not required in this case. The DGS will not approve an SI for audit.

#### First Semester

<sup>a</sup>500a Advanced Classical Mechanics  
<sup>a</sup>508a Quantum Mechanics I  
<sup>a</sup>506a Mathematical Methods of Physics

#### Second Semester

<sup>a</sup>502b Electromagnetic Theory I  
<sup>a</sup>608b Quantum Mechanics II  
<sup>a</sup>512a Statistical Physics I  
 504Lb Modern Physics Measurements  
<sup>b</sup>590b Responsible Conduct in Research  
 for Physical Scientists

#### Third Semester

<sup>c</sup>609a Relativistic Field Theory I  
<sup>c</sup>628a Statistical Mechanics II

#### Fourth Semester

<sup>d</sup>Electives  
<sup>c</sup>610b Many Body Theory of Solids

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<sup>a</sup>Core courses

<sup>b</sup>one day seminar required for all first year students

<sup>c</sup>or at least one of the following: 538, 610, 628 or 630.

<sup>d</sup>Electives - At least 3 semesters of more advanced or survey courses depending on field of specialization.

### 3.3.2 Choosing an adviser

Formal association with a dissertation adviser normally begins in the third or fourth term after the qualifying examination has been passed and after most required course work has been completed. It is best though to start exploring possible advisers in your first year at Yale. An adviser from a department other than Physics can be chosen in consultation with the DGS, provided the dissertation topic is deemed suitable for a physics PhD. It is up to you to seek out faculty and talk to them no later than your

third term (if not earlier) to discuss your interest and possibilities of collaborating. It is up to you to be proactive in seeking out a mentor because the Department does not “provide” a mentor for you and there is no guarantee that a particular mentor will have an opening (and research funding) available at the time you are ready to begin research. Hence it is imperative that you explore different advising opportunities within a subfield and perhaps even more than one subfield of physics.

### **3.3.3 Research over the summer between Years 1 and 2**

Students are generally expected to work in a research laboratory during the summer after their first year in order to gain experience in a field of potential interest. This may turn out to be the beginning of a research collaboration with a future adviser, but there is no obligation to continue working in the same group if you decide it is not suitable. Students who have not passed the qualifying examination are expected to make arrangements with the summer adviser to allow time to study for the exam. At the end of the summer, students are expected to make a Powerpoint or similar presentation of their research. Written feedback concerning the overall performance will be provided by the summer research advisor and also will be reviewed by the DGS.

### **3.3.4 Registration information**

See Chapter 4 for more information on registration.

### **3.3.5 Taking courses outside the department**

If you desire to take a course outside of Physics or Applied Physics, this should be brought to the attention of the DGS and especially your research adviser for their review.

### **3.3.6 Grades**

The grades assigned in the Graduate School are:

H = Honors  
HP = High Pass  
P = Pass  
F = Fail

The Physics Department requires a grade point average of HP for a student to remain in good standing. In addition, there is a Graduate School requirement that a student must attain at least two grades of Honors within the first two years of study. A grade of P is generally considered an unsatisfactory grade, its name notwithstanding.

### **3.3.7 Incomplete grades**

In occasional circumstances, a student may need additional time to complete coursework. An arrangement for a completion date must be worked out with the instructor. The instructor will submit the grade as a Temporary Incomplete (TI) with the intended completion date. Incomplete grades must be converted to a final grade no later than October 1 of the following academic year. Otherwise, the TI will be converted to a permanent Incomplete (I). See Graduate School Program & Policies Bulletin for more details.

### **3.3.8 Language and teaching requirements**

Teaching experience is regarded as an integral part of the graduate training program although it is not an absolute requirement for a Physics PhD at Yale. However, students on University Fellowships must serve as teaching fellows during a portion of their first two years of study. Teaching in this case refers not to grading papers, but teaching in a laboratory or discussion section in which you can develop classroom presentation skills. These presentation skills are essential to your future success as a teacher and researcher.

Students whose native language is not English (and have not taken the Test of Spoken English (TSE) with a score of at least 50) are required to pass the SPEAK assessment administered at Yale within the first two years of study. Non-native English speakers are strongly encouraged to take advantage of the many course opportunities and English conversation groups available through the Graduate School, Hall of Graduate Studies (HGS) and the English Language Institute (ELI). If you are not able to speak and write English fluently, you will find it very difficult to carry out your research, write publications, or find employment.

### **3.3.9 Course waivers**

Certain equivalent course work carried out elsewhere than Yale may reduce the course requirement here for individual students at the discretion of the

DGS and with the approval of the Graduate School Associate Dean, provided the earlier courses were taken while registered as a graduate student.

### 3.3.10 Qualifying Exam

See Section 3.7 for information on the Qualifying Examination.

### 3.3.11 Degrees

See Section 3.8 for information on petitioning for degrees.

## 3.4 Third Year

### 3.4.1 Admission to candidacy

The graduate school requires all students to be admitted to candidacy by the end of the third year. Students who have completed their course requirements with satisfactory grades (a High Pass average and the Graduate School requirement of two Honors<sup>1</sup>), pass the qualifying examination, and who have submitted an acceptable thesis prospectus are recommended for admission to candidacy.

Students must be admitted to candidacy by the end of the third year or they will not be permitted to register for the next term.

### 3.4.2 Core Thesis Committee

A core thesis committee, consisting of 3 faculty members must be selected by each student at the earliest opportunity, either in the second semester of the second year or in the first semester of the third year. *The committee composition can be changed later.*

The first meeting between the student and the core thesis committee should take place early in the first semester of the third year. Here the student will present their Year 2-to-3 summer research as well as their initial thesis research plans to this committee.

Subsequently, each student must meet periodically with his/her core thesis committee in closed session to discuss progress. These meetings will occur at least once per year, but could be more frequently. It is the student's

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<sup>1</sup>which can include PHYS 990 Special Investigation

responsibility to arrange these closed session meetings at least once per year or more frequently if deemed necessary by student or the committee. The purpose of these closed-session meetings is NOT for the student to provide a formal scientific presentation to the committee. An update on the student's research progress is appropriate, but should not be the sole focus of this session. Rather, the goal of these meetings is for the committee to assess the student's overall progress as a physicist. For example, one important role of the core thesis committee is to ensure that the student has a sufficiently broad knowledge of their subfield. The committee may choose to do this via a variety of procedures at their discretion. Questions on, and related to, the field and **on physics in general** will be a typical part of these sessions. In addition, the committee should assess the student's professional progress, i.e. exposure to the literature and the work of other groups e.g. via conferences; opportunities to write and present their work orally; attendance at relevant seminars and/or classes; etc.

The ongoing monitoring of a student's research progress through these meetings should diminish the chances of surprises at the thesis defense. Such monitoring can also provide a protection to both the student and advisor: First, if a student has sufficient material for a PhD, then the committee can push a reluctant advisor to agree to a thesis defense. Alternatively, if a student's research performance is inadequate, the committee can support academic sanctions on the student, *i.e.* that the student is not in good academic standing.

After the closed-session meeting, the core thesis committee chair will prepare a brief report of the committee's assessment of the student's progress towards the thesis, and present this to the student and Departmental Registrar.

In addition to the private committee meetings, students will periodically give presentations (at least once per year) in a public forum, which the core thesis committee members are expected to attend and concerning which the core committee should provide written feedback to the student. Possible forums for such presentations include the Weak Interaction Discussion Group, The Monday Evening Seminar, the Sackler Discussion Group, collaboration presentations, group meeting presentations, etc. The format of the presentation should be a talk that lasts 30 minutes or more. The allowable format and content for the "public presentations" should be viewed broadly, subject only to the participation of the core thesis committee. Especially early on in her/his research career, to satisfy this requirement, it may be that it makes most sense for a student to make a



journal club-type presentation in the context of a group meeting, later on progressing to a research-based presentation in one of the regularly scheduled series. It is also the student's responsibility to arrange for this public presentation.

This public presentation is NOT meant to be merely a progress report for the core thesis committee, or an opportunity for the committee to ask physics questions about the work. Rather, the goal is primarily for the student to practice communicating in a public setting, and to receive feedback about how to improve their presentation abilities.

After the public presentation, the core thesis committee chair will prepare a brief report of the committee's assessment of the student's presentation, and present this to the student and Departmental Registrar. Once again, the focus of this report should be on presentation style rather than a comment on the scientific progress.

### 3.4.3 Preparing a prospectus

The first page should contain the following information: title, student's name, adviser's name, Yale University Physics Department, and date.

Prospectus should also include an abstract. The faculty adviser and the student's core thesis committee should read and approve the thesis prospectus before it is submitted to the Physics Graduate Registrar's office. Here is the approval form. The submission should be done electronically in PDF format. In addition each student will present their thesis Prospectus in an oral presentation (Powerpoint or similar) to their core thesis committee (before the end of their third year).

The following is an excerpt from the Graduate School Programs and Policy Bulletin describing the prospectus:

The prospectus should be viewed as a preliminary statement of what the student proposes to do in his or her dissertation and not as an unalterable commitment. The appropriate form and typical content of a prospectus inevitably vary from field to field. In most cases, however, a prospectus should contain the following information:

1. A statement of the topic of the dissertation and an explanation of its importance. What in general might one expect to learn from the dissertation that is not now known, understood, or appreciated?

2. A concise review of what has been done on the topic in the past. Specifically, how will the proposed dissertation differ from or expand upon previous work? A basic bibliography should normally be appended to this section.
3. A statement of where most of the work will be carried out – for example, in the Yale library or another library or archive, in the laboratory of a particular faculty member, or as part of a program of field work at specific sites in the United States or abroad.
4. If the subject matter permits, a tentative proposal for the internal organization of the dissertation – for example, major sections, subsections, sequence of chapters.
5. A provisional timetable for completion of the dissertation.

Although it is difficult to prescribe a standard length for the prospectus, it should be long enough to include essential information for the proposed topics but not overly long. Seven to ten pages, excluding figures and bibliography, should be appropriate in most cases. The prospectus should be written in a manner comprehensible to people who are not experts in your particular subfield. A concise introduction to the subject is therefore essential.

#### **3.4.4 University teaching fellowships**

Teaching Fellowships can be offered to advanced students (third year and up) who are no longer on university support. This is subject to availability of teaching assignments after all first and second year students on university fellowships have been given their assignments. Students will be compensated at the rates established by the Graduate School Teaching Fellows Office.

### **3.5 Fourth Year and Beyond**

#### **3.5.1 Annual dissertation progress report**

The Dissertation Progress Report is due each May 1 for work done in the academic year just completed. Filling in the form is now an on-line process.

### 3.5.2 Dissertation Requirements

The Graduate School has specific rules about formatting, etc. When you are preparing your final draft, you should consult their Dissertation Submission Checklist.

Once your dissertation is in its final form, the department requires two hardbound copies: one for Kline Science Library, and one for our own collection.

### 3.5.3 Forming a dissertation committee

The Physics Department requires a 4-member faculty committee plus an outside reader and must be approved by the Director of Graduate Studies. Therefore, the student should consult with their research adviser, core thesis committee and then the DGS about the make-up of the committee and when approval is given, the student should then ask those wanted on the Committee if they will agree to serve. The Committee should be made up of at least two tenured faculty members. Typically, the Committee would include the members of the core thesis committee and one more faculty member.

Usually, the make-up of the committee is as follows:

For students in an experimental field:

Adviser and another in same experimental field; another in same field but theoretical; another experimentalist (any field).

For students in a theoretical field:

Adviser and another in same theoretical field; another in same field but experimental; another theorist (any field).

### 3.5.4 Dissertation First Chapter

The Physics Department recommends that the first chapter of the thesis be a succinct summary of the entire thesis, including in particular:

- (1) a brief review of the field prior to the thesis research to provide context
- (2) a presentation of the goals and motivations of the thesis research
- (3) a clear description of what the student has achieved in the thesis research (primarily written in the first person singular, but with due credit to other as appropriate). This description should refer back to (1) and clearly indicate the relation to prior work.

It may also make sense to add:

- (4) suggestions for how to best build upon the thesis research in future work.

Otherwise these suggestions should appear in the conclusion of the thesis.

### **3.5.5 Dissertation defense**

Once the Defense Committee is chosen and approved by the DGS, it is the student's responsibility to set the date, time and place for the defense at a time convenient to all members of the Committee. Copies of the dissertation should be given to them at least three weeks in advance. The Physics Registrar's office will assist in locating a room if necessary. The dissertation defense shall consist of two consecutive parts. The first part, which shall be open to anyone interested, will consist of an oral presentation of approximately one-hour in length, in the style of a research seminar. An announcement will appear in the weekly Seminar Notices. The second part will consist of detailed questioning of the candidate by the dissertation committee, at which attendance will be restricted to members of the committee.

#### **Outside reader (after oral defense)**

The outside reader must be someone outside of Yale who has had no involvement with the student's research and who can be completely objective in his/her evaluation of the dissertation. The outside reader is usually selected by the dissertation adviser and approved by the DGS. Usually the adviser contacts the reader and requests his/her services. The dissertation is forwarded to the outside reader after the final copy of the dissertation is submitted to the Graduate School.

### **3.5.6 Submitting your dissertation**

After the defense, the committee may ask the student to make some changes in the dissertation. These changes must be made before submission to the Graduate School.

Submission guidelines are posted on-line at the Graduate School's website: Dissertation Guidelines, Dissertation Check list (under Resources), and Notification of Readers form.

It is also requested that students submit 2 hardbound copies of the dissertation to the Physics Graduate Office: one for the Department and one for the Center for Science and Social Science Information located in the Kline Biology Tower. *This does not need to be done at the time of submission to the Graduate School.*

Note: Students must be registered through the term of dissertation submission (unless they have already completed their sixth year).

### 3.5.7 Petitioning for Extension

A student wishing to extend his/her registration beyond their original six year terminal date must file a Petition for an Extension. A Dissertation Progress Report must also be completed along with a letter to the DGS stating the reasons for needing an extension. The extension can be requested for one or two terms. Extensions beyond the seventh year are not normally allowed. Note: It is not necessary to be a registered student beyond your sixth year to be able to complete your dissertation and defend. However, you would not be allowed to receive AR salary as a student, nor would you have health insurance if you were not registered.

### 3.5.8 Preparing for the job market

#### Graduate Career Services

The Graduate Career Services Office (GCS) is a comprehensive career center for students and alumni/ae of Yale University's Graduate School of Arts and Sciences and for postdoctoral fellows. Through individual counseling, programs and a library of resource materials as well as internet resources, the office assists graduate students and alumni/ae with career planning and decision-making. GCS encourages students to begin using the services of the office early in their graduate careers in order to expand the choices they will have upon completion of their degrees. For more information visit <http://www.yale.edu/graduateschool/careers/>.

## 3.6 Teaching

### 3.6.1 Graduate Teaching Center

The Graduate Teaching Center is a useful resource for all of your teaching needs. Workshops and courses are held throughout the year. Consultations

with staff can be arranged by request. For more information visit the Graduate Teaching Center web site.

### 3.6.2 Requirements

Teaching experience is regarded as an integral part of the graduate academic program. Most physics students serve as Teaching Fellows in their first two years, with a teaching commitment of 10 hours per week (TF2 appointment) each semester. As soon as you know the course in which you will be a TF, you should immediately contact the course instructor to let him/her know that you've been assigned to their course, and to find out when any course staff meetings are scheduled. Such meetings are usually held a little before the undergraduate semester begins and mark the start of your semester's teaching responsibilities.

Throughout the semester you must fulfill your teaching obligations conscientiously. If you find that you are routinely required to spend more than 10 hours per week on your teaching duties, you should contact the DGS. Your teaching obligations only end when you are released by the course instructor. In particular, you will likely be asked to help grade the final exam. It is therefore essential that you be at Yale from a few days before the first day of classes until after the final exam is graded.

## 3.7 Qualifying Exam

The Qualifying Examination must be taken for the first time no later than the beginning of a student's third semester. Any entering students may take the qualifying examination at the start of their first year. If a first-year student passes the exam, it satisfies the requirement. If the student does not pass, it does not count against the student in any way. In particular, it does not count as one of the two permitted opportunities to pass.

The exam will be in two separate parts. Each part will consist of four questions and last for three hours. Each part will be given on a separate day. The structure of each of the two parts is as follows. Part 1 will consist of one question each on Classical Mechanics and Mathematical Methods, and two questions on E& M. Part 2 will consist of two questions each on Quantum Mechanics and Statistical Mechanics. The content of the exam will draw from this list of topics.

To create, administer, and grade the Qualifying Examination, a committee will be established by the Chair of the Physics Department. Both the

Exam Committee and the students will be given the list of exam topics. Students taking the examination will remain anonymous to the committee and to the faculty (except the DGS) until the results of the examination are accepted by a vote of the faculty.

Students will be given associated letter grades, one for each part — A through F — based on their performance. A, B, and C are passing grades. D and F are failing grades. The letter grades will indicate performance in the top third of passing grades (A), performance in the second third of passing grades (B), performance in the bottom third of passing grades (C), inadequate performance (D), and very poor performance (F). The line between C and D, and D and F will be established by the committee for each of the two parts and approved by a vote of the faculty. Exam questions and their solutions will be given to the students after the exam. However, students are not permitted to review their graded exams. Students will have two opportunities to pass each part of the Qualifying exam. If a student fails one part, he or she will normally be required to retake only the failed part the following year. Two failures to pass either part of the exam will ordinarily result in withdrawal from the PhD program. Only under exceptional circumstances, at the discretion of the faculty may students who have failed one or both parts of the qualifying exam for the second time be permitted to take a Special Oral Examination. The outcome of the Special Oral will then determine whether the student in question will be permitted to continue in the program. The purpose of any such Special Oral Examination is to test whether the student, who has twice failed the written qualifying examination, is nevertheless sufficiently secure with the material of the core courses to eventually graduate with a Physics PhD. Any Special Oral Exam, therefore, should test whether this is the case by asking a number of questions at the level of and on the material of the written Qualifying Exam. The Special Oral Exam committee shall consist of 4 faculty nominated by the DGS. Please make sure to look over the syllabus covering topics which may be on the qualifying examination.

## 3.8 Degrees

### Masters requirements and petitioning for master's degree

*M.S. (en route to the Ph.D.).* Students who complete the first-year graduate courses with a satisfactory record (including two Honors or four High Passes) qualify for the M.S. degree.

*M.Phil.* Students who have successfully advanced to candidacy qualify for the M.Phil. degree. See the Graduate School Programs and Policies Bulletin for additional information.

Students can petition for their degree once they have met the requirements for the degree. This should be done at the end of the term in which requirements have been completed. A form can be obtained by visiting the Graduate school forms web page.

At the time of advancement to candidacy, students who have not petitioned for or received en route masters' degrees will automatically be considered for such degrees at the next degree award date.



## Chapter 4

# Registration information

All students must register on-line, either for course enrollment, or in the case of more advanced students: Admission to Candidacy (CAND 999), or Dissertation Research (DISR 999).

Students should go to the Yale University Student Systems and log in with their netID and password. Then choose On Line Course Selection to choose courses. The DGS will then approve your course selections or notify you if he has any questions. Registration normally ends two weeks after the first day of classes for that term.

## Chapter 5

# International student issues

The Office of International Students and Scholars can help with questions regarding your visa and other issues that pertain to your status as an international student at Yale. For general information, visit the Office of International Student Services web site or call 432-2305.

## Chapter 6

# Absences

### 6.1 Leave of absence

Students who wish or need to interrupt their study temporarily may request a leave of absence. There are two types of leave, personal and medical. There are very important considerations about deadlines and about continuation of medical insurance, the details of which are described in the Graduate School Programs and Policies Bulletin. Students facing any type of personal or health difficulties are strongly encouraged to consult with the DGS and/or Dean.

### 6.2 Parental Support and Relief

Registered Ph.D. students who wish to modify their academic responsibilities because of the birth or adoption of a child may request parental support and relief during or following the term in which the birth or adoption occurs. For the whole of the term in which the support and relief are requested, the student's academic clock stops, effectively adding an additional term to the total time to degree. During this period, students remain registered, receive the full financial aid package as specified in their letter of admission, and will have departmental academic expectations modified to best suit the specific situation. The precise nature of the academic responsibilities undertaken or suspended during this period should be a matter of consultation among the adviser, the student, and the Graduate School, with the understanding that students are entitled to full relief for at least an eight-week period. Students who take only eight weeks of relief during the term in which, or just after, a birth or

adoption occurs may receive an additional eight weeks of stipend funded by the Graduate School in a later term. Parental relief may not be combined with other funding. To arrange for parental relief, a student should contact the appropriate associate dean four months prior to the birth or adoption.

## Chapter 7

# Vacations and Summer Funding

Students supported by external funding sources, must in all cases comply with the vacation policies associated with their funding sources. Beyond this, for students already in research groups, the total vacation time that a student may take is at the discretion of, and may be negotiated with, the thesis adviser. Students and faculty may consult the DGS with questions about vacation policy.

As a guideline, however, the Department expects that Physics students will take an average of two weeks' vacation per year, in addition to the stated University holidays and the Christmas Eve to New Year's Day break. This amounts to a total of about 4 weeks vacation annually. In this context, students are reminded that the first year of graduate school is when you are expected to transition from a "school" schedule to a full-time, self-motivated research schedule. Thus, for example, the period between the fall and spring semesters and Spring Break are each considered to be an active time of scholarship and research, and there may be specific teaching duties for those with teaching fellowships during these times.

The Physics department expects that students will receive a stipend for vacation time up to an average of two weeks per year, in addition to stated University holidays and the Christmas-to-New Year's break. However, especially in the case of international students, some of whom may wish to return home for less-frequent-but-longer visits, the department notes that a one-size-fits-all policy is not sensible and encourages faculty to be flexible in accommodating such requests as fairly as possible.

Ordinarily, the Physics department expects students to carry out research

and receive a stipend full-time during the three summer months. Students who have not yet found a summer research position should start looking no later than the beginning of the second semester and they should consult with the DGS if they haven't found a position by the last month of the spring semester. The Physics department recommends that first-year and second-year students, especially those starting research in a new research group, who wish to take vacation, schedule the vacation for the last two weeks of May, after the student's academic commitments are finished and while the student is still supported on a University fellowship (which runs through May 31) and before the students research commitments and funding begin on June 1. Students, who nevertheless wish to take long summer vacations and obtain the permission of their research advisor to do so, will not receive a stipend during such vacations. The Blue Book states that "Continuing students who were registered during the preceding spring term and are engaged in degree-related activities at least half-time remain registered through August 31." It follows that, if a student wishes to take a summer vacation that is longer than six weeks, the student becomes not registered as a Yale student in that period, and therefore must apply for a formal Leave of Absence.

According to Graduate School rule, in no case is it permissible for an advisor to insist that a student must take unpaid summer vacation. Last but not least, student vacation should not conflict with academic or teaching obligations.

## Chapter 8

# Financial Matters

### 8.1 Loans

Under certain circumstances, loans are available to students. Requests for loans should be made to the Graduate School Financial Aid Office for determination of eligibility. Visit their office at 129 HGS or call 432-2739 for more information.

### 8.2 Paychecks

**First paycheck of academic year: September 15 — pick up in the Chairmans Office, room 34 SPL.**

Paydays: Semi-monthly on the 15th of the month and the last day of the month.

When either of these days falls on the weekend, payday will be the last working day before either of those days (i.e. usually Friday but occasionally earlier on holiday weekends). On each payday, “real” paychecks are available in 34 SPL after 12:00 noon on payday up until closing time.

**We strongly encourage the use of Direct Deposit.** On payday, “real” paychecks are available to you only when our offices are open; Direct Deposit gives you access to your funds immediately on payday. Direct Deposit stubs are placed in your mailbox. Please see Sandy for the necessary form or download a Direct Deposit form.

## Chapter 9

# Departmental facilities and resources

### 9.1 Room assignments and laboratory facilities

Entering students are assigned a desk usually in room 76 SPL for use during their first year. Each desk has a lock so you may store personal belongings. Please do not leave belongings unattended on top of your desk. Second year students are usually assigned a desk in either room SPL 75 or SPL 77 if they do not have a space with their adviser's research group. For safety reasons, small appliances, such as hot pots or coffee pots, may not be used in any of these office areas. Once you begin working with an adviser, your work and laboratory space will be assigned by your adviser.

### 9.2 Keys

Students will be issued keys as necessary. Please see Jean Caragnano in 31 SPL who will issue keys and collect a \$5 deposit fee for each key. When you terminate your studies and leave the university, all keys should be returned and your deposit will be refunded. The building is normally locked from 5:00 p.m. to 6:00 a.m. and accessible only with your Yale ID.

### 9.3 Facilities

All problems and concerns regarding the Physics buildings, such as doors or locks, should be reported to the Department Manager, John Fox. Please



do not hesitate to bring a problem to his attention. A small problem left unresolved can become a big problem if not taken care of in a timely manner.

## 9.4 Telephones

Rooms 75, 77 and 58 SPL (level 1 and 2) each have a telephone. For long distance calling, you will need to use a University Toll Authorization Number (TAN) if you have one for use in your dorm or if you have been given one by your research group. Otherwise you will need to use a telephone credit card or a prepaid calling card. Please report telephone problems to Sandy.

## 9.5 Computers and Printers

Room 75, 77 and 58 SPL each have a desktop computer. Please do not save data files to these desktop machines. Also, your laptop computers with the wireless access can be used at your desk in those areas. A wireless hub is located in the hall outside those rooms.

There is a printer for your use in Room 75: HP 2300n series printer - IP address 128.36.107.144 .

Local department IT support is provided by Andrew Currie in room SPL 68D on the second floor. Please contact Andrew initially with any problems you may have regarding departmental computing and your laptops. Andrew can be reached at [physics.support@yale.edu](mailto:physics.support@yale.edu).

Please see Sandy for paper and toner supplies and to report any problems with the equipment.

## 9.6 Laptop Computer Program

### 9.6.1 For 2010 entering students:

Entering students are provided with either a Dell or Macintosh laptop for your use as a graduate student in Physics.

**Please note that these machines are the property of the University.** Should you leave the Physics PhD program before five years or graduate before, the laptop computer and all software must be returned to the Physics Graduate Office.

If you lose it or it is stolen, you are responsible for obtaining a replacement. So, please don't lose it or make it easy target for theft. Students are strongly encouraged to register their machine with the Yale Police Department (YPD) through their STOP program. See their web site for more information.

If you encounter problems with the laptop, your first step is to send a message to `physics.support@yale.edu`. You should expect a response within 24 hours. The machines have a three year warranty. The machines are typically delivered mid-August. Upgrades or repairs outside of the warranty are the responsibility of the user.

Wireless hubs are located throughout the physics department. The laptops are properly configured to work on the hard-wired ethernet ports on campus as well as the wireless network.

## **9.7 Copy Machine**

A copy machine is located in 37 SPL. This machine is for your use for copying teaching materials if you are assigned a T.A. position. You will be given a code number at the beginning of the term. In general, this copier is not for personal use. However, we can accommodate you for personal copies on an infrequent basis for small jobs. See Sandy for code number. For larger personal jobs, we can make arrangements for copy charges. Also, a copier is available at The Kline Science Library for use with a prepaid copy card that can be purchased at the library.

## **9.8 Mail**

You will be assigned a mailbox in 37 SPL. This box will be for Campus Mail and department notices. Important notices are often placed in the mailboxes so please check your box regularly. These boxes should not be used to receive your personal U.S. postal mail. Your postal address should be where you reside. If you reside in the graduate dorms, you will need to obtain a Yale Station U.S. postal mailbox.

## **9.9 Security**

As a general precaution, use good judgment when placing your belongings in the classrooms and labs or your desk space/office.

Please keep your desk locked if you are storing anything of value, i.e. textbooks, laptop computer etc. Also, wallets, purses and cell phones should not be made visible to others who may enter an office or lab area when no one is present.

Also, for security reasons, if you encounter a problem with any lock or door to or in the Physics buildings, please notify our Department Manager so that the problem can be fixed.

## 9.10 Kitchen Facilities

Students may use the refrigerator in the kitchen on the third floor (adjacent to the Lounge). You may wish to bring a lunch with you if you live off campus. There is also a microwave oven available. The air pot coffee machines are not available for your use other than for getting hot water. This is a community kitchen (and used for department events as well) so mark your refrigerated items with your name.

For a small fee, coffee and espresso are available to students during normal business hours in 33 SPL.

## 9.11 Department Directory

The physics department telephone directory can be viewed on line.

## 9.12 Department Calendar

The weekly department calendar for seminars and events can be found on line.

## 9.13 Forms

All Graduate School forms can be found on the Graduate School's Web site.

### 9.13.1 Registration and Academics

- Request for Registration in Absentia
- Notification of Course Schedule Change

- Individual Study Course Information
- Petition for Extended Registration
- Application for Medical Leave
- Request for Departmental Transfer
- Notice of Intention to Withdraw
- Personal Leave of Absence

### **9.13.2   Degree Requirements**

- Petition for Degrees
- Report on Dissertation Progress
- Certification of Admission to Candidacy
- Certification of Language Proficiency
- Qualifying Examination/Prospectus Certification
- Preparation & Submission of the Doctoral Dissertation

## **9.14   Graduate School Calendar**

The academic calendar can be viewed on line.

## **9.15   Classes Server**

The Classes server can be accessed on line.

## **9.16   Software Library**

The university software library is available on line for downloading software for which the university has a license.

## **9.17   Yale Info**

The Yale Phonebook and Index of Sites can be viewed on line.

## Chapter 10

# Life as a Physics student

### 10.1 Departmental colloquia and seminars

You will receive an e-mail notice each week with the next weeks Seminar Schedule which is also available on line.

- Physics Club Colloquia are held on Mondays at 4:00 pm in 57 SPL with tea and cookies at 3:30 in third floor lounge. **THIS IS AN IMPORTANT WEEKLY EVENT THAT WILL HELP YOU DECIDE WHAT SUBFIELD YOU ARE INTERESTED IN AND KEEP YOU INFORMED CONCERNING WHAT IS HAPPENING IN OTHER SUBFIELDS OF PHYSICS. ALL STUDENTS ARE EXPECTED TO ATTEND.**
- Various group seminars are scheduled each week throughout the year: Atomic, Astrophysics, Condensed Matter, Solid State and Optics, Nuclear, etc. See long term calendars, located at the bottom of the weekly calendar page, for semester schedules for the various group seminars.

#### Other activities

- A graduate student lunch time seminar is run by graduate students for graduate students. Faculty members do not attend. Students are encouraged to give talks (good practice opportunity to speak before small groups). The organizers will send notification once the day and time for that semester has been established.

- Daily department tea from 3:30–4:00 p.m. in the Sloane Third Floor Lounge
- Graduate Student Happy Hour held twice a month during the academic year usually on the 2nd and 4th Fridays at 5:15 p.m. in the third floor lounge, **after Physics Club**.

## 10.2 Graduate Student Assembly

The Graduate Student Assembly (GSA) is an elected body of students in the Graduate School of Arts and Sciences that participates in Graduate School policymaking relevant to matters of their education and their lives as students.

The Assembly's goals are to:

- identify the needs and concerns of graduate students, consider possible solutions, and present these to the Dean and other administrators.
- discuss and advise on changes to Graduate School policy proposed by the administration.
- provide a means for communication and deliberation both among and between graduate students and other members of the university community.

Recent accomplishments of the GSA include:

- implementation of a Conference Travel Fund (CTF) that provides awards to students allowing them to present their research at conferences.
- improvements to the Yale transit system (Central Science Loop, nighttime shuttle changes).
- the elimination of the summer gym fee for all graduate and professional students.

Current issues being adopted by the GSA include:

- the accessibility of child care at Yale.
- lobbying Congress for the reduction of federal income tax on graduate students.

The GSA welcomes new ideas, issues and concerns raised by students. If you have suggestions for changes or improvements to policies and services, please bring it to our attention by attending a meeting, or contacting a representative. Meetings are every other Wednesday in the Hall of Graduate Studies (HGS) room 119 at 7pm during the academic year. Meetings are open to ALL graduate students. There are currently no Physics GSA representatives. You may contact the assembly directly at [graduate.student.assembly@yale.edu](mailto:graduate.student.assembly@yale.edu). More information about the GSA may also be found on the web.

### 10.3 McDougal Graduate Student Center

The McDougal Center, located at 320 York Street in the Graduate School, has services and facilities designed specifically for graduate students and post-docs. Created in 1997 through a generous gift from Alfred McDougal '53 and his wife Nancy Lauter, its mission extends far beyond the walls of HGS.

The Center is a great physical space with a Common Room, Caf, meeting rooms, a computer cluster, Resource Library, and offices for the staff and students Fellows. The offices of Career Services, Student Life and Teaching, all located in the McDougal Center, individually organize various events and programs to foster student life and professional development . Visit the McDougal Graduate Student Center website for information on events and activities or call 432-BLUE (432-2583)  
Go to McDougal Graduate Center - Calendar of Events.

## **Chapter 11**

# **Taking Care of Yourself**

### **11.1 Payne Whitney Gym**

Payne Whitney Gymnasium, the largest building at Yale, is located at the north end of campus on Tower Parkway. Anyone affiliated with the University is eligible for membership. Yale students with valid I.D. cards are permitted open access to the building while other members of the Yale community are required to register and pay a membership fee. For specific schedule information on activities etc., please call the Information Desk at 432-1444. Membership information can be obtained by calling 432-2474.

### **11.2 Yale events calendar**

The Yale University calendar of events is available on line.

### **11.3 New Haven events**

The New Haven area events calendar is available on line.

### **11.4 Yale Health Plan**

All Ph.D. students are given a university fellowship for single coverage for health and hospitalization insurance. For a two person plan to include a spouse or a family plan, the Graduate School will pay 50% of the premium and the student is responsible for the other 50%.



HEALTH COVERAGE Rates for 2009–2010*			
	<u>Fall Term</u>	<u>Spring Term</u>	<u>Full Year</u>
Single	\$666 (666)	\$672 (672)	\$1338
2 Person	\$3227 (1613.50)	\$3258 (1629)	\$6485
Family	\$5361 (5361)	\$5412 (5412)	\$10773

## YHP Prescription Plus Coverage

Single	\$256	\$258	\$514
2 Person	\$487	\$492	\$979
Family	\$707	\$714	\$1421

**\*The amounts in ( ) are the health fellowships to be paid to the student by the Graduate School fellowship**

Health services are provided through the Yale Health Plan, 17 Hillhouse Avenue. Please contact Member Services for more detailed information about coverage and services at 432-0246 or visit the University Health Services web site.

## Chapter 12

# Resources

### 12.1 Library resources for Physics

The Yale University Library contains a wealth of resources, from electronic journals to historical manuscripts from scientists such as Newton and Copernicus. You may access materials from any library collection through the library's main web site, <http://library.yale.edu>.

#### 12.1.1 Physical Library Resources

Your closest library location, the Center for Science and Social Science Information, provides access to many resources. All rooms are available for booking via the CSSSI's main page, <http://csssi.yale.edu>.

- Presentation practice rooms with video recording equipment and video conferencing abilities;
- Small rooms seating 4-6 individuals with MediaScape technology, allowing you to connect multiple computers to the same screen for group discussion;
- Computers with scientific and statistical software;
- Access to StatLab consultants, many of whom have training in MATLAB and L<sup>A</sup>T<sub>E</sub>X: <http://statlab.stat.yale.edu>;
- Access to the 180,000 volume on-campus collection of science and social science books. Please note that the Math, Chemistry, and Geology collections are primarily housed in departmental libraries elsewhere on campus.

### 12.1.2 Electronic Library Resources

Your subject librarian, Kayleigh Bohémier, curates a guide to databases, ebooks, and other electronic materials most useful to your Physics research. Please visit <http://guides.library.yale.edu/physics>, which is grouped into tabs for easy resource navigation.

### 12.1.3 Research Assistance

Kayleigh Bohémier, Science Research Support Librarian, is your subject librarian. Feel free to talk to her about citation management, accessing library resources, or best practices for finding information on your research topic. Her skills include search strategies in ADS, Google Scholar, and INSPIRE, but also bibliography and citation management tools such as Bib<sub>T</sub>E<sub>X</sub>, Mendeley, and Zotero.

She can be reached at [kayleigh.bohemier@yale.edu](mailto:kayleigh.bohemier@yale.edu) or 203-432-9519. Feel free to stop by her office in CSSSI C41 or drop in during the open hours listed on her LibGuide profile:

<http://guides.library.yale.edu/profile/kayleigh-bohemier>.

## 12.2 Professional resources

Students who are not already members of the American Physical Society are encouraged to join. In addition to giving you the privilege of submitting talk abstracts to meetings, you will receive a subscription to *Physics Today*, a useful magazine for acquainting yourself with forefront research areas.

## Chapter 13

# Departmental Forms

Internal departmental forms are listed below. All forms are available on-line by clicking on the form name or by coming to the Graduate Registrar's Office (SPL 35).

- Special Investigation Proposal Form
- Special Investigation Evaluation Form
- Thesis Progress Report Form
- Notification of Reader's Form
- Qualifier Syllabus
- LaTeX template for Dissertation
- LaTeX class file for Dissertation

# Appendix

For more current information please refer to your copy of the Graduate School of Arts and Sciences Annual Programs and Policies Bulletin..

This Student handbook can be viewed online at

<http://pantheon.yale.edu/~dok3/Graduate/Handbook.pdf>.