Department of Physics
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Graduate Student Guide

2015-2016

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I. Department Overview

Chairperson: Andreas Albrecht (175A Phy)

Vice Chairperson (Graduate Affairs): Rena Zieve (243 Phy)
- Handles graduate academic matters and graduate administrative matters having to do with financial support, course requirements, exams, exceptions to Graduate Studies policies, etc.

Vice Chairperson (Administration & Undergraduate Affairs): Lori Lubin (507 Phy)
- Oversees courses and teaching assignments, general administration, and the undergraduate program.

Laboratory and Teaching Supervisor: David Webb (209 Phy)
- Handles the recruitment and hiring of all graduate and undergraduate Teaching Assistants (TAs) and Readers.

Department Manager: Tracy Lade (175B Phy)

Graduate Program Coordinator: Angela Sharma (174A Phy)
- Handles all administrative aspects of graduate program.

Undergraduate Academic Adviser: Jason Sison (174 Phy)
- Handles course registration, grades, PTA numbers, Roster program, and other issues relating to your own or your students' enrollment issues.

Student Assistants: Noelle Demarco and Megan Yim (174 Phy)
- Handle desk copies of text books and lab manuals related to TAing, schedule rooms for office hours, and deal with end-of-quarter course evaluations.

Financial Assistants: Laura Kemp and Onelia Yan (174 Phy)
- Handle employment records, reimbursement forms, and keys.

Computer Support: Daniel Wang (536 Phy)
- Handles computer and email access and inquiries.
- Email help@physics.ucdavis.edu for all technical assistance

Graduate Ombudsperson: John Conway (311 Phy)
- Can give confidential advice about academic and nonacademic conflicts

Academic Adviser
- Assigned on entry to the program, and should be consulted for all academic matters. Can also discuss the prelim exam, finding a research adviser, personal difficulties that may arise, etc.

Research Adviser ("Major Professor")

- The professor who guides a student's thesis research. After the student advances to candidacy, the research adviser becomes the chair of the thesis committee.

Graduate Curriculum Committee (2014-15 Chair: TBA)

Petitions and exceptions to departmental policies.

I. General Information

KEYS

All physics graduate student will receive a "GRAD KEY" (A1AAB). Please see Laura Kemp or Onelia Yan in 174 Phy to check out the key. This key gets you into the building, your office, and undergraduate lab rooms. If you need access to other places, the faculty member who is in charge of the area must give authorization. Forms for this purpose are available in the Business Office, or the faculty member can send an email to Laura or Onelia.

OFFICES

All first year graduate students are provided with a desk. Students beyond the first or second year are generally assigned to an office designated for a particular research area. Some students have desks in their research labs. Office locations are posted on the bulletin board outside the department office.

If you want to change offices and can arrange a trade, please be sure to inform Angela Sharma. **Do not move offices without talking to Angela Sharma.**

COMPUTER ACCESS AND E-MAIL

General policy is that physics graduate students have access to appropriate departmental computers for physics related work (class work, TA information, email, etc.). Each graduate student office on the 4th floor has at least one computer that is connected to the student computing network in Physics. These are set up to be essentially identical to the computers in the Physics computer classroom (room 106).

All graduate students automatically have accounts on these computers (both those in the classroom and those in the offices).

The computers in the classroom are available for graduate-student use at any time, except when a scheduled class is using the room.

The computers in the classroom all run a version of the GNU/linux operating system.

There is a scanner available in room 428, which authenticates with your Physics account.

It is also permissible for graduate students to use their own laptop computers on the Physics network, but computers must first be registered with the computing support group in the department. (Send email to help@physics.ucdavis.edu for this and all other computer-related requests.)

The Physics department runs most of its own computer-related services, such as email, etc., but as a student at UCD you automatically also have access to similar services at the central-

campus facilities. The following web page is a good place to start to get information related to those facilities:

https://computingaccounts.ucdavis.edu

Your professors and other colleagues within the department will assume that they can reach you by sending email to your UC Davis email account. You must either check that account regularly (once a day or more) or set up your account to forward email to an account that you do check regularly.

Your Physics computer account should be already set up when you arrive. If, for any reason, your account is NOT already set up, you should go to room 536, identify yourself (picture ID), and ask for an account to be set up. This can usually be done within 24 hours.

You will be given a login name for the Physics classroom computers (and their "relatives" in the various student offices). It will probably be your last name, or your first initial followed by your last name, etc., depending on what is required to distinguish you from all other users of the system, i.e., if your name is Kristin Lavransdatter, there is a pretty good chance that you'll get "lavransdatter" (or maybe "lavransd") as your login name. If your name is James Smith, there's pretty good chance that your login name will have to be "jsmith" or "jasmith" or ..., in order to distinguish you from all of the other Smiths.

You must check the information that you're given to determine your login name.

Your login name and password will allow you to login to any of the computers in the classroom, room 106 (or, again, from the similar computers located in one of the student offices). If you send email from one of the computers on the Physics student network, your email will have a return address of:

<login-name>@ms.physics.ucdavis.edu

e.g.,

jasmith@ms.physics.ucdavis.edu

Here "ms" is the name of the mail server, not a system to which you would typically login directly. (The point is to keep you from having 16 different email addresses from your use of the 16 systems in the classroom.)

You can also have email sent to "physics.ucdavis.edu," from which system it will be forwarded automatically to the student mail server (currently, ms). In MOST cases you can have email addressed simply to:

last-name@physics.ucdavis.edu

and it will forward to your ms account. Please be sure to check the Physics "people" web site:
http://www.physics.ucdavis.edu/everyone.php

to be sure your last name is unique before "advertising" your address as last-name@physics. This year we have multiple Yagers, multiple Fongs, multiple Lees, etc. In most of these cases the first initial will serve to disambiguate:

pyager@physics.ucdavis.edu --> Philip
ryager@physics.ucdavis.edu --> Robert

Please send a note to help@physics.ucdavis.edu if you have any questions or concerns about this.

MAILBOXES

Mailboxes are located in room 173. It is essential for you to check your mail every day! If you are away from the building, have a friend check it for you on a regular basis.

PHOTOCOPYING and SUPPLIES

Copying and other department services and office supplies are provided **only for departmental purposes, and require proper faculty authorization. Supplies and copying are NOT provided for your personal coursework.** Specific instructions for TAs are provided in Section V of this handbook.

COFFEE/TEA GATHERING

During the academic year on Mondays when there is a colloquium held at 4 pm, there is a coffee/tea gathering at 3:30pm in the department atrium on the first floor. This is an opportunity for faculty and graduate students to meet and talk in an informal atmosphere. For schedule changes, a notice will be posted in the Physics Dispatch (email newsletter).

PARKING

The “C” sticker is valid in designated lots from 7 am to 10 pm, and in any lot or meter spot from 5 pm to 10 pm Monday through Friday. The “N” sticker allows night parking in all lots from 5 pm to 10 pm Monday through Friday. Permits are generally not required for general campus parking weekdays 10 pm to 7 am, weekends, or University holidays.
For more information, visit http://taps.ucdavis.edu/

BICYCLES

You must register your bicycle. You can be ticketed for riding an unregistered bike. For more information, visit http://taps.ucdavis.edu/

III. Expectations of Graduate Students

There is *Physics Department Policy* and there is *Graduate Studies Policy*. The two are not always the same. When Physics policy differs from Graduate Studies policy, Physics policy takes precedence; however, this often means an exception must be secured from Graduate Studies. The Department will work out the conflict in policies so that the student is not penalized.

See information on the Graduate Studies web site for general information and regulations: http://gradstudies.ucdavis.edu.

CONDUCT

As you enter and go through the Physics graduate program, you are making a transition from being a student to being a professional, i.e. to becoming an independent researcher and colleague. You need to recognize the new responsibilities that come with this development. Regarding your relations with your professors and fellow students, you are expected to maintain the sort of courteous, helpful and respectful attitude which provides a supportive environment for all your colleagues in the department to do their coursework and research.

The transition to professional also involves maintaining appropriate behavior towards your students. As a teaching assistant/instructor, you must follow the same policies enunciated in the University of California Faculty Code of Conduct. This Code includes the ethical principles to which faculty are to be held: "As teachers, professors...demonstrate respect for the student as an individual [and] adhere to their proper role as intellectual guides and counselors... They avoid any exploitation of students for their private advantage..." Among the types of unacceptable faculty behavior is the "Use of the position or powers of a faculty member to coerce the judgment or conscience of a student or to cause harm to a student for arbitrary or personal reasons."

COURSES

First year graduate students generally take a set of required introductory core courses in mechanics, electromagnetism, mathematical methods, quantum mechanics, and statistical mechanics.

Second year students take a set of cluster courses geared to their research area.

Typical First Year:

Fall		Winter		Spring	
200A	**4 units**	**200B**	**4 units**	**200C**	**4 units**
204A	**4 units**	**204B**	**4 units**	**215C or 230A**	**3-4 units**
215A	**4 units**	**215B**	**4 units**	**219A**	**4 units**
290	**1 unit**	**290**	**1 unit**	**290**	**1unit**
371	**1 unit**	**295**	**1 unit**	**390**	**1 unit**
390	**1 unit**	**390**	**1 unit**		

The choice between 230A and 215C spring quarter depends on whether you are on a high energy/cosmology/nuclear track (230A) or a condensed matter track (215C). Note that first year students must sign up for the Colloquium (290) each quarter as well as the Introduction to Department Research seminar (295) in Winter. Additional suggested courses: seminars and research (299).

Typical Second Year:

Condensed Matter Experiment: PHY 240ABC
Condensed Matter Theory: PHY 219B, 240ABC
High Energy Experiment: PHY 223B, 230B, 245AB, 252BC
High Energy Theory: PHY 230BC, 245ABC, 246, 252B
Nuclear Physics: PHY 252B and three courses from 224ABC and 229AB
Biophotonics Designated Emphasis (Experiment): PHY 240AB; EAD 271; BIS 101 or 102 or 104 or BIM 202
Biophotonics Designated Emphasis (Theory): PHY 219B, 240AB; EAD 271; BIS 101 or 102 or 104 or BIM 202
Observational Cosmology: PHY 265, 266, 267
Theoretical Cosmology: PHY 230B, 260, 262, 263
Physics Education: PHY 297, EDU 260 (Modern History of Sci Ed), EDU 262 (Research Topics in Sci Ed), EDU 292 (Spc Topics in Sci. Ed.), one course in Qualitative Research Methods

Additional courses:

Physics 270: This two-unit course is for research group meetings. Each faculty member has a unique section number assigned. Students involved in research should sign up; this will be rare for first-year students but common for everyone else.
Physics 285: This "career skills" course was developed to help students learn about non-university job opportunities. It brings in a variety of speakers with physics degrees who have jobs outside academia. Although the course is mostly taken by students nearing graduation, some junior students might be interested.
Physics 299 : Advanced students normally meet the minimum course-load requirements in part through Physics 299, which gives "research credit" with their thesis adviser.
Physics 390: Students who teach Physics 7 or Physics 9 labs should sign up for a section of Physics 390 ("Methods of Teaching Physics"). This is a one-credit course.

Minimum GPA

The minimum GPA for satisfactory progress is 3.0, and Graduate Studies policy does not allow a student to be employed in any capacity (Teaching Assistant or Graduate Student Researcher) if the GPA falls below the minimum. In most but not all cases the department can obtain a one-time exception.

EXAMS

Diagnostics Exam

The diagnostic exam is a one hour test given to all entering graduate students used as assessment of their background and preparation for first year graduate courses. The results of the exam are not used for any other purpose.

Preliminary Exam

The Preliminary Exam, or "written examination," covers the material from the first year graduate core courses. It consists of four three-hour sessions, given in the week before the start of Fall quarter. Questions are grouped by topic into two sections— Classical Physics (Electricity and Magnetism, Classical Mechanics, Mathematical Methods) and Modern Physics (Quantum Mechanics, Statistical Mechanics and Thermodynamics, Modern Physics, Laboratory Methods and Data Analysis).

Students take the Preliminary Exam the summer after their first year of courses, with an opportunity to take the exam again the following summer. Entering students—especially those with a more advanced background—are encouraged to take the exam immediately upon entry to the program. This first attempt, before starting courses, does not count against the limit of two attempts.

Qualifying Exam (Oral exam)

A student who passes the written Preliminary Exam upon entry or at the start of the second year should take the Qualifying Exam by the end of Fall quarter of the third year.

A student who passes the written Preliminary Exam at the start of the third year should take the Qualifying Exam by the end of the Spring quarter of the third year.

The exam is conducted by a five member committee, proposed by the student and the student's research adviser and approved by the Graduate Vice Chair.

The committee is generally composed of faculty within the student's research area, as well as faculty outside the area. An example of a committee for a Condensed Matter Experiment student is as follows:

CME faculty member– Chair
CME faculty member
CMT faculty member
Faculty member outside of CM
Faculty member outside of the Department

Students should plan on giving a 30 minute talk for the exam, followed by a question session. The committee can ask questions about the research as well as about course material covered by or beyond the Preliminary Exam.

The student will be given a pass, not pass or fail. A student who passes will then select a dissertation committee and complete the Advancement to Candidacy paperwork. A not pass can come with a

range of conditions, specified by the committee; the student may be told to retake the exam, write a paper for the committee, etc. A student who fails must leave the Ph.D. program.

EMPLOYMENT AND FINANCIAL SUPPORT

The Department of Physics has a longstanding policy that students making satisfactory progress toward their Ph.D. will receive financial support. For many students, this means a TA for the first two or three years and then a GSR on their Research Adviser's extramural grant(s) until they finish. At any given time there are constraints imposed by the number of GSR and TA positions available and students whose progress is marginal should not count on support.

Time Requirements/Limitations on Employment

There is an upper limit of 18 quarters of employment as a TA, and 21 quarters as a GSR, not including summer employment (UC-wide Policy). This means that you cannot, for example, be a TA for more than six years. Please plan accordingly. There are no exceptions to these limits.

Types of Financial Support

Teaching Assistantships: The department employs approximately 70 TAs per quarter for all the Physics 7 D/Ls, Phy 9 Discussions and Labs, Upper Division labs and Astronomy labs. We also employ students as Course TAs (also known as readers) for the lower division, upper division and graduate courses. To be considered for a TA position in a given quarter, you must respond promptly to calls that are sent out the previous quarter.

Graduate Student Researcher: Please consult with your Research Adviser about the possibility of being employed as a GSR. The department does not keep a list of "open" GSR positions so you must be proactive about seeking out this type of funding.

Fellowships: External fellowships, often very competitive, are available from NSF, DOE, NASA, and other agencies. The Office of Graduate Studies awards several internal UC Davis fellowships, and the Physics department usually has direct control of some fellowship funds as well. Most fellowships awarded through the department or Grad Studies require US citizens or permanent residents to have a current FAFSA on file. International students are also eligible for many of these fellowships, and they do not need to file a FAFSA.

Work-Study: This program is available in conjunction with the GSR appointments. You must have a FAFSA on file to be considered. International students are not eligible.

Loans: Need-based loans are available (check with the financial aid office in Dutton Hall); even GSRs and TAs qualify for some of these. Short-term emergency loans are also available.

Summer TA Positions

You will not be able to TA for an undergraduate course during the summer (7ABC, 9ABCD) unless you have already taught the same course during the academic year. There are also a few summer

reading jobs. **Plan your budgets accordingly - don't assume you will have summer support, especially after your first year.** Note that a typical summer TA position is for one 6-week summer session and pays only 50% to 75% of a standard TA position for an academic quarter.

FEES AND TUITION

TA appointments pay almost all of these expenses, apart from Non-Resident Tuition (NRT). TAs are responsible for about $260 per quarter in campus fees. Most students who file the FAFSA by the early March deadline receive a campus fee fellowship that covers most of the $260. GSR appointments automatically pay a student's entire fees and tuition.

Non-Resident Tuition is imposed on domestic out-of-state students for their first year, and on international students for their entire term of study. Domestic out-of-state students must establish CA residency during the first year. Those who do not establish CA residency by the start of the second year will be responsible for paying the NRT of $5,034 per quarter. More information about establishing CA Residency can be found at the Office of the Registrar's website (http://registrar.ucdavis.edu/).

For International students, once they have advanced to candidacy (by passing the "oral exam," selecting a dissertation committee, and completing the necessary paperwork), NRT is waived for the next three years by a UC-wide policy. Students may then apply for UC Davis fellowships that cover NRT for an additional two years. A student who has not graduated by 5 years after advancement to candidacy will have to pay the full NRT.

For Ph.D. students, the department practice has been to pay out-of-state students' NRT for the one year it is imposed, and to pay international students' NRT for up to two years. The department requires satisfactory academic progress and a student who is not making adequate progress may not get a full NRT payment. International students should also understand clearly that it is unlikely that the department will pay their NRT for more than two years before they advance to candidacy, or at all after they advance to candidacy.

For M.S. students, the department normally does not guarantee funding, but if TA positions are available they may receive support.

Alternate Student Statuses

PELP:
The Planned Educational Leave Program (PELP) allows students to take leave from the university for up to one year. A student on PELP cannot hold employment. For more information about PELP please visit: http://gradstudies.ucdavis.edu/forms/GS338_PELP.pdf

Filing Fee:
A student whose dissertation is nearly finished may go on Filing Fee for one quarter. A student on Filing Fee can be employed for one quarter. An extension to a second quarter of Filing Fee is possible but not guaranteed; an extension of the employment limit is extremely unlikely. For more

information about Filing Fee please visit:
http://www.gradstudies.ucdavis.edu/forms/GS305_FilingFeeApp.pdf

In Absentia Registration:
This status is suitable for students who are conducting research outside of California. Students are able to register for fewer units and pay reduced fees since they are away from the university and have access to fewer instructional resources and student services than students who are on or near campus. For more information about *In Absentia* registration please visit:
http://gradstudies.ucdavis.edu/forms/in-absentia-policy.pdf

IV. Adviser and Degree Information

Academic Adviser
You will be assigned an academic adviser. S/he will help you select your courses and will be your adviser until you have selected a research adviser (see below).

Research Adviser
Students are encouraged to find a research adviser as quickly as possible. Physics 295 is a good way to learn about opportunities in the department, but talking to advanced students is also recommended. Usually a student will have an adviser by the end of his/her first year in the program.

Applying for M.S. Degree
After passing the prelim exam, either at the PhD or MS level, you can file for a M.S. degree under Plan II. Plan II requires 36 quarter hours of graduate and upper division course work of which at least 18 must be at the graduate level. No more than nine units of research (299 units) may be used to satisfy the 18-unit graduate course requirement. Both plans require the standard first-year graduate classes. Exceptions can be approved by the Graduate Curriculum Committee.

Filing your Dissertation
To officially file your dissertation, you must contact Graduate Studies and set up an appointment to turn in your completed and signed dissertation. For more information about the requirements, please visit the Graduate Studies website at http://gradstudies.ucdavis.edu.

Please also provide the department with an electronic copy of your dissertation to be included in your student record.

V. TA/Course TA Information

Note: There is a bargaining agreement that covers student academic employees. Please familiarize yourself with its provisions. A PDF version of the agreement may be accessed by going to the following web page:
http://atyourservice.ucop.edu/employees/policies/systemwide_contracts/uaw/index.html

WHO TO GO TO WITH QUESTIONS

Course Instructor: You should be in continuous contact with the course instructor or lab supervisor regarding all issues of your employment. It is ***your responsibility*** to stay in contact. You should take the initiative to find out exactly what the instructor expects of you.

Angela Sharma: Graduate Program Coordinator, located in PHY 174A. Angela should be your first point of contact for any graduate student matters.

David Webb: for general questions on TA/Course TA assignments, policies, etc.

COMMUNICATION with STUDENTS

Students in your lab or discussion sections (or lecture course if you are a course TA) should contact you by e-mail or leaving written messages in your mailbox, rather than calling the Physics Department.

SUPPLIES and HANDOUTS

The Business Office (Rm.174) will assist you with supplies you might need that are directly associated with your TA duties.

From time-to-time you may need to make a small number of photo copies of enrollment lists or other items directly associated with your TA duties. You may sign-out the TA copy card from the main office (Rm. 174) for this purpose. You will need to enter your name, the course and section, and the number of copies when signing out the TA copy card.

ACCESS TO COMPUTERS AND PRINTERS FOR TA/COURSE TA DUTIES

There are terminals connected to various physics department workstations in graduate offices. There are also terminals located in the department computer teaching lab, Room 106. (The computer lab is available when it is not specifically reserved for scheduled labs)

TA RESPONSIBILITIES AND EXPECTATIONS:

- TAs are responsible for securing a replacement when needed. Only in emergencies should a TA expect the course instructor or lab supervisor to find a replacement for them.

- All TAs will be expected to grade throughout the entire quarter, including the final exam.

- The grading of final exams is important work and not to be taken lightly. The instructor you grade for will give instructions as to how you should grade, as well as answer any questions you may have. It is very important that you grade exactly as the instructor has requested.

- All TAs are expected to participate in the department's TA Training and Professional Development Program during their first year of employment. All TAs are expected to participate in the on-going professional development activities.

- All TAs and Course TAs work under the direct supervision of a course instructor. In the case of lower-division labs, this is the lab supervisor.

- All TAs and Course TAs must hold *regularly scheduled office hours* with students in the course.

- All TAs, except Course TAs, must collect and turn in an end of quarter performance evaluation from each student. A summary of these evaluations will be kept in your student record.

- All TAs/Course TAs will be evaluated by their direct supervisor.

GAINING TEACHING EXPERIENCE

Another opportunity to gain teaching experience is to work as an Associate Instructor (AI). As an AI you will be the course instructor, either as a Lecturer or Lead D/L Instructor.

To be considered for AI appointments you must have taught the course for which you are applying and your teaching evaluations must reflect your ability to teach a course. You must also have a M.S. degree to be considered.