Program overview

- 50 students
  - 10 F, 40 M
  - 17 from outside the US
- Typical admitted class sizes 8-10
- Typical time to degree is 6.5 years
- Retention is a little tricky to measure but $\sim$ 70%

Core classes

	Fall Semester	Spring Semester	Summer
Year 1	PHYS 601 - Classical Mechanics PHYS 603 - Mathematical Physics PHYS 621 - Quantum Mechanics I PHYS 651 - Teaching Physics PHYS 685 - Colloquium	PHYS 610 - Electricity & Magnetism I PHYS 630 - Statistical Physics & Thermodynamics PHYS 622 - Quantum Mechanics II PHYS 652 - Teaching Physics PHYS 685 – Colloquium	2 month summer research experience Take the PhD qualifier examination
Year 2	PHYS 611 - Electricity & Magnetism II PHYS 721 - Quantum Field Theory I PHYS 651 - Teaching Physics PHYS 685 - Colloquium Elective	PHYS 800 - Dissertation PHYS 651 - Teaching Physics PHYS 695 - Research Electives	Dissertation
Year 3+	PHYS 800 - Dissertation		
PhD: Electives: At least 1 inside and at least 1 outside subfield of study. Suitable graduate courses numbered at the 500, 600 or 700 course-level. M.S. required in black (32 credits over 3 semesters)			

Electives

Course number/title	Catalogue description	Prerequisites
PHYS430/630 Quantum Optics and Atomics	This course covers the core concepts and processes in quantum optics and atomic physics, including 2-level atoms, atom-light interactions, quantum coherence, and the quantized electromagnetic field. The course will also include topics in current research, such as laser cooling and trapping, quantum gases, electromagnetically induced transparency, quantum information science, quantum sensing, entanglement, and squeezing.	PHYS313, PHYS314
PHYS432/632 Quantum Materials and Quantum Devices	The course introduces the basic concepts and methods for the theoretical description of quantum materials and quantum devices. The first part of the course focuses on the electronic properties of quantum materials. In the second part, the concepts of qubit, quantum gate, and quantum sensor are introduced, along with examples of their implementation based on quantum materials.	PHYS313
PHYS434/634 Plasma Physics	This course provides an introduction to plasma physics, including where plasmas are found, avenues of current research, and computational methods in the field. The concepts of single particle motion, fluid equations, magnetohydrodynamics, and waves and instabilities are covered.	PHYS401 or PHYS302
PHYS436 Modern Astrophysics	Renumbering of existing PHYS485	PHYS313, PHYS401(coreq)
PHYS438/638 Nuclear and Particle Physics	This course provides an introduction to particle and nuclear physics. Topics include: global properties of nuclei, nuclear stability, nucleon structure, elastic and deep inelastic scattering from nuclei, QCD (quarks and gluons), quarkonia and other mesons, collider physics, weak interaction phenomenology, neutrino oscillations, weak bosons, and the Standard Model.	PHYS313, PHYS314
PHYS439/639 General Relativity	Place holder	

Incoming student priorities 1st year

- Fall
  - Your classes
  - Your teaching assignment
  - Investigating research with an eye out for a person or group you'd like to work with next summer
- Spring
  - Similar to above
  - By spring break you need to have a research advisor for the summer.
- Summer
  - First two months spent doing research
  - Last month studying for the qualifying exam held during the week before fall classes

Qualifying exam

- Usually taken in August after the 1st year
  - Occasionally incoming students take it.
- The exam is developed by members of the GSC.
- Three days 9:00-13:00. Four questions per day.

Content:

- The examination deals with undergraduate material, with the contents of the first-year graduate courses, and with material that a first-year graduate student should have obtained from seminars, colloquia, and journals. The results of the written examination are considered together with the candidate's course grades, recommendations from the faculty, and all other aspects of the candidate's academic record.

A second try is always allowed. A third try is allowed by appeal.

Incoming student priorities 2nd year

- Mix of research and courses
- Teaching will likely be easier

All subsequent years

- Research and professional development

Graduate student TA experience

- All PhD students have to TA for two semesters.
- Typically students from outside the US start with grading assignments.
- Students from the US usually start with 1st or 2nd year laboratory courses.
  - Due to familiarity with the US system and English proficiency
  - But there are exceptions
- We try to swap in the 2nd semester when appropriate.
- Many students TA for 3-4 semesters.
- Restrictions on using students after the first two years as TAs but it does happen on occasion.

Annual reviews

- Nearly iron-clad requirement
  - Sometimes waived (by the grad studies committee) if close to graduation.
- Yearly meeting with the student, their advisor, and 2 more faculty members.
- $\sim$45 minutes, in-person meeting.
- Student responsible for assembling the committee and scheduling.
  - This is a healthy exercise for their next career step.
- Typically they pick a committee member close to their research and one more at arms length.
- Intent is that this is $\sim$ ½ of a day's work for the student.

Why do we do annual reviews?

- To ensure that nobody gets lost in the system.
    - Students are our collective responsibility as a department.
- To discover problems in academic or research progress.
- To help the student and advisor plan ahead for the year.
- To help the advisor and provide a "second opinion."
- It is a best practice encouraged by the APS and AIP.

Why my offer letter worded so strangely

- Physics department recommends you for admission.
- The dean issues the offers.
  - You would need to sign and send the **intent form** to initiate the official offer.
  - The dean will not proceed unless all official documents (e.g. all transcripts) are in the system.