PHYSICS ILLINOIS
Graduate Program
The overall objective of our PhD degree program is to enable our graduates to pursue successful advanced technical careers in academia, business and industry, or national laboratories, by providing outstanding training in academics, research, and teaching methodologies, in a supportive, collaborative environment. We currently have about 270 physics graduate students working toward their PhD degrees, with about 35 percent engaged in theoretical work and about 65 percent in experimental. All of our graduate students are financially supported through fellowships, teaching assistantships, or research assistantships.

Physics Illinois graduate students enjoy the advantages that come from being part of a large research institution having state-of-the-art facilities. With roughly 70 faculty members engaged in leading-edge physics research—both theoretical and experimental, and in just about every physics research area—we offer incoming students a diverse range of research opportunities. Finding a doctoral adviser who is a good match for your research interests and style is essential to your ultimate success. Your adviser will help guide and provide resources for your original research and will work with you to edit your PhD thesis. Your doctoral adviser will also help you to establish the relationships within and outside the scientific community that will further your intellectual and career goals.

To help you find a research adviser, we offer first-year graduate students a required orientation course in which faculty members describe research opportunities in their groups. This course additionally offers basic training in scientific communications and ethics—to fully prepare you for research. Our grad school curriculum includes an extensive range of courses that provide foundational training in advanced physics. An important part of our PhD program is one-on-one advising and mentoring to help students identify the best set of courses to take, given their varied background preparations.

Our program is dedicated to maintaining an environment that is conducive to the success of our graduate students. Each year, we graduate 35 to 40 PhD candidates, making our program one of the top producers annually of physics PhDs in the United States. Over the last 10 years, more than 96 percent of our PhD graduates had job placements or had been admitted to postgraduate educational programs immediately following graduation. We are proud that many of our PhD graduates have gone on to make major contributions in science, industry, and government. The success of our graduates is a testament to the quality of our program—and to the caliber of our students.

We are looking for PhD students who not only have an aptitude for physics research but have demonstrated through their coursework and other activities a firm foundation in undergraduate physics and the ability to work hard. For that reason, our applicant review process is holistic, giving individual attention to all components of the graduate application. We believe diversity among our student body and faculty contributes to a richer intellectual environment, and so we welcome applications by students from groups historically underrepresented in physics.

We invite you to explore our program more deeply to find out how Physics Illinois might fit your aspirations.
It’s in this unique academic environment that we train future generations of scientists and leaders. The doctoral thesis—the presentation of original research by a PhD degree candidate—is the culmination of many years’ preparation.

Our graduate students work with preeminent faculty in traditional physics disciplines, including condensed matter physics, nuclear physics, high-energy physics, and astrophysics, and in younger fields of study, such as biological physics, atomic, molecular, and optical physics, computational physics, the physics of quantum information, cosmology, and physics education research. Additionally, some of our graduate students conduct research with faculty in other departments, including astronomy, bioengineering, chemistry, electrical and computer engineering, materials science and engineering, math, and mechanical science and engineering—many also ranked among the top ten U.S. programs in their fields.

At Illinois, great research facilities enable collaborative, interdisciplinary projects. In addition to state-of-the-art research laboratories, physics faculty and students make use of specialized research infrastructure and equipment at campus-wide facilities. Some faculty also carry out research at two national labs within two hours’ driving distance of campus, Argonne National Laboratory and Fermi National Accelerator Laboratory.

Here, you will learn research methodologies and be exposed to research opportunities starting your first semester. You should be ready to join a lab or research group by the summer before your second year. When ready to engage in independent research in collaboration with a physics faculty member (or, with departmental approval, on a physics topic with a faculty member in a related department), you will earn coursework hours through Physics 599 Thesis Research.

The original research you conduct at Physics Illinois will prepare you for a career at the forefront and in the intersections of physics.
FIRST YEAR
First-year students typically take two to three courses per semester and prepare for the qualifying exam. Many serve as teaching assistants while they look into research opportunities. By the first summer after enrollment, most students formally join a research group.

Courses commonly taken by students in their first year include Physics 580/581 Quantum Mechanics I/II, Physics 508/509 Mathematical Methods A and B, Physics 505 Electricity and Magnetism, and Physics 504 Statistical Physics.

A breadth requirement is satisfied by completing two introductory graduate-level courses in any of the following: biophysics, nuclear and particle physics, astrophysics, quantum optics and information or atomic physics, or condensed matter physics.

SECOND YEAR
Second-year students sit for their qualifying exam at the start of the year. The "qual" tests foundational knowledge in four key areas: classical mechanics, electricity and magnetism, quantum mechanics, and statistical physics.

Second-year students typically enroll in one or two advanced courses each semester in preparation for research and spend the balance of their time doing research. Many serve as research assistants in this and subsequent years.

THIRD YEAR
In the third year, students focus more intently on research, taking perhaps one specialized course per year. This is the year students typically prepare and present their preliminary examination. The "prelim" consists of a 15-page paper and research presentation describing the PhD student's proposal for thesis research, which is evaluated by a committee of four or five faculty members.

FOURTH YEAR
During the fourth year and up to the thesis defense, students focus entirely on research, taking only an occasional seminar course.

COURSEWORK
Our graduate program provides a firm foundation in physics, mathematics, and advanced research topics through a variety of advanced course offerings, including research-level special topics courses.

Since our graduate programs are highly specialized, there are very few specific course requirements. Student advising is tailored to individual interests and proficiencies, to ensure readiness for requisite milestones: the qualifying exam in the second year, the preliminary exam in the third year, and the thesis defense prior to graduation.

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SCIENTIFIC WRITING & PRESENTATION
Training in scientific communications and ethics is invaluable to success in graduate school—and to aspirations beyond the PhD.

We offer several professional development opportunities to help our graduate students become better communicators of science.

All first-year students are required to take Physics 596 Graduate Physics Orientation, which covers scientific writing, scientific presentation, research collaborations, scientific ethics, and more. Beyond that, students may elect to take Physics 598 PEN Communicating Physics Research, which provides more advanced instruction and practice in scientific writing and presentation, as well as grant proposal writing.

Optional instruction in proposal writing is also offered in a yearly Graduate Fellowship Workshop and in an NSF Graduate Fellowship Precompetition. These provide basic training in proposal writing to students interested in submitting NSF, DOE, or other graduate research fellowship applications.
Physics Illinois is a vibrant, inclusive, and collegial community of scholars, set within the rich cultural backdrop of the twin cities of Urbana and Champaign.

Our graduate students work hard. To help relieve the typical stress associated with research and teaching and to help foster a collegial environment among students and faculty, we organize a number of social activities for graduate students each year.

We host a picnic for all graduate students, faculty, and staff early each fall semester to welcome the first-year physics graduate students. And Physics Illinois graduate students run an annual Physics Illinois Physical Revue, a departmental talent show, each December, which features graduate student and faculty musical acts, comedy skits, movie shorts, and more.

We also support several physics graduate student organizations, which contribute significantly to the supportive climate at Illinois.

PHYSICS GRADUATE STUDENT ASSOCIATION (PGSA)
PGSA is active throughout the academic year. PGSA runs a variety of social and academic activities for our graduate students, including Physics Phridays Ice Cream Socials, brown-bag lunches with faculty members, a biweekly movie night, a physics graduate student colloquium, a PGSA picnic each semester, a barbecue for incoming students at the beginning of the year, and a basketball tournament. The PGSA also sponsors a department softball team, the “Wild Bohrs,” which plays in a Champaign-Urbana city league.

ILLINOIS GPS
Illinois GPS is a newly founded physics-grad-to-physics-undergrad student mentorship program run by our graduate students. This voluntary program matches students based on personal profiles and preferred style of mentoring.

WOMEN IN PHYSICS
Women in Physics holds regular meetings and lunches for women faculty, postdocs, and graduate students.
CAREER PLACEMENT

As our graduate students approach the thesis defense—both the apex and the terminus of their doctoral program—their futures loom large. An integral part of our training of the next generation of great scientists is preparing them for their successful transitions to productive careers.

To enhance the visibility of our graduate students’ research and improve their ability to network and find job opportunities, we run a Physics Graduate Student Travel Award Program for our students interested in attending scientific conferences and workshops. Invaluable career guidance from visiting PhD alumni is offered to our graduate students through our Physics Careers Seminar series. Speakers describe their varied career paths in industry, academia, finance, medicine, law, and government, demonstrating the wide range of possible professions for physics PhDs. The graduate programs office runs a Physics Grad Student Blog, where updated job, fellowship, and research information and links are posted daily. We also encourage our graduate students and our alumni to join our Physics Illinois LinkedIn network, to trade information about jobs.

We recognize the importance of building our graduate students’ CVs. The department confers several graduate student awards annually to deserving students. We also regularly nominate or support the application of our graduate students to non-departmental research fellowships and distinctions.

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Check out the Graduate Student Blog

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Apply

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