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 274 physics graduate students working toward their PhD degrees, with roughly 50 percent engaged in theoretical/computational research and another 50 percent doing primarily experimental research. All of our graduate students are financially supported through fellowships, teaching assistantships, or research assistantships. Illinois Physics 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 computational, experimental, and theoretical physics research, 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 90 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 invite you to explore our program more deeply to find out how Illinois Physics might fit your aspirations.

Selecting the right graduate school program to fit your career aspirations, your interests and work style, and where you’d like to live—it’s a weighty decision that will define a good portion of your daily life for the next five to seven years. Beyond that, the work you’ll do, the courses you’ll take, and the relationships you’ll form will all influence your career opportunities after graduate school.

PROFESSOR LANCE COOPER
Associate Head for Graduate Programs

WELCOME TO ILLINOIS PHYSICS

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PROFESSOR LANCE COOPER
Associate Head for Graduate Programs
Illinois Physics—ranked among the top ten physics departments in the U.S. by the National Research Council of the National Academy of Sciences—is world renowned for its traditional “Urbana style” of research. Defined by its collegial spirit and open collaboration across areas of expertise—where theorists and experimentalists work together to drive discovery—the “Urbana style” continues to foster innovation in an atmosphere of intellectual freedom.

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 astrophysics/cosmology, condensed matter physics, gravitation, high energy physics, and nuclear physics, and in younger fields of study, such as atomic, molecular, and optical physics, biological physics, physics education research, and quantum information. 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 Illinois Physics will prepare you for a career at the forefront and in the intersections of physics.

CORE RESEARCH AREAS

Astrophysics, Gravitation, and Cosmology
Atomic, Molecular, and Optical Physics
Biological Physics
Condensed Matter Physics
High Energy Physics
Nuclear Physics
Physics Education Research
Quantum Information

COLLABORATIVE RESEARCH FACILITIES AT ILLINOIS

Beckman Institute for Advanced Science & Technology
Carl R. Woese Institute for Genomic Biology (IGB)
Center for the Physics of Living Cells (CFLC)
Illinois MRSEC (Materials Research Science and Engineering Center)
Illinois Quantum Information Science and Technology Center (IQUIST)
Institute for Condensed Matter Theory (ICMT)
Micro and Nanotechnology Laboratory (MNTL)
National Center for Supercomputing Applications (NCSA)
NCSA Petascale Computing Facility
NIH Center for Macromolecular Modeling & Bioinformatics
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.

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.
STUDENT LIFE
Illinois Physics 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 Illinois Physics graduate students run an annual Illinois Physics Physical Revue, a departmental talent show, each December, which features graduate student and faculty musical acts, comedy skits, movie shorts, and more.

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

PHYSICS GRADUATE STUDENT ASSOCIATION (PGSA)
The PGSA is active throughout the academic year and 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, a member organization of the multi-campus ACCESS Network, provides physics-grad-to-physics-undergrad student mentorship. This voluntary program matches students based on personal profiles and preferred style of mentoring.

THE GRADUATE STUDENT DIVERSITY COMMITTEE
The Graduate Student Diversity Committee, appointed by the associate head for graduate programs, helps guide graduate-driven initiatives that support inclusion and equity and serves as a sounding board for the Physics Faculty Diversity Committee.

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 Illinois Physics 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.

Top Job Placements of Illinois Physics PhDs at Graduation 2005 to 2019

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<tr>
<th>RANK</th>
<th>US ACADEMIC INSTITUTION</th>
<th>INDUSTRY</th>
<th>NATIONAL LABORATORY</th>
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<tbody>
<tr>
<td>1</td>
<td>Harvard</td>
<td>Intel</td>
<td>Los Alamos</td>
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<td>2</td>
<td>Stanford</td>
<td>IBM</td>
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<td>U.C. Berkeley</td>
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<td>Sandia</td>
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<td>7</td>
<td>Northwestern</td>
<td>Bank of America</td>
<td>National Institutes of Health</td>
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Check out the Graduate Student Blog

PHYSICS.ILLINOIS.EDU/ACADEMICS/GRADUATES/BLOG/

Apply

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