PHYSICS

http://physics.illinois.edu

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Major: Physics
Degrees offered: M.S. and Ph.D.

Major: Teaching of Physics
Degrees offered: M.S.

Medical Scholars Program: Doctor of Philosophy in Physics (Ph.D.) and Doctor of Medicine (M.D.) through the Medical Scholars Program (https://www.med.illinois.edu/mdphd)

Graduate Degree Programs

The Department of Physics is actively developing a new paradigm for graduate physics education and research for the 21st century, aimed at enhancing interdisciplinary interactions and creating an integrated approach to educational and research training. Advanced degrees offered in physics are the Master of Science and the Doctor of Philosophy. Outstanding graduate research opportunities are available in many subdisciplines of physics, including:

- condensed matter physics
- high energy and nuclear physics
- astrophysics
- atomic
- molecular and optical physics
- complex systems
- quantum information
- biological physics
- physics education research

Students may select experimental, theoretical, or computational thesis projects. Multidisciplinary projects are especially encouraged, and, with the consent of other departments, students may earn master's degrees in areas such as materials science and engineering, or computer science, simultaneously with their Ph.D. degrees in physics. Opportunity also exists for specializing in:

1. computational science and engineering and
2. energy and sustainability engineering within the department's graduate programs via the Computational Science and Engineering (CSE) Option (https://www.ece.illinois.edu/academics/grad/overview/cosc.asp) and the Energy and Sustainability Engineering (EaSE) Option (http://ease.illinois.edu).

The Medical Scholars Program (https://www.med.illinois.edu/mdphd) permits highly qualified students to integrate the study of medicine with study for a graduate degree in a second discipline, including Physics.

Information listed in this catalog is current as of 06/2017
Faculty Research Interests
The research specialties of Physics faculty fall into the broad categories described in the graduate programs section of this document. Details of each individual’s specific interests are available at the department’s faculty research Web site. Included are faculty whose primary appointments are in other departments but who supervise Physics students.

Facilities and Resources
The Department of Physics offers world-class research facilities in traditional areas of physics, including condensed matter, nuclear, particle, and optical physics, as well as state-of-the-art instruments for quantum information, nanoscale science and engineering, and biological physics. For a complete description of physics facilities, please consult the department’s facilities Web site.

Financial Aid
Fellowships, research assistantships, and teaching assistantships (all of which include waivers of tuition and some fees) are available for the majority of admitted students. All applicants, regardless of U.S. citizenship, whose native language is not English and who wish to be considered for teaching assistantships must demonstrate spoken English language proficiency (by achieving a minimum score of 24 on the speaking subsection of the TOEFL iBT or 8 on the speaking subsection of the IELTS. For students who are unable to take the iBT or IELTS, a minimum score of 4CP is required on the EPI test). Proficiency in a language other than English is not required.

Doctor of Philosophy in Physics
Admission to Ph.D. candidacy is based on the faculty’s evaluation of a student’s potential to carry out independent research, scholastic competence as evidenced by grades and class ranks, and satisfactory performance on the qualifying examination. Although there is no formal Ph.D. core curriculum, all candidates are expected to complete courses necessary for their research, which may include advanced courses in:

- mechanics
- electromagnetism
- light
- atomic physics and quantum mechanics
- nuclear and particle physics
- condensed matter physics
- mathematical or computational methods for physics

Other Requirements and Conditions
Other Requirements and Conditions may overlap.

Recommended elective courses:
PHYS 504, 505, 508 & 509, 580 & 581

PHYS 599 (thesis research) cannot be taken until after the preliminary exam is passed.

Ph.D. exam and dissertation requirements:
Qualifying exam: 2
Preliminary exam
Final exam or dissertation defense
Dissertation deposit
Minimum GPA: 2.75

1 For additional details and requirements refer to the department’s Degree Requirements and the Graduate College Handbook.
Qualifying Exam Information

**Entering with approved B.S. degree**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>PHYS 599</td>
<td>Thesis Research (min applied toward the degree)</td>
<td>6</td>
</tr>
<tr>
<td>PHYS 513</td>
<td>Quantum Optics &amp; Information</td>
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<tr>
<td>or PHYS 514</td>
<td>Modern Atomic Physics</td>
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<tr>
<td>PHYS 540</td>
<td>Astrophysics</td>
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<td>PHYS 550</td>
<td>Biomolecular Physics</td>
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<tr>
<td>PHYS 560</td>
<td>Condensed Matter Physics I</td>
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<tr>
<td>or PHYS 569</td>
<td>Emerging States of Matter</td>
<td></td>
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<tr>
<td>PHYS 570</td>
<td>Subatomic Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 597</td>
<td>Individual Study (prior to the preliminary exam)</td>
<td>1-16</td>
</tr>
</tbody>
</table>

Elective courses – chosen in consultation with advisor
(subject to Other Requirements and Conditions below)

Total Hours 96

**Other Requirements and Conditions**

Other Requirements and Conditions may overlap

Recommended elective courses:

PHYS 504, 505, 508 & 509, 580 & 581 (& denotes sequence)

A minimum of 12 500-level credit hours applied toward the degree.

A minimum of 16 PHYS credit hours, with 8 at the 500 level.

PHYS 599 (thesis research) cannot be taken until after the preliminary exam is passed.

An additional maximum of 8 hours of PHYS 597 (or other individual study) may be applied toward the elective course work requirement.

These students may earn a Master of Science degree during the Ph.D. program.

Ph.D. exam and dissertation requirements:

Qualifying exam:

Preliminary exam

Final exam or dissertation defense

Dissertation deposit

Minimum GPA: 2.75

For additional details and requirements refer to the department’s Degree Requirements and the Graduate College Handbook.

Qualifying Exam Information

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