

# DEPARTMENT OF PHYSICS

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Physics is the scientific study of the nature and behavior of matter and energy. On the basis of quantitative observations, physicists develop theories to describe the observed behavior. Further experiments and observations are used to verify or refine the theories. The scientific method demands logical and mathematical rigor. The wealth of applications of physics to technology appeals to pragmatic persons, yet physics has much greater similarity to the arts and humanities than is commonly realized because of the intellectual curiosity and creativity on which it is built.

The physics program at U of I introduces students in technical and non-technical curricula alike to the scientific method and to physical laws. The B.A. and B.S. curricula in physics emphasize a broad liberal-arts education and the core subjects in physics. Many B.A. and B.S. recipients go on to graduate study in physics or related disciplines.

Training in the theory, history, and philosophy of physics is provided by the required core courses and electives in most of the major areas of specialization. Formal laboratory courses and directed research familiarize students with experimental techniques, modern instrumentation, and computers. Equipment in the department's research laboratories includes low-temperature, strong magnetic field, high-vacuum, and vapor deposition facilities, electron and atomic beam apparatus, plasma devices, various lasers, spectrometers, optical telescopes, and nuclear radiation detectors. All offices, laboratories, and classrooms have computer network connections. The program is supported by a machine shop and a computer services shop. Collaborations with other universities and research institutes provide access to an even wider range of facilities.

The department offers graduate curricula leading to the M.S. and Ph.D. degrees. A bachelor's degree in physics is normally required as preparation for graduate study. Students with a bachelor's degree in another physical science, engineering, or mathematics field will generally qualify after removal of a few upper-division-level deficiencies.

Research in the Department of Physics emphasizes the areas of condensed matter physics, nuclear physics, atomic physics, astrophysics, and biophysics. In addition, there is an interest in research on physics teaching.

The M.S. is not a prerequisite for the Ph.D., but beginning doctoral students may earn the M.S. if they wish. General departmental course requirements exist for the M.S. and Ph.D. degrees in addition to the general requirements of the College of Graduate Studies. Other course requirements are specified in the student's study plan, developed by the student and their advisor and approved by the student's supervisory committee. All graduate students are encouraged to gain some teaching experience during the course of their graduate studies.

## Physics Department Statement of Objectives

### Undergraduate Program

Our goal is to provide students with a qualitative and quantitative understanding of the core topics in theoretical physics: classical

mechanics, electricity and magnetism, modern physics, quantum mechanics, thermal physics, and mathematical methods, as well as a familiarity with the experimental techniques on which advances in physics are based. In addition, it is expected that each student will develop a more detailed knowledge of several special areas in physics such as atomic and molecular physics, nuclear and particle physics, classical optics and quantum optics, solid state physics, astronomy, relativity and computational physics.

In the process of developing specific knowledge of areas in physics, students will learn to analyze physical phenomena using basic physical principles and acquire skills in basic logic and reasoning, mathematics and computation, problem solving, experimental technique, and oral and written communication.

Students completing the undergraduate program should be well prepared for further study at the graduate level or to apply their skills successfully in other professional settings. They will be able to effectively communicate orally and in writing either with co-workers in a team effort or with non-scientists in public discussions of scientific issues

### Graduate Program

In the graduate program, we aim to deepen a student's basic knowledge and understanding of theoretical and experimental physics as well as to guide them to achieving expert status in a particular area of contemporary interest to the physics community. By carrying out a research project in collaboration with a major-professor acting as mentor, the student will develop the skills required to initiate, and carry to completion, an independent research program upon obtaining an advanced degree.

Faculty members in the department are happy to discuss programs in detail with interested persons. Requests for information or a tour of the facilities can be made by a letter, e-mail, or telephone call (208-885-6380) to the department.

### Majors

- Physics (B.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/physics/physics-bs/>)
- Physics (B.A.) (<https://catalog.uidaho.edu/colleges-related-units/science/physics/physics-ba/>)

### Minors

- Physics Minor (<https://catalog.uidaho.edu/colleges-related-units/science/physics/physics-minor/>)

### Physics Graduate Program

Candidates must fulfill the requirements of the College of Graduate Studies and of the Department of Physics. See the College of Graduate Studies (<https://catalog.uidaho.edu/colleges-related-units/graduate-studies/>) section for the general requirements applicable to each degree.

- Physics (M.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/physics/physics-ms/>)
- Physics (Ph.D.) (<https://catalog.uidaho.edu/colleges-related-units/science/physics/physics-phd/>)