

Department of Physics and Astronomy

A dictionary might define physics as "the science that deals with matter and energy," but there are no limits to what physicists study! We investigate everything from galaxies to subatomic particles and from window glass to living things, in an attempt to understand the basic principles of nature and their operation in the world in which we live. Students studying physics and astronomy at Oberlin find a lively, diverse program with a close community of students and faculty, a rich selection of academic courses, faculty interested in both undergraduate teaching and research, and ample opportunities for both formal and informal education, including active student research involvement.

The Oberlin department of Physics and Astronomy is large enough to offer a first-rate education, yet small enough to encourage close student-faculty contact. The course offerings cover the fundamental areas of physics as well as special topics such as electronics and astrophysics. Outside speakers visit campus about once a month to give lectures and to talk informally with students. Frequent lunch gatherings generate lively discussion between students and faculty concerning recent happenings in physics.

About a dozen majors graduate each spring, with concentrations in either general physics or astrophysics. About a third of the recent majors have entered physics or astronomy graduate programs at institutions including Harvard, Cornell, Rochester, and the Universities of California, Colorado, Wisconsin, and Pennsylvania. Another third have gone to medical school or to graduate school in fields such as engineering, biophysics, geology, architecture, law or economics. Still others have found rewarding positions in industrial or governmental laboratories, in computer programming, in the financial sector, in the Peace Corps, or in highschool teaching, including at schools in Ecuador and Japan.

Each year, about one third of the senior majors participate in the honors program, for which they adopt a research project of their own choosing. Many students select projects related to faculty research, while others pursue independent

investigations. The faculty engage in research in areas such as radio astronomy, materials science, energy and the environment, and theoretical physics. With no competition from graduate students, opportunities are available during the summers and academic year to work with faculty in many of these areas. Students recently accompanied a faculty member to Puerto Rico for radio astronomy observations, and with another faculty member went to the South Pole to study atmospheric physics. Two Oberlin undergraduates spent the month of January, 2005 working on projects at the Raman Research Institute in Bangalore, India.

The department of Physics and Astronomy occupies the Wright Laboratory of Physics, which holds offices, classrooms, teaching and research laboratories, a machine shop, and an electronics shop. The ground floor of Wright was completely renovated in 1993 and now houses impressive research and instructional laboratory facilities. The upper two floors have been renovated in connection with the new Science Center. Departmental apparatus includes three high-vacuum stations, a Bomem FTIR spectrometer, a Lakeshore Vibrating Sample Magnetometer, a Phillips X-ray diffractometer (shared with Chemistry), a reflecting telescope with a state-of-the-art CCD camera, an electrically shielded room, twenty microcomputers and several Sun computer graphics workstations.

The Oberlin College department of Physics and Astronomy offers a solid academic program and an opportunity for undergraduates to work closely with faculty on interesting research. The physics major is certainly one of the most exciting majors at Oberlin!

Physics and Astronomy Department Faculty and their Research Interests

STEPHEN FITZGERALD

B.A. Mod., Trinity College, University of Dublin, 1987

Ph.D., Cornell University, 1994

Infrared spectroscopy, hydrogen trapping in fullerines

YUMI IJIRI

A.B., Princeton University, 1991

Ph.D., Cornell University, 1996

Experimental solid state physics, magnetic thin films

CHRISTOPHER MARTIN

B.A., Rice University, 1994

Ph.D., University of California, Santa Barbara 1999

Astrophysics, atmospheric physics

JOSEPH N. PALMIERI

Professor Emeritus

Sc.B., Brown University, 1954

Ph.D., Harvard University, 1959

W. BRUCE RICHARDS, CHAIR

A.B., Oberlin College, 1961

Ph.D., University of California, Berkeley, 1966

Physics of musical instruments

JOHN H. SCOFIELD

A.B., University of Michigan, Flint, 1978

Ph.D., Cornell University, 1985

Experimental solid state physics, photovoltaics,
energy use in buildings

DANIEL R. STINEBRING

B.A., Williams College, 1976

Ph.D., Cornell University, 1982

Astrophysics, radio astronomy, pulsars

DANIEL F. STYER

B.A., Swarthmore College, 1977

Ph.D., Cornell University, 1983

Statistical mechanics, chaos in quantum mechanics

ROBERT E. WARNER

Professor Emeritus

B.S., Antioch College, 1954

Ph.D., University of Rochester, 1959

Nuclear physics

Sample Course Program for a Physics Major

Freshman Year

Fall Semester

Mechanics and Relativity (Physics 110)

Calculus II (Math 134)

Spring Semester

Electricity, Magnetism, Optics, Waves (Physics 111)

Multivariate Calculus (Math 231)

Sophomore Year

Fall Semester

Modern Physics (Physics 112)

Differential Equations (Math 234)

Spring Semester

Classical Mechanics (Physics 310)

Junior Year

Fall Semester

Quantum Mechanics (Physics 312)

Intermediate Laboratory (Physics 314)

Spring Semester

Electricity and Magnetism (Physics 311)

Senior Year

Fall Semester

Statistical Mechanics (Physics 410)

Spring Semester

Applied Quantum Mechanics (Physics 412)

Advanced Laboratory (Physics 414)

A student taking the Physics/Mathematics program outlined above would be well prepared for graduate study in physics. Not all of these courses are required for the major: a program that includes the intermediate and advanced laboratory courses plus any three of the 300- and 400-level courses would still satisfy the major requirements. Students wishing

to have a concentration in astrophysics take two astrophysics courses in place of one of the upper-level physics courses, and may substitute Electronics for the Advanced Laboratory.

Students not prepared to take Calculus II in the first semester of the freshman year should take Calculus I and Calculus II (Math 133 and 134) in their freshman year, and begin the physics curriculum with Physics 110 in the first semester of their sophomore year.

Prospective physics majors who have Advanced Placement in physics should consult the Chair of the Physics and Astronomy Department upon their arrival for their first semester at Oberlin.

Send questions to Physics and Astronomy Department, Oberlin College, Oberlin, OH 44074, or by computer mail to Internet address physics.admissions@oberlin.edu

The department World Wide Web server is <http://www.oberlin.edu/physics/>

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