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Explore.
Discover.
Achieve.

Departments
and Programs
in the College
of Science

Biochemistry &
Biophysics

Biology

Botany & Plant
Pathology

Chemistry

Environmental
Sciences

Geosciences

Mathematics

Microbiology

Molecular &
Cellular Biology

Physics

Pre-professional
Programs in the
Health Sciences

Professional
Science Masters

Science &
Mathematics
Education

Statistics

Zoology

OSU
Oregon State
UNIVERSITY

Physics

Physics majors enroll in OSU's nationally recognized program, "Paradigms/Capstones in Physics", which includes a senior research thesis.

The Department of Physics at OSU is one of the few departments in the United States offering a B.S. degree in computational physics.

In the number of physics majors, OSU's Department of Physics ranks in the top 30 among the 177 Ph.D.-granting departments in the United States.

Explaining the behavior of the physical universe. **Physics is the study of the fundamental structure of matter and the interactions of its constituents.** Physicists are concerned with the development of concepts needed for a precise description of nature and with experiments to test such concepts. Consequently, the science of physics is at the core of many new advances in engineering and technology.

Research areas include:

Electronic and linear and nonlinear optical properties of electronic materials.
Electronic structure calculations.
High resolution laser spectroscopy
Magnetic anisotropy in transition metals
Nano- and micro-structured materials, including carbon nanotubes
Negative index media
Neutron diffraction studies of novel magnetic semiconductor nanostructures
Nonlinear optical phenomena
Nuclear magnetic resonance studies of various materials
Octonions to describe the symmetries of 10-dimensional physics
Optical trapping of atoms and particles
Photonic devices
Photophysics
Physics education research
Precision atomic physics
Single-molecule fluorescence spectroscopy
Thin film physics
Transparent conductors
Ultrafast carrier dynamics in semiconductors
Ultrafast spectroscopy

Research

The Department of Physics has joint programs with several departments on campus: chemistry, mathematics, science & mathematics education, and departments in the College of Engineering.

A new effort in femtosecond spectroscopy studies the high speed dynamics and nonlinear response in semiconductor nanostructures.

An interdisciplinary program in physics, chemistry, and electrical & computer engineering encompasses wide-ranging research on transparent conductors with a view to building a new generation of transparent opto-electronic devices.

Ultrafast spectroscopy and single-molecule fluorescence microscopy are used to understand fundamental, light-matter interactions in organic

optical materials and to develop high-performance materials for electronic and photonic applications.

Theoretical and computational research is performed to understand the electromagnetism of nano- and micro-structured composites and to design metamaterials with tailored optical properties for ultra-compact waveguides, high-performance sensing, negative refraction, and other photonic applications.

Diode lasers are used in laser cooling and trapping of rubidium atoms and nano-particles, in experiments to study laser noise properties, and to develop new spectroscopic techniques.

OSU's reactor is used to measure neutron capture cross sections, including some that are needed for producing radioisotopes employed for medical diagnosis and therapy.

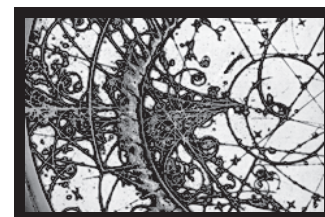
Neutron diffraction is applied to the study of semiconducting magnetic superlattices.

Optically active impurities in semiconductors are investigated with nuclear magnetic resonance combined with in-situ optical excitation.

Optical waveguide surface coherent anti-Stokes Raman scattering is used for investigation of fundamental atomic processes occurring at surfaces.

Physics education research is performed in the context of the "Paradigms in Physics" project and the CPUG program (computational physics for undergraduates).

Theoretical research is performed to study basic electronic, magnetic, optical, and structural properties of metals, alloys and ceramics, magnetic anisotropy of transition metals, and properties of semiconducting magnetic superlattices.



Physics

The Department of Physics offers a degree program in engineering physics through OSU's College of Engineering.

State-of-the-art research equipment includes two Pulsed Laser Deposition systems and several femto-second laser systems.

One of the connections between the department and industry is the company ViewPlus, which was started by John Gardner, an emeritus faculty member in the Department of Physics.

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Education

Opportunities abound! The Department of Physics at Oregon State University offers degree programs leading to the bachelor of science degree or bachelor of arts degree in physics (within the College of Science), and the bachelor of science degree in engineering physics (within the College of Engineering). A new interdisciplinary degree in computational physics was approved in the fall of 2001 and is receiving national recognition as a model program. Many options within the physics degree are available, and we also offer a minor in physics.

Our undergraduate program provides a modern approach to physics and a variety of interactive class formats. "Paradigms in Physics", the junior year sequence, is a series of nine, 3-week courses, based on central concepts in physics. "Capstones in Physics" is the senior-year program, designed to help students consolidate, broaden, and deepen their understanding of the subjects introduced in the junior-year.

All students do a senior thesis research project under the direct supervision of a faculty member.

These approaches have moved the curriculum from a traditional set of courses rooted in single topics, to problem solving and the integration of knowledge across physics. The program, with support from the National Science Foundation, is now being disseminated across the United States as a new approach to training physicists.

The Department of Physics at OSU offers degree programs leading to the Master of Science (M.S.) Degree in Physics, Master of Science (M.S.) Degree in Applied Physics, and the Doctor of Philosophy (Ph.D.) Degree in Physics. In addition, since 2003, the department has accepted students into the Professional Science Master's degree program in applied physics.

Outreach

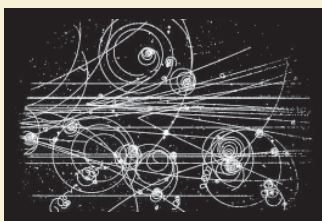
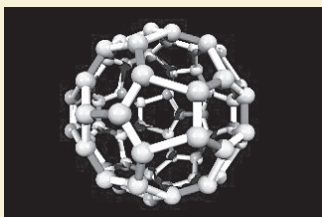
Faculty and students from the Department of Physics participate in the "Adventures in Learning" and "Outside the Box" pre-college programs for gifted, talented, and creative students. We also host a physics-activity learning module during the "Discovery

Days" program in which 4,000 K-8 students come to campus for the purpose of increasing their interest in science by experiencing science.

Faculty

The Department of Physics has 16 faculty members, with honors including:

- 5 Fellows of the American Physical Society
- 2 Alumni Distinguished Faculty Awards
- 2 Frederick H. Home Award for sustained excellence in teaching
- 2 Fulbright Fellowships
- 2 Humboldt Fellowships
- 2 Phi Kappa Phi Emerging Scholar Awards
- 2 Sloan Foundation Fellowships
- 1 American Library Association "Choice Award"
- 1 D. Curtis Mumford Faculty Service Award
- 1 Distinguished Alumnus Award from Purdue University
- 1 Elizabeth P. Ritchie Distinguished Professor Award
- 1 Editor, IEEE/AIP CISE Journal
- 1 Killam Memorial Fellowship
- 1 Mary Lyon Alumnae Award (Mount Holyoke)
- 1 Millikan Medal from the American Association of Physics Teachers
- 1 National Science Foundation Career Award
- 1 Thomas T. Sugihara Young Faculty Research Award



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