Physics

College of Science and Mathematics

Department of Physics
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B.S. in Physics

M.S. in Physics

Minor in Physics

Minor in Physical Science

Single Subject Teaching Credential in the Sciences

Physics

The fascination of physics is that it is so fundamental: the continuing attempt to understand how things work. It combines observational and experimental grappling with nature to get the facts of behavior, with the creative synthesis of these facts into theories and laws of nature, often beautiful in their simplicity and universality.

Albert Einstein said, "They [the laws of theoretical physics] should form the basis from which a picture of all processes of nature can be derived by thoughtful deduction — and these include also the processes of life." He also said, "The deeper we search, the more we find there is to know, and as long as human life exists, I believe it will always be so."

More specifically, physics includes the study of the fundamental particles that make up nuclear particles, of electromagnetic, gravitational, atomic and nuclear forces, of energy, of light and heat, of electronics and the structure of materials, of the interiors of the earth and the stars.

Faculty and Facilities

Our faculty came here to teach and do research. Several faculty members have research projects involving students.

Classes are small; our upper-division and graduate classes run from two to 15 in enrollment. Physics majors get to know each other very well. They develop friendships with peers, faculty, and staff, which extend beyond graduation.

We have two medium-power lasers, which enhance our capabilities in modern optical studies, including Raman spectroscopy and nonlinear optics. The department has well-equipped research laboratories with laminar flow hoods, evaporative and ion beam sputtering chambers, and high temperature ovens for thin film research. We also have a fully-equipped scanning probe microscope with low current scanning tunneling, lateral force and intermittent contact atomic force imaging capabilities — contained in an environmentally controlled chamber for research involving the self assembly of biomolecules. A dedicated networked computer houses an SPM image library for K-12 education purposes.

Another ongoing research project involves fullerenes, the cage-like molecules formed entirely from carbon. We are able to produce gram quantities of fullerenes in our computer-controlled plasma generator. Current fullerene projects include the measurement of the polarizability and electric dipole moments of metal-doped fullerenes.

High energy particle physics experiments and semiconductor research dealing with solar cells and optical fibers are also part of our current experimental efforts. Two faculty members do theoretical work in particle physics and field theory and several are interested in physics pedagogy. One faculty member is involved in radiation medical physics.

In addition, our physical facilities have just undergone a multimillion dollar renovation. The renovation project substantially improves both our research and teaching capabilities.

The Downing Planetarium. The Downing Planetarium, which is operated by the Physics Department, was completed during the 2000 spring semester. The planetarium features a computer-controlled Minolta MS-8 star projector and a main theater which seats 74 in reclining seats under a thirty-foot dome. The facility presents multi-media shows on a daily basis. Physics students have the opportunity to participate in presenting the shows and to assist in planetarium operation.

A remote robotic observatory (which will be situated in the nearby foothills) is in the planning stage. Students interested in astronomy will be able to perform observation projects using a computer-controlled 16" Schmidt-Cassegrain telescope and a CCD camera. The telescope will be controlled from campus and students will be able to electronically download images on campus without having to go to the telescope site.

Career Opportunities

Approximately half of our bachelor's and master's degree graduates have gone directly into graduate school at various institutions, pursuing master's or doctoral degrees in physics or related fields. The other half have found employment in teaching, in industry, in government, and in the