

Physics

College of Science and Mathematics

Department of Physics

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B.S. in Physics

B.S. in Biomedical Physics

B.A. in Natural Science

Teaching Credential

Option: Physics

M.S. in Physics

Minor in Astronomy

Minor in Medical Physics

Minor in Physics

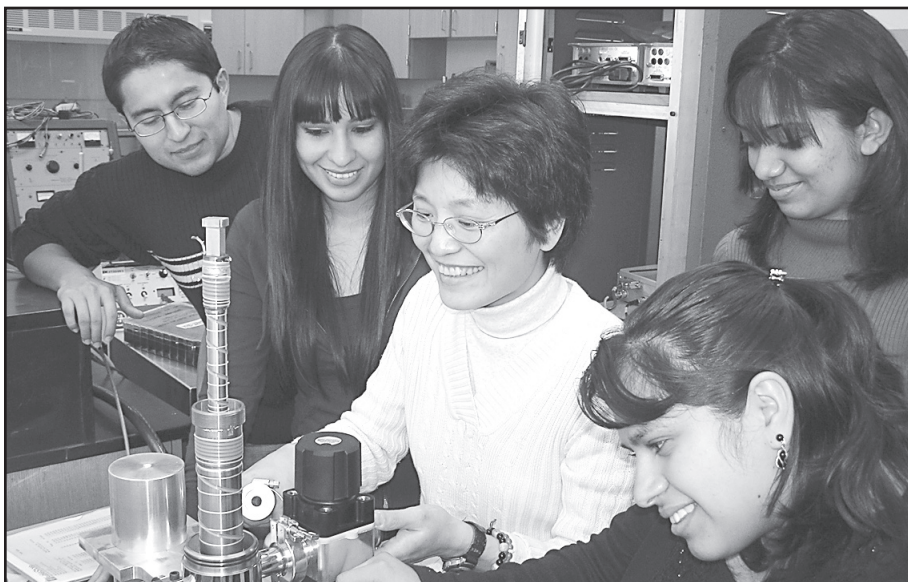
Minor in Physical Science

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 all matter, of electromagnetic, gravitational, atomic and nuclear forces, of energy, of light and heat, of electronics and the structure and properties of materials, of the interiors of the Earth and the stars.



Faculty and Facilities

Our faculty members are here to teach and to do research. Several faculty members have research projects involving students. Two of our faculty members do theoretical work in particle physics and field theory while others are involved with numerous different experimental research fields; some of our faculty are involved in physics pedagogy.

Our classes are small; our upper-division and graduate classes usually have 10-15 students or less. Physics majors get to know each other very well. They develop friendships with peers, faculty, and staff, which extend well beyond graduation.

The Department of Physics has an active theoretical physics program that focuses on gravitational physics and field theory. We have ongoing collaborations with several international research groups including the Institute of Applied Physics of the Academy of Sciences of Moldova, Kyrgyz-Russian Slavic University, the Center for Gravitation and Fundamental Metrology (VNIIMS) at the Peoples' Friendship University of Russia, the Universidad de Costa Rica, UC San Diego, UC Merced, the University of Idaho, the National Observatories, UC Davis and San Diego State, and the National High Magnetic Field Laboratory at Los Alamos. Our students in this area regularly attend national and international conferences to give talks, and they are active in publishing their research work in refereed journals. Several international researchers have visited our department and engaged in collaborative research, colloquia, and seminars.

The department has well-equipped research laboratories with laminar fume hood, evaporative and ion beam sputtering machine, and high temperature ovens for thin film research. We have two medium-power lasers, which enhance our capabilities in modern optical studies, including Raman spectroscopy and nonlinear optics.

Four new research laboratories are also part of our current experimental efforts: the Radiation Measurements and Instrumentation Laboratory, the High Energy Physics (HEP) Laboratory, the Condensed Matter Physics Laboratory, and the Astrophysics Laboratory. The High Energy Laboratory develops and constructs state-of-the-art solid-state charged particle detectors for use in the D0 Project at Fermi National Laboratory (Fermilab). Our HEP program has joined the ATLAS experiment of the Large Hadron Collider (LHC) at the European Organization of Nuclear Research (CERN). LHC came online in 2008 and will remain the energy frontier for the next 15 years. This new direction links us to the world's center for HEP research where discoveries such as the Higgs boson, supersymmetry, extra dimensions, and several other exciting new physics scenarios may be possible. The Condensed Matter Physics Laboratory is well equipped with both teaching and student research equipment, such as a pulsed NMR spectrometer, X-ray diffractometer, and Hall effect system. The lab is available for experiments on superconductivity, temperature-dependent measurements of electrical resistivity, semiconductor band structure, thermal conductivity, thermo-