

# Physics, M.S.

## DEPARTMENT

MN in Physical Science, Minor  
MS in Physics, M.S.  
BS in Physics, B.S.  
MN in Physics, Minor  
MN in Medical Physics, Minor  
MN in Astronomy, Minor  
BS in Biomedical Physics, B.S.

## REQUIREMENTS

Department of Physics

### Master of Science in Physics - Requirements

The objective of our M.S. program is to build a firm basis for subsequent Ph.D. study in physics or in related fields, for positions in industry, and for teaching at the community college level. We offer a broad-based academic program with the opportunity for specialized theoretical or experimental research. Students completing degrees have successfully pursued all three of these career goals - with roughly equal numbers going to doctoral programs and industry, and a smaller number directly into teaching.

Areas of research in which our faculty are active include physics pedagogy, condensed matter theory and experiment, characterization of materials properties (amorphous semiconductors), dipolar magnetism, Fullerene research, laser Raman spectroscopy, radiation medical physics, classical and quantum field theory, and gravitation. Faculty also study forces and interaction of fundamental constituents of matter with experiments using the world's most powerful particle accelerators at Fermi National Laboratory and CERN, Switzerland. Astronomy research includes observations of cataclysmic variables, black holes, and extrasolar planets. It is done with the most powerful instruments available today, including Hubble Space Telescope, and other NASA spacecraft, as well as many other telescopes around the world.

Under the direction of the graduate adviser and the graduate faculty, a coherent program, directed toward the student's goal in graduate study and designed within the framework outlined in the copy that follows, is prepared and submitted to the department. There is a standard core of classical mechanics (PHYS 203), classical electrodynamics (PHYS 220A, PHYS 220B) and quantum mechanics (PHYS 222A, PHYS 222B) which is strongly recommended for students planning to pursue further graduate study - and, at least in part, for all students. Other courses, both from within and from outside the department, can be used to complete the 30 unit master's program. A culminating experience, consisting of either a thesis (PHYS 299) or a project (PHYS 298) plus a competency examination, is required.

Undergraduate education equivalent to a physics major at California State University, Fresno is necessary for admission. Note the other requirements under Graduate Program.

### Physics Graduate Course Requirements (21 - 22 units)

PHYS 203 (4 units), PHYS 220A (4 units), PHYS 222A (4 units), PHYS 290 [minimum 3 units], and PHYS 298 or PHYS 299 [minimum 3 units]; MS students taking the PHYS 299 thesis option must also take PHSY 280 (1 unit). One additional graduate course in physics (3 units)

Upper-division or graduate electives in physics or related fields (8 - 9 units). Students planning further graduate study should include PHYS 220B, and PHYS 222B in these 8 -9 units.

### Total (30 units)

### Graduate Program

The Department of Physics offers graduate instruction and research leading to the Master of Science.

For general information, read the Graduate Studies section in this catalog, and in particular, the sections on Admission to Graduate Standing, Advancement to Candidacy, and Program Requirements. The minimum entrance requirements are a GPA of 2.5 over the last 60 units, satisfactory scores on the GRE General Examination, and good references. Although the GRE scores are not the only, or most important, criteria used in the admission process, we generally look for scores above 150 on the

quantitative portion of the exam or for a total above 300 on the combined quantitative and verbal portions. The GRE General Examination must be taken before applying for admission.

It is important to achieve classified standing quickly, before completion of 10 units. The next step is advancement to candidacy, after completion of at least 9 units of graduate study with a minimum GPA of 3.0 and satisfaction of the graduate writing requirement. To satisfy the writing requirement, students must submit a formal paper demonstrating writing skills at the graduate level. This graduate-level paper may be a research proposal, a literature review in their field, a paper from a graduate-directed research project, or another paper. Detailed writing requirement regulations are available from the department's graduate coordinator. Please contact the graduate coordinator for more information. Advancement also requires a score at or above the 25th percentile on the Advanced Physics GRE Subject Examination, or a score at or above the median in the Major Field Test (MFT) for Physics.

Teaching assistantships are usually available, as is general financial aid. For some forms of financial aid, applications must be completed before the end of February.

For specific questions, consult the chair of the department or the graduate adviser/coordinator.

## **FACULTY**

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

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.

There are eight research/creative activity areas that are part of our current efforts: (1) Computational Physics, (2) High Energy Physics (HEP), (3) Strongly Correlated Electron Physics, (4) Nanotechnology, (5) Astronomy and Astrophysics, (6) Microbeam X-ray Fluorescence (XRF), (7) Theoretical Physics, (8) Physics Outreach.

For faculty phone numbers and e-mail, see the campus directory.

For more on the faculty, see the faculty pages.

The faculty pages are updated by the department or program.