

## What else does the SSU Physics and Astronomy Department have to offer?

The primary focus of our faculty is to provide individualized undergraduate instruction that will help you to achieve your personal career goals. We offer small classes and “hands-on” involvement in the learning process.



*Orion Leland and Professor Severson at SSU working on a solar concentrator.*

We are committed to your success at SSU and after graduation. More than two-thirds of our graduates stay in touch with the department, sending us regular information about how they use their physics training. Approximately 30% of our students have gone on to attend graduate school in physics, astronomy or a related area, and have received Ph. D. or Master's degrees.

Our students have received prestigious national fellowships, have attended many top graduate schools and often participate in summer research programs. We support student research at SSU through privately sponsored assistantships and NASA-funded employment.

Our weekly What Physicists Do public lecture series has brought outstanding scientists and engineers to the campus each week since 1971. Speakers have included thirteen Nobel laureates and other prominent scientists. The lectures cover the latest discoveries in physics and astronomy and present them at an accessible level.

We offer Public Viewing Nights monthly at our Observatory.



*High School Summer Intern Deanna Gelosi at the SSU Observatory.*

For further information about the SSU Department of Physics and Astronomy, see our web page at:

<http://phys-astro.sonoma.edu>

or call the Department office at:

**(707) 664-2119**



# Sonoma State University



## PHYSICS & ASTRONOMY

### What is Physics?

Physics is the most fundamental of all the scientific disciplines. Ranging from the applied to the abstract, from the infinitesimal to the infinite, and from quarks to the cosmos, the study of physics seeks to explain the phenomena of the natural world in terms of a few essential principles and laws.

Physicists seek a unified mathematical description of the four known forces of nature (gravitation, electricity and magnetism, and the weak and strong nuclear forces). This quest for the “Theory of Everything” eluded Einstein, and is continued today.



*Gabi Sanz-Douglass making measurements in the New High Magnetic Field Lab*

Physicists use their knowledge of underlying principles to solve concrete problems. Examples include: understanding and using the properties of semiconductors and other materials; designing and building lasers, photonics and telecommunications devices; nuclear physics and biophysics; and designing and using instrumentation for astrophysics and cosmology. These skills in problem solving make our graduates employable in the technology fields of today and tomorrow.

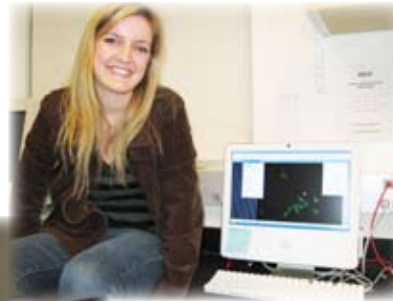
### Programs of Study

At Sonoma State University, we offer both BS and BA degrees in Physics, and minors in both Physics and Astronomy. All programs stress fundamental concepts and techniques, offer an outstandingly rich laboratory experience, intensive use of computers, and require a “capstone” course as a culminating experience. Capstone projects are completed in close collaboration with an advising faculty member and include experimental design, instructional design or undergraduate research - personalized and unique opportunities to demonstrate the skills and knowledge acquired in the major.



*Mark Wiedemann working on a low temperature system in the Keck Microanalysis Laboratory.*

*Right - Katy Wyman investigating semi-regular variable stars.*



*Left - Ken Martinelli runs the Scanning Electron Microscope in the Keck Lab.*

### Facilities

The department is housed within the recently *remodeled Darwin Hall* and has excellent classroom and laboratory resources. Laboratories available for use in intermediate and advanced laboratory courses and in undergraduate research include:

- *High Magnetic Field Laboratory* with a focus on the electronic and magnetic properties of materials. The laboratory hosts a wide range of capabilities from synthesis to characterization and includes a 17 Tesla superconducting magnet system, as well as equipment for manufacturing thin films and microelectromechanical devices.
- *An Applied Nuclear Laboratory* that includes an intrinsic germanium detector, an alpha particle detector, and a liquid scintillation counter.

- *An Adaptive Optics Laboratory* for the study of advanced imaging techniques, including the sensing and correction of optical distortions in real-time. Such systems sharpen images through the use of microelectromechanical deformable mirrors.

Students and faculty within the department routinely use the facilities of the *Cerent Engineering Science Complex* in Salazar Hall:

- *The Keck Microanalysis Laboratory* includes a scanning electron microscope, atomic force microscopes, an automated X-Ray diffractometer and other materials analysis instrumentation.
- *The Photonics Laboratory* features extensive laser instrumentation as well as fiber optics analysis equipment.

A distinguished program in undergraduate astronomy is supported by a teaching observatory on the SSU campus, a NASA-funded research observatory at a darker site in northern Sonoma County and the development of a remote dark site in the *Galbreath Wildlands Preserve* in southern Mendocino county. NASA funds the department’s Education and Public Outreach Group, led by Prof. Lynn Cominsky, which develops classroom activities, trains teachers and creates websites, television and planetarium shows on behalf of several high-energy satellite missions.



*NASA Telescope at Pepperwood Preserve*