

# PHYSICS

**What is Physics?** ( from <http://www.uncwil.edu/stuaff/career/Majors/physics.htm>)

“Physics is the discipline of science dealing with the properties of matter and energy. Includes acoustics, atomic physics, cryogenics, electromagnetism, elementary particle physics, fluid dynamics, geophysics, mathematical physics, mechanics, molecular physics, nuclear physics, optics, plasma physics, quantum physics, solid state physics, statistical mechanics and thermodynamics. It is the branch of science concerned with the study of properties and interactions of space, time, matter and energy.”

**What is this career like?** (from <http://www.bls.gov/oco/ocos052.htm>)

“Physicists design and perform experiments with lasers, particle accelerators, electron microscopes, mass spectrometers, and other equipment. On the basis of their observations and analysis, they attempt to discover and explain laws describing the forces of nature, such as gravity, electromagnetism and nuclear interactions. Experiments also help physicists find ways to apply physical laws and theories to problems in nuclear energy, electronics, optics, materials, communications, aerospace technology and medical instrumentation.

Most physicists work in research and development. Some do basic research to increase scientific knowledge. Others conduct applied research to build upon the discoveries made through basic research and work to develop new devices, products and processes. For example, basic research in solid-state physics led to the development of transistors and, then, integrated circuits used in computers.

Physicists also design research equipment that often has additional unanticipated uses. For example, lasers are used in surgery, microwave devices function in ovens, and measuring instruments can analyze blood or the chemical content of foods.

A small number of physicists work in inspection, testing, quality control and other production-related jobs in industry.

Much physics research is done in small or medium-sized laboratories. However, experiments in plasma, nuclear and high-energy physics, as well as in some other areas of physics, require extremely large, expensive equipment, such as particle accelerators. Physicists in these subfields often work in large teams. Although physics research may require extensive experimentation in laboratories, research physicists still spend much time in offices planning, recording, analyzing, and reporting on research.

Physicists generally specialize in one of many subfields: elementary particle physics, nuclear physics, atomic and molecular physics, condensed matter physics (solid-state physics), optics, acoustics, space physics, plasma physics, or the physics of fluids. Some specialize in a subdivision of one of these subfields. For example, within condensed-matter physics, specialties include superconductivity, crystallography, and semiconductors. However, all physics involves the same fundamental principles, so specialties may overlap, and physicists may switch from one subfield to another. Also, growing numbers of physicists work in interdisciplinary fields, such as biophysics, chemical physics, and geophysics.”

## What are the career opportunities for a physics concentrator?

### Related Career Titles (Some may require education beyond bachelor's degree)

Acoustics Physicist	Geodesist	National Laboratory Research
Aerodynamist	Geophysicist	Nuclear Magnetic Resonance
Aerospace Testing	High-Tech Designer	Nuclear Physicist
Astronomer	Hydrologist	Nuclear Power Plant Mgr.
Astrophysicist	Industrial Hygienist	Medical Devices Designer
Atomic Physicist	Laboratory Technician	Physicist
Biophysicist	Lawyer, Technology Specialty	Physics Researcher
Cardiac Imaging Researcher	Mathematician	Physiognomist
Chemical Physicist	Teacher	Plasma Physicist
Computer Specialist	Medical Physicist	Process Engineer
Computer System Engineer	Medical Products Designer	Radiological Laboratory Director
Engineer	Meteorologist	Research & Development
Fluids Physicist	Molecular Physicist	Technical Salesperson
Research Assistant	Seismologist	Technical Writer
Satellite Data Analyst	Solid Earth Physicist	Test Engineer
Satellite Missions Analyst	Solid State Physicist	Technical Consultant
Science Teacher	Stratigrapher	Air Traffic Controller
Science Writer	Agriculture Scientist	Environmental Health Specialist
Automotive Engineer	Environmental Analyst	Industrial Hygienist
Forensic Scientist	Health Physicist	Optometrist
Occupational Safety Specialist	Oceanographer	Systems Analyst
Quality Control Manager	Scientific Photographer	Television Chief Engineer
Technical Illustrator		Particle Accelerator Operations Analyst

### How do you get ready? (from <http://career.utk.edu/students/majors/pdf/physics.pdf>)

- A bachelor's degree will qualify for positions as research assistants, high-level technicians or computer specialists, as well as non-technical work in publishing or sales.
- An undergraduate degree also provides a solid background for pursuing advanced degrees in other employment areas such as law, business, accounting or medicine.
- Be aware that expertise and experience in a specialty area are usually required for employment opportunities directly related to physics.
- A graduate degree and post-graduate experience will allow for more responsibility and advancement in the field of physics.
- An earned doctorate is required for college or university teaching, advanced research and administrative positions.
- Some companies, such as manufacturers of electrical devices, will train in the specialty of the firm.

- A bachelor’s degree and state teacher certification are required for K-12 teaching opportunities.
- Visit government laboratories or research centers. Talk with a physicist about his/her profession and career path.
- Join relevant professional associations. Attend their meetings and read their publications.
- Acquire excellent oral and written communication skills.
- Gain experience with tools, electronics and machinery.
- Become familiar with the government job application process for positions in federal, state or local government.

**Related Major Skills** (from <http://www.uncwil.edu/stuaff/career/Majors/physics.htm>)

<b>Investigation</b>	<b>Communication</b>	<b>Computational</b>	<b>Technical</b>
Define research problems	Develop & write research proposals	Measure distances/relationships	Design equipment
Develop research models	Review scientific literature	Perform calculations	Identify/classify materials
Establish hypotheses	Summarize research findings	Mathematical modeling	Observe data
Gather/analyze data	Inform, explain, instruct	Maintain records	Establish experimental designs
Evaluate ideas	Prepare technical reports	Utilize math formulas	Use instruments
See relationships among factors	Draw meaningful conclusions		

**What about the future?** (from <http://www.bls.gov/oco>.)

“Employment of physicists and astronomers is expected to grow at 7 percent, about as fast as the average for all occupations during the 2006-16 decade. People with a physics background continue to be in demand in information technology, semiconductor technology and other applied sciences. Those with only a bachelor’s degree in physics or astronomy are usually not qualified for physics or astronomy research jobs, but they may qualify for a wide range of positions related to engineering, mathematics, computer science, environmental science and some non-science fields, such as finance. Those who meet state certification requirements can become high school physics teachers, an occupation in strong demand in many school districts. Some states require new teachers to obtain a master’s degree in education within a certain time. Despite competition for traditional physics and astronomy research jobs, graduates with a physics or astronomy degree at any level will find their knowledge of science and mathematics useful for entry into many other occupations.”

For additional job outlook information, refer to [www.bls.gov/oco](http://www.bls.gov/oco).

## Available at Albright College Career Development Center's Resource Library

- Career Opportunities in Science, by Susan Echaore-McDavid
- Careers for Geniuses and Other Gifted Types, by Jan Goldberg
- Careers for Hard Hats and Other Constructive Types, by Margaret Gisler and Marjorie Eberts
- Careers for Puzzle Solvers and Other Methodical Thinkers, by Jan Goldberg
- Careers for Scientific Types and Others With Inquiring Minds, by Jan Goldberg
- Great Jobs for Engineering Majors, by Geraldine Garner
- Opportunities in Aerospace Careers, by Wallace R. Maples
- Opportunities in Engineering Careers, by Nicholas Basta
- Opportunities in Laser Technology Careers, Jan Bone
- Opportunities in Medical Imaging Careers, by Clifford J. Sherry
- Opportunities in Research and Development, by Jan Goldberg

### Disclaimer

Links to Internet sites are provided for your convenience and do not constitute an endorsement by Albright College or the Career Development Center.

Links found at <http://www.uncwil.edu/stuaff/career/Majors/index.htm>

### Job and Internship Search Links

- Physics Jobs Online <http://physicsweb.org/jobs/>
- TIPTOP Jobs Online <http://tiptop.iop.org/>
- Health Physics Employment Opportunities <http://www.physics.isu.edu/radinf/jobs.htm>
- Jobs in physics, astronomy and other fields  
<http://www.phys-astro.sonoma.edu/advisor/Jobs.html>
- Jobs in Science <http://aaas.sciencecareers.org/js.php>
- Physics and Astronomy Online [www.physlink.com](http://www.physlink.com)
- American Institute of Physics Career Services <http://www.aip.org/careersvc/>
- Association of Science-Technology Centers - job listings  
<http://www.astc.org/profdev/jobs/jobs.htm>
- Jobs in Optics <http://www.optics.org>

### Career Planning Links

- Physicists and Astronomers (Occupational Outlook Handbook)  
<http://stats.bls.gov/oco/ocos052.htm>
- Careers in Biophysics [www.biophysics.org/careers](http://www.biophysics.org/careers)
- Physics Careers [www.cap.ca/careers](http://www.cap.ca/careers)
- Journal of Young Investigators Science Career Center <http://www.jyi.org/SCC/Index.php>
- The Internet Pilot to Physics <http://physicsweb.org>
- Physics Central - brought to you by the American Physical Society  
<http://www.physicscentral.com/>

## Professional Associations

- American Institute of Physics <http://www.aip.org>
- American Astronomical Society <http://www.aas.org>
- National Aeronautics and Space Administration <http://www.nasa.gov>
- American Physical Society <http://www.aps.org/>
- Institute of Physics <http://www.iop.org/>
- The Geophysical Union <http://www.agu.org/>
- American Meteorological Society <http://www.ametsoc.org/AMS/index.html>