



# What can I do with a Major in...

## Physics

### What is Physics at U of L?

The University of Louisville Department of Physics & Astronomy offers Bachelor of Science and Bachelor of Arts degrees through the College of Arts and Sciences. Students may also obtain a Minor in Physics.

The B.A. degree in Physics is designed for substantial pre-professional education for such fields as medicine, patent law, teaching, technical writing, and technical sales. Students preparing for secondary school science teaching may choose electives to fulfill teaching certification requirements and, if desired, to complete a 21-hour teaching minor.

The B.S. Degree is intended as preparation for entry into graduate programs in physics and other scientific or engineering fields. It also provides suitable training for entering the workforce in a technical position.

A Master of Science in Physics is offered through the Graduate School. Access is also provided to the study of Chemical Physics through a Ph.D. in Chemistry from the Department of Chemistry, a Mathematical Physics Ph.D. track with the Department of Mathematics, as well as a joint doctoral program with the University of Kentucky Department of Physics & Astronomy.

### Degrees in Physics at U of L:

Bachelor of Arts (BA) in Physics

Bachelor of Science (BS) in Physics:

- Applied Optics Track
- Astronomy and Astrophysics Track
- Computational Physics Track
- Materials Science Track
- Professional Track

5 year Accelerated BS/MS degree in Physics

Master of Science (MS) in Physics

Ph.D. in Physics, joint with University of Kentucky

### Occupational Overview

Physics is the mathematical and philosophical basis for all natural science and engineering. Therefore, the greater your understanding of physics, the more readily you'll be able to adapt to any scientific problem or situation that arises throughout virtually any career. Moreover, a physics student develops highly sophisticated problem solving skills for a wide variety of problems. He or she gains the ability to analyze and solve concrete problems



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with abstract mathematical knowledge.

As a result, many find that a degree in physics opens the door to a large number of career choices in industry, government, and academia. It is a common misconception that people who study physics can only conduct research or teach physics. It is true that the majors that really love the art of physics tend to want to use their talent in the scientific research community and to teach others about it. However, according to the American Physical Society, about 70 percent of all physics bachelor's either enter the industrial workforce or use their talent to pursue careers in fields like engineering, mathematics, chemistry, business, computer science, medicine, or law. Further, it is not uncommon to see physics graduates enter fields such as philosophy, social work, or even finance. The world is continually changing. Physics equips you with the tools to adapt to a changing world.

### **Employment Requirements [Extensive Job Preparation Needed]**

A bachelor's degree is the minimum formal education required. However, many employers also require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).

### **Employers/Industries and Success Strategies:**

**Astrophysics:** Airports - Colleges and universities - Commercial industry - Government laboratories - Military - National Aeronautics and Space Administration (NASA) - Observatories - Planetariums - Research centers - Space industry

**Suggested Strategy:** Obtain experience through part-time or voluntary position in a planetarium, observatory or science museum. Complete an internship with a research organization or related industry. Participate in research with scholars in the field. Contact the American Astronomical Society for more information.

**Technical:** Atomic and nuclear labs - Engineering firms - Government agencies e.g., Department of Commerce, Department of Defense - Government laboratories - Hospitals - Manufacturing and processing firms - Mining and petroleum companies - Professional and technical journals - Research and development firms - Television and radio stations - Weather bureaus

**Suggested Strategy:** Gain experience through internships or co-ops. Complete applicable certification or licensure through professional organizations. Gain knowledge about the field through informational interviews with professionals. Develop work habits that are systematic, precise, and patient. Develop a strong computer background. Gain experience using scientific instruments and equipment. Pursue a graduate degree in engineering.

**Optical:** Colleges and universities - Federal agencies: NASA, the Department of Energy, the Department of Defense - Government laboratories - Industry e.g., medical scanners, eyeglasses, binoculars, microscopes, lasers, holography, display technologies, x-ray, ultraviolet spectra, fiber optics - Nonprofit research centers

**Suggested Strategy:** Obtain a master's degree for positions in industry. Supplement program with courses in electricity, magnetism, quantum mechanics, and electronics. Get involved in an independent optics project during senior year.

**Nuclear:** Colleges and universities - Government agencies e.g., Department of Defense, De-



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partment of Energy - Government laboratories and research centers - Industry e.g., nuclear weapons, nuclear accelerators, nuclear reactors, nuclear instrumentation, radioisotope products - Military

**Suggested Strategy:** A master's degree is preferred for positions in industry. Develop excellent laboratory skills through your coursework. Acquire a strong mathematics and chemistry background.

### Related Links in the Physics Discipline:

#### Professional Association Links

American Institute of Physics <http://www.aip.org>

American Astronomical Society [www.aas.org](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>

#### Career Planning Links

Physicists and Astronomers (Occupational Outlook Handbook, 1996-97)

<http://stats.bls.gov/oco/ocos052.htm>

Careers with Physics <http://careers.iop.org> ; [www.sckans.edu/~gangwere/careers.html](http://www.sckans.edu/~gangwere/careers.html)

**Careers in Biophysics** [www.biophysics.org/careers](http://www.biophysics.org/careers)

Physics Careers [www.cap.ca/careers](http://www.cap.ca/careers)

Get a Physics Degree and See the World [www.physics.adelaide.edu.au/jobs/jobs.html](http://www.physics.adelaide.edu.au/jobs/jobs.html)

American Institute of Physics Weekly News <http://newton.ex.ac.uk/aip/>

Career Converter <http://6steps.monster.com/step1/careerconverter>

Career Fields <http://career.berkeley.edu/Infolab/CareerFields.stm>

Resources [http://guide.symphlicity.com/resources/profession\\_index\\_a\\_z.php](http://guide.symphlicity.com/resources/profession_index_a_z.php)

<http://www.bw.edu/career/programs/wcidwami>

Journal of Young Investigators Science Career Center <http://www.jyi.org/SCC/Index.php>

<http://www.physics.louisville.edu/sps/SubPages/links.htm>

### Salary/Outlook Info

Median annual earnings of physicists were \$87,450 in May 2004. The middle 50 percent earned between \$66,590 and \$109,420. The lowest 10 percent earned less than \$49,450, and the highest 10 percent earned more than \$132,780. Median annual earnings of astronomers were \$97,320 in May 2004. The middle 50 percent earned between \$66,190 and \$120,350, the lowest 10 percent less than \$43,410, and the highest 10 percent more than \$137,860. According to a 2005 National Association of Colleges and Employers survey, the average annual starting salary offer to physics doctoral degree candidates was \$56,070. The American Institute of Physics reported a median annual salary of \$104,000 in 2004 for its full-time members with Ph.D.'s (excluding those in postdoctoral positions); the median was \$94,000 for those with master's degrees and \$72,000 for bachelor's degree holders. Those working in temporary postdoctoral positions earned significantly less. The average



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annual salary for physicists employed by the Federal Government was \$104,917 in 2005; for astronomy and space scientists, it was \$110,195.



<http://online.onetcenter.org>



<http://www.bls.gov/oco/>