

# Physics

HARTWICK COLLEGE  
Know the Facts.



## The Hartwick Difference

Physics majors at Hartwick enjoy the individual attention of faculty and the opportunity to work as research assistants on faculty research projects. Hartwick's Physics Department stresses the fundamentals but encourages creativity, especially in combining physics with other disciplines to increase students' attractiveness to future employers and graduate schools. An understanding of the language and analytical methods of science and the basic principles of physics offer preparation for life in a future heavily influenced by science and technology. Hartwick offers its physics majors complete access to state-of-the-art labs and the Ernest B. Wright Observatory, located high atop Oyaron Hill on the Hartwick College campus.

## Three-Year Program

Ready to move faster? Get the full Hartwick physics experience in three-quarters the time at three-quarters the cost. Learn more at [www.hartwick.edu/threeyeardegree](http://www.hartwick.edu/threeyeardegree).

## Major Components

Hartwick physics majors acquire not only knowledge of physics but valuable training in analytical thinking and a quantitative approach to problem solving. Course requirements for the major in physics provide students with a broad and flexible background in the discipline and enable them to develop analytical skills necessary to pursue a career in physics or a related field. Students are introduced to the major sub-disciplines within classical and modern physics: optics, relativity, mechanics, electricity and magnetism, thermodynamics, atomic and nuclear physics, quantum mechanics, and electronics. In addition, majors must take courses in general chemistry, calculus, and differential equations.

[www.hartwick.edu/catalog](http://www.hartwick.edu/catalog)

## Course Highlights

For the full online course catalog and requirements, visit [www.hartwick.edu/catalog](http://www.hartwick.edu/catalog).

Beyond the minimum requirements, students can tailor their academic programs to meet their interests and needs. Students considering graduate study in physics, for example, are encouraged to take additional courses in physics and mathematics. Although not required, physics majors are encouraged to take a computer programming course. In addition to advanced courses in an area of interest, majors can pursue a particular area through directed study with a faculty member. Topics of recent directed studies and senior projects include the study of single photo interference, optical pumping, high- $z$  type Ia supernovae for various cosmological models, use of standard rulers to study curvature in cosmology, chaos in a bouncing ball, force analysis on an arch, computer simulation of a catapult, the effectiveness of sunscreen on absorbing ultraviolet radiation, a study of the dynamics of a rolling ball and rolling disk, optic-ray tracing applied to the human eye, and a study of MOND (MODified Newtonian Dynamics), construction of a pulse jet engine, investigation of the Faraday Effect, and an investigation into the Zeeman effect.



SMALL CLASSES



PERSONAL ATTENTION



STUDY ABROAD



NETWORK THROUGH INTERNSHIPS

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# Find your place.

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**HARTWICK  
COLLEGE**

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[www.hartwick.edu/physics](http://www.hartwick.edu/physics)

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For more information, contact  
the Office of Admissions  
at 607-431-4150 or  
888-HARTWICK (888-427-8942).

For specific inquiries, contact  
Larry Nienart, Department Chair,  
at 607-431-4737 or  
nienartl@hartwick.edu.

Students interested in engineering can earn a B.A. degree in physics from Hartwick and an engineering degree from Clarkson University or Columbia University through Hartwick's dual degree program. Under this program, students spend three years at Hartwick and two at an engineering school, graduating with a bachelor's degree from each school. In addition, students may complete four years at Hartwick, earning a bachelor's degree in physics and then spend two years at the engineering school and earn a master of science degree in engineering.

## Beyond the Classroom

Physics students get hands-on experience in the nuclear physics laboratory, the optics laboratory, and the Ernest B. Wright observatory. The nuclear physics laboratory has an Ortec multichannel analyzer. The optics laboratory has a 4'-by-12' vibration isolated optical table and a fiber optics experimenters kit, as well as an Argon laser. The observatory houses a 40 cm (16 inch) Maksutov convertible Cassegrain/Newtonian telescope and two 20 cm Cassegrain telescopes, one with a computerized drive. The observatory also has a CCD camera to take digital pictures, which can be digitally processed and enhanced, and several 35 mm cameras. In addition, there is a fine photometer for measuring light intensity of variable intensity astronomical objects. A full range of eyepieces, filters, cameras, film, adapters, charts, logbooks, lounge chairs, and tools used at the observatory is kept in the classroom building next to the dome.

The Hartwick campus is completely wired for Internet access in classrooms, laboratories, and residence halls. In addition, there are computers in the physics labs with software for conducting simulations in electronics and research in quantum mechanics and thermodynamics.

Students are encouraged to engage in research and work on projects with faculty members during the academic year and during the summer at Hartwick and other institutions. For example, students have built a carbon dioxide laser and an electromagnetic "can crusher" in the lab and are building a ruby crystal laser. Physics students also have participated in summer research internships at the University of Massachusetts at Lowell, State University of New York at Stony Brook, University of Connecticut, Michigan State, Georgetown University, California State at Los Angeles, Ithaca College, and the Los Alamos National Laboratory.

## Putting Physics to Work

Physics majors have gone on to pursue graduate degrees at the Rochester Institute of Technology, University of Texas-Austin, Drexel University, Rensselaer Polytechnic Institute, the University of Arizona, and State University of New York at Stony Brook. They are employed as teachers at the secondary and post-secondary level and have careers in computers, fiber optic component testing, and photonic device research. Some of the companies that employ Hartwick graduates are Corning Glass, Raytheon, Lucent Technologies and Jet Propulsion Laboratory (JPL), the NSA, and GE.

Future career options are much wider if one majors in physics: the problem-solving skills acquired in physics can be broadly applied to many areas. Out of the past 26 physics majors and minors, seven have acquired master's degrees and four have acquired Ph.D.s. Some are active in graduate studies.

## Faculty

**Robert Gann**, Professor; M.S., Rensselaer Polytechnic Institute; M.A., Ph.D., Cornell University. Areas of focus: computational physics, phase transitions, computer simulations

**Lawrence Nienart**, Professor; Ph.D., State University of New York at Buffalo. Areas of focus: general relativity, mathematical physics, radio astronomy, cosmology

**Parker Troischt**, Assistant Professor; M.S., Michigan State University; Ph.D., University of North Carolina at Chapel Hill. Areas of focus: MHD wave coupling, general relativity, cosmology, extragalactic HI surveys, and variable stars