

DEPARTMENT OF PHYSICS

Physics is the study of the behavior of matter, space, time, and fields. Using highly sophisticated experimental and mathematical techniques, physicists gather detailed measurements of phenomena—from the largest scales involving the entire universe to the smallest scales involving the most fundamental particles—to construct theories that explain how the universe and the things in it behave.



Education

The Department of Physics educates students at all levels from general education, through preparation for teaching and scientific careers, to doctoral and post-doctoral education. The department encourages the involvement of undergraduates in research; currently more than 180 undergraduates participate in research within the department.

Research

Subjects of current concern to physicists range from the behavior of the universe at the earliest times and farthest distance, to the collective behavior of large numbers of particles, to the behavior of nuclei and their constituents, to the fundamental nature of space, time, particles, and fields at the smallest distances.

Current work includes studying basic symmetries in atoms, quantum information, understanding the structure of nuclei and elementary particles, calculating the properties of matter from first principles, measuring the properties of carbon nanotubes, studying the collisions of high energy particles at accelerators such as FermiLab and the Relativistic Heavy Ion Collider, and many other areas. Research highlights include:

- Members of the Nuclear Experiment and Particle Astrophysics groups participated in work which established that neutrinos have mass, and resolved the long-standing problem of why the number of neutrinos coming from the sun seemed to be so low.
- Researchers are conducting experiments that are placing tight constraints on the nature of the gravitational force using sophisticated torsion balances, which establish the accuracy of general relativity down to a distance of 100 microns.

STUDENTS (Autumn 2017)

406	Undergraduate majors
44	Master's students
143	PhD students

DEGREES AWARDED (2016-2017)

142	Bachelor of Science degrees
12	Master of Science degrees
25	PhD degrees

RECENT STUDENT AWARDS (since 2014)

9	Clean Energy Awards
6	NSF Fellowships
6	ARCS Awards
2	Graduate Thesis Awards
1	GoMap Award
1	Husky 100 Award



Faculty

The Department of Physics has 56 faculty. 49 of the faculty are research active and 7 anchor the instructional programs of the department. The Department is home to 34 research associates. Faculty and emeritus faculty honors include:

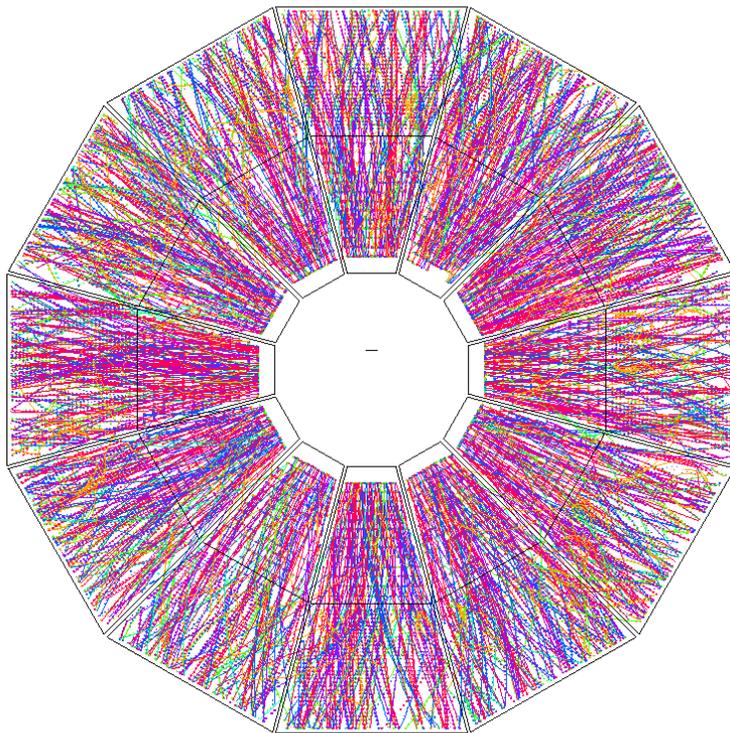
- 2 Nobel Laureates*
- 8 Members of the National Academy of Sciences
- 8 Fellows of the American Academy of Arts and Sciences
- 1 Wolf Prize recipient

* includes Nobel Prize recipient Hans Dehmelt, who died in 2017

Outreach

The Physics Education Group has been involved for 30 years in programs to help pre-service and in-service physics teachers understand physics and how to help students deal with the concepts. Programs are offered during the academic year and the summer.

The Washington Large Area Telescope Array, which is supported by the U.S. Department of Energy, engages science teachers and students in local high schools by having the students build and install cosmic ray detectors on the roofs of their schools. The students study the more common events while the rare, high-energy events are forwarded to the Department of Physics for further study.



At left: Physics faculty are involved with measurements of high energy collisions of heavy nuclei at Brookhaven. This image displays the products of a single collision.

FACULTY

- 30 Professors
- 5 Associate Professors
- 7 Assistant Professors
- 2 Research Professors
- 2 Research Associate Professors
- 3 Research Assistant Professors
- 1 Principal Lecturer
- 1 Senior Lecturer
- 5 Lecturers

AREAS OF RESEARCH

- Astrophysics and Gravitational Physics
- Astrophysics, Axions, and Dark Matter
- Atomic Physics
- Biophysics
- Condensed Matter Experiment
- Condensed Matter Theory
- Elementary Particle Experiment
- Elementary Particle Theory
- Nuclear Experiment
- Nuclear Theory
- Particle Astrophysics
- Particle Theory
- Physics Education
- Quantum Computing

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