



# PHYSICS

Faculty and students contributing to research discoveries, from revolutionary to fundamental

Physics is at the heart of both the technological revolution and science education. From lasers to computers, from engineering to modern cancer therapy, from the information superhighway to the imaging devices so critical to modern medicine, physics plays an ever-increasing role in all of our lives.

In 1888, the West Physics Building was erected on Michigan's campus, the first of its type in the nation. Today in a new, state-of-the-art laboratory, Michigan leads the nation in physics education and research. Over the past decade, physics has undergone spectacular development, with major discoveries across its various sub-fields. Some of these discoveries have enabled technological progress, propelling the revolution in telecommunications and inspiring entirely new industries in medical diagnostics. Other discoveries are more fundamental, offering deeper insights into the workings of nature and opening new physical vistas for exploration and application.

Physics is an integral scientific component of the liberal arts environment. Our mission is to enhance the goals and ideals of the university by making lasting contributions at the forefront of human understanding and by communicating the excitement of scientific discovery to our fellow citizens. Physics is one of the broadest and most active fields of science. Its goal is to understand the behavior of matter and energy on every level, from the origins of the universe in the Big Bang to the interior of atoms in your computer screen. Great mysteries remain and fundamental physics research continues at a furious pace.

Some of the questions now being pursued by physicists at the University of Michigan include: Can practical quantum computers be built? How would they outperform today's digital computers? What is causing the expansion of the universe to accelerate, and will it continue to do so forever? How does the mechanical stretchiness of proteins like DNA affect their biological function? In all these areas of research and more, faculty members are assisted by undergraduate students who, in addition to learning about physics in class, are doing physics in the lab.

An undergraduate degree in physics gives students a rich understanding of how the world works and prepares them for continued study in graduate or professional school, or for careers in industry, medicine, business, public service, private consulting, and teaching.

Currently ranked 13th in the nation, Michigan Physics seeks to become the country's premier department of physics. In order to achieve this goal, we must establish a secure base of funding that allows us to excel in the areas of physics we practice, to provide an incisive and enriching education for our students by recruiting the best faculty and students to our programs, and to ensure a nurturing environment for the professional advancement of our faculty and staff.

## TEACHING INITIATIVE FOR SCIENCE EDUCATION

Research has shown that this is a critical time in the 20-year development of physics instruction. The old teaching model is simply not effective in enabling students to reach desired learning goals. The Department of Physics is leading the way in using new active learning techniques to improve physics education for all levels of students. Your gift of \$10,000 to \$50,000 annually will enable future physics teachers to gain experience as classroom learning assistants as they lead active learning groups and provide mentorship to undergraduate students. In addition, the prospective teachers will have a chance to develop the presentation and instructional skills that will benefit them in any career path they choose. Providing well-trained physics teachers is a national priority, and the Teaching Initiative for Science Education program will help achieve this important goal.

## DEPARTMENT STRATEGIC FUND

Expendable, undesignated gifts of \$10,000 to \$50,000 annually are extraordinarily important to the continuing success and growth of the department. Contributions to the strategic fund make it possible to meet unexpected needs and challenges such as:

- Seed funding for new faculty research
- Curriculum development
- Purchase or repair of major instruments for the research and teaching labs (\$50,000 per year)
- Summer research opportunities for undergraduates
- Conferences highlighting the department's scholarship (\$25,000 per conference)
- Student activities and clubs



**“Learning how Physics developed historically has been one of my favorite parts of my time at Michigan. In particular, knowing the story of that development has helped me to contextualize the work that I do in research, and knowing that I can be a small piece of the continuation of that development is a source of motivation for my continued work.”**

*–Evan C., LSA undergraduate student*



## INTERNATIONAL RESEARCH SCHOLARSHIPS

Gifts to support summer fellowships will enable undergraduate students to perform research at premier institutions around the world. Research opportunities for a 10-week summer research assistantship exist in locations such as China, Chile, Japan, and the European Laboratory for Particle Physics (CERN). These fellowships will allow students to spend a summer performing cutting-edge research as well as participating in cultural exchange. An endowed contribution of \$100,000 will provide \$5,000 of funding per student.

## UNDERGRADUATE SCHOLARSHIPS

Scholarships are essential to recruit the very best students to the department. Funding for tuition support for both in-state and non-resident students is especially critical to ensure excellence and a diverse community of students regardless of their financial ability. Although an endowment of \$200,000 ensures a scholarship in perpetuity, an annual gift of \$10,000 to cover tuition or living costs on a yearly basis is also of great value.

## SATURDAY MORNING PHYSICS

Each Saturday, this popular program draws over 300 adults and children from around southeast Michigan to learn about the mysteries and wonders of physics. U-M professors from several departments present topics ranging from black holes to astrophysics, from MRI technology to human genetics. Multimedia demonstrations, hands-on experiments, and audience participation make the mornings a lively give-and-take between professor and audience. An endowment of \$1M would allow programming for the academic year to continue in perpetuity. It costs \$25,000 to produce one semester of programming, which includes professional videotaping of the sessions for distribution on public television.



## POST-DOCTORAL FELLOWSHIP

Proceeds from these endowments of \$1.5M would provide a full stipend and tuition for a physics graduate student or a stipend and research start-up assistance to support a post-doctoral fellow. Because graduate students are recruited according to the department's broad research strengths, these endowments will enable the department to recruit talented young scientists to pursue research work in specific, targeted areas of physics. Endowments will provide flexibility for the student and strengthen the department's ability to recruit and retain top-notch scientists.

## WAYS TO FUND YOUR GIFT

Your gifts of cash, pledges, or appreciated securities change lives. Wills, estate, and planned gifts allow you to create a lasting legacy that will enable the best and brightest minds to experience a liberal arts education, solve problems in a changing world, and yield ideas and innovations that will make a difference in Michigan and around the globe.

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